



## BURCHILL WIND PROJECT ADDENDUM

### Updated Watercourse, Wetland, and Archaeological Surveys

September 25<sup>th</sup> 2020

natural forces

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APPENDIX B: UPDATED ARCHEOLOGICAL REPORT

## 1 Introduction

On Feb 18, 2020, an Environmental Impact Assessment (EIA) for the Burchill Wind Project (BWP or Project) was registered by the province. The EIA for the Project was submitted by Natural Forces Development Limited Partnership.

The Project proposed a 5-10 turbine wind farm within the boundaries of the City of Saint John that would produce between 20-42 MW of wind energy. Since the submission of the EIA, Natural Forces has confirmed that the Project Size will be set at 42MW therefore requiring 10 turbines. This addendum addresses the updated wetland, watercourse, vegetation and archaeological surveys that have been conducted since the original EIA submission. The Proponent will adhere to the mitigation measures for potential impacts described in section 5 of the original EIA submission. Below, a short overview of wetland, watercourse, rare plant and archeological surveys are provided. Detailed reports are provided in Appendices A and B.

This addendum is submitted by Natural Forces Development Limited Partnership. It is meant to be read in conjunction with the BWP registration EIA document, and the associated addendums submitted on April 15<sup>th</sup> and September 2<sup>nd</sup>, 2020.

## 2 Watercourse Surveys

### 2.1 Field assessment summary

Depth to bedrock across the Project lands is typically only a few centimetres below the surface and the soils atop the bedrock are poorly drained clays. As a result, many watercourses are present on the lands. Watercourses were delineated in the field between 19 August 2019 and 15 October 2019 and between 31 July 2020 and 10 September 2020.

Three additional watercourses were identified in the 2020 surveys. Overall, 77 watercourses were identified and delineated within the survey area (Figure 2.1). Most of the watercourses delineated are ephemeral and likely do not support fish and / or fish habitat. Other than Burchill's Brook (BB), Frenchman's Creek (FC), Mill Creek (MC), and Marsh Brook (MB), the only watercourse delineated in the field where fish were observed was Maguires Cove Brook (MCB). Several brook trout (*Salvelinus fontinalis*) were observed in pools below the outlet from the wetland connected to MCB.



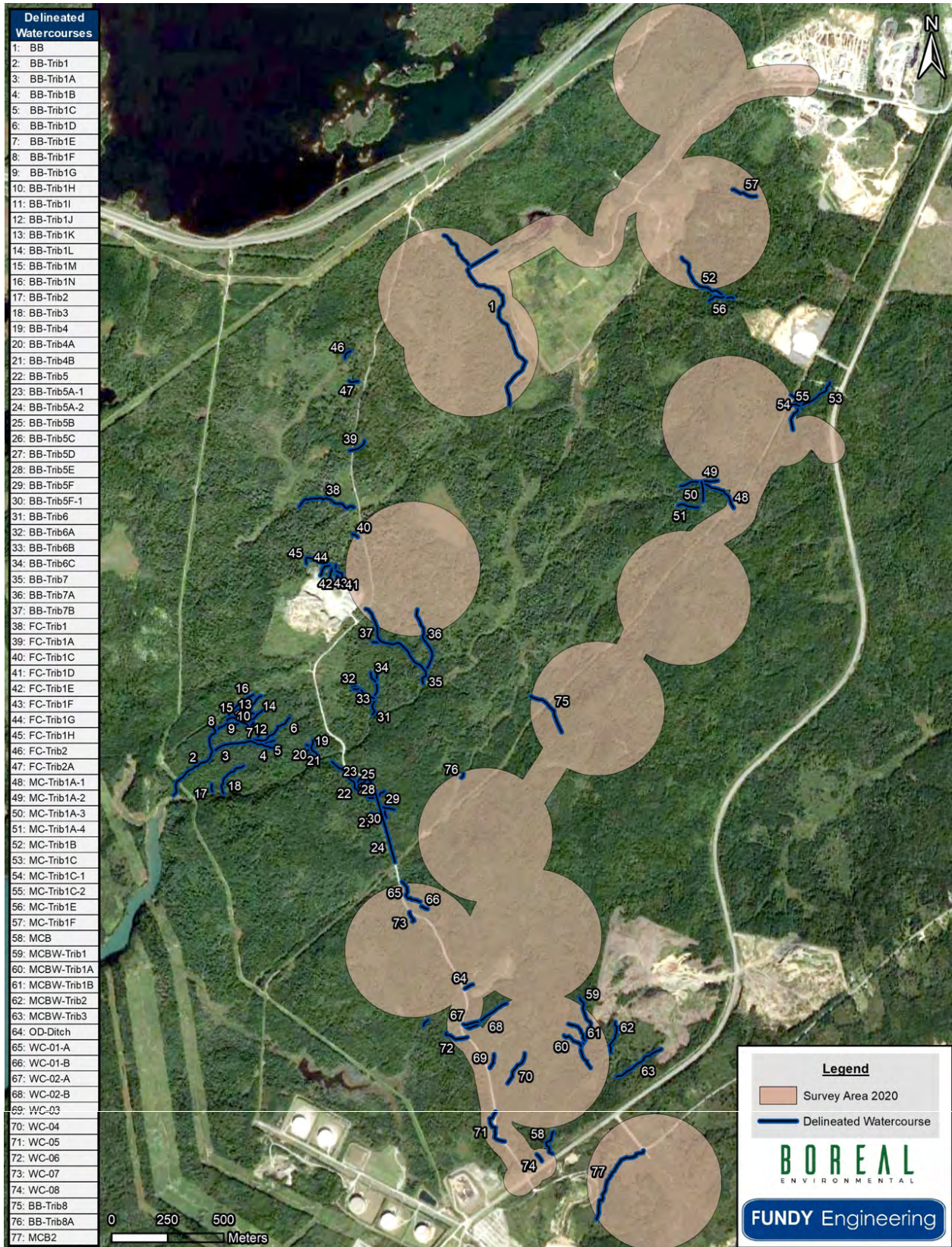


Figure 2-1. Watercourses delineated in the field within the survey area on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

### 3 Rare Plant Surveys

#### 3.1 Field assessment summary

A vegetation survey was conducted across the Project site between 10 June 2019 and 15 October 2019 and between 31 July 2020 and 10 September 2020 to determine the presence and locations of any rare plant species and rare vegetation communities. All told, 297 plant species were identified on the property. According to ACCDC databases, five of those species are considered rare:

- purple false foxglove (*Agalinis purpurea*);
- coastal sedge (*Carex exilis*);
- Wiegand's sedge (*Carex wiegandii*);
- Loesel's twayblade (*Liparis loeselii*); and
- cloudberry (*Rubus chamaemorus*).

The only species considered as May Be At Risk is purple false foxglove. Locally, it appears to be flourishing in disturbed areas across the property, such as along the pipeline right-of-way, all-terrain vehicle trails, and the sides of Burchill Road. The other four species are considered secure. The location and population density of these species are shown in Figure 3.1.



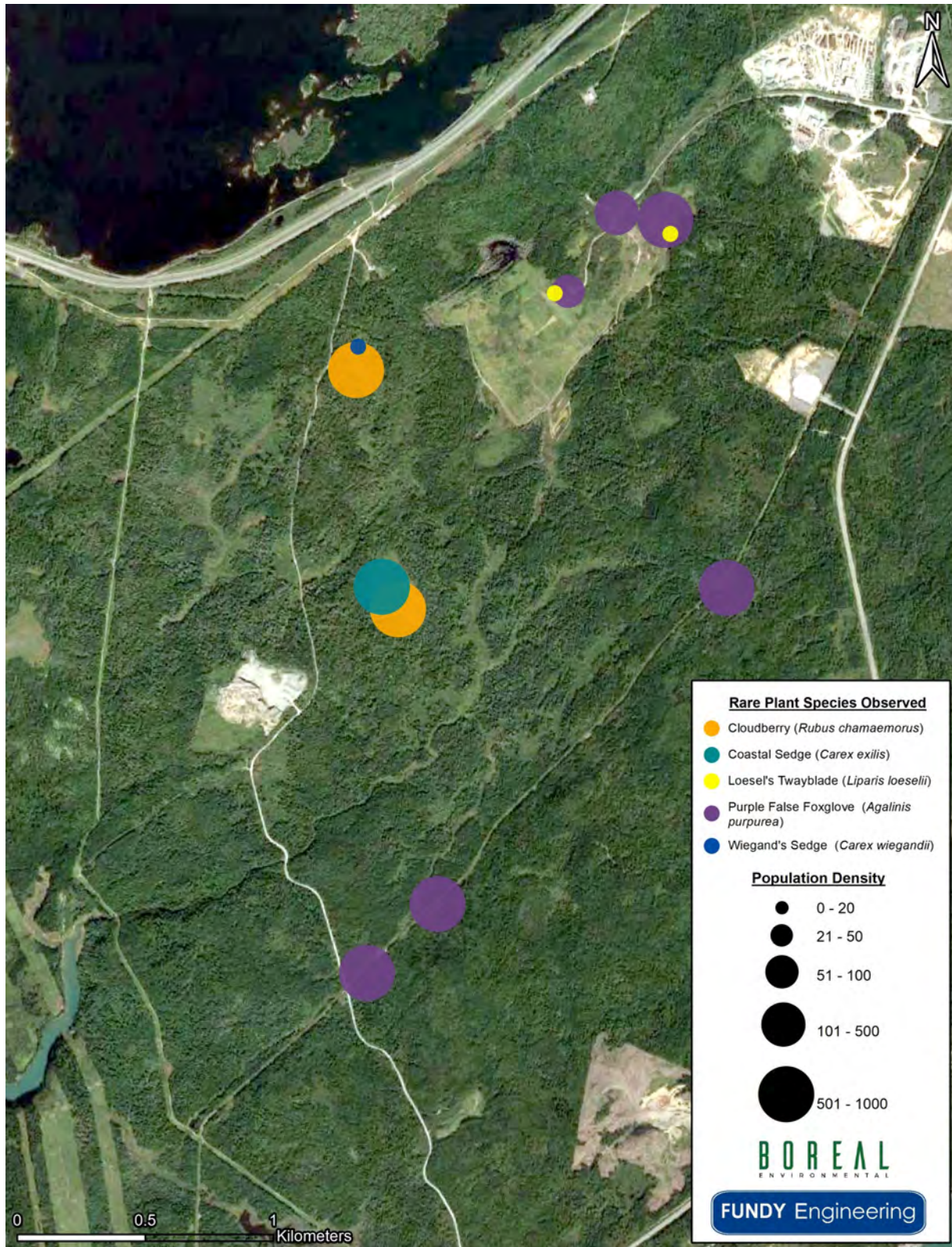


Figure 3-1. Location and population density of rare plants observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



## 4 Wetland Surveys

### 4.1 Field assessment summary

Wetlands were delineated in the field between 19 August 2019 and 15 October 2019 and between 31 July 2020 and 10 September 2020. These wetlands are shown in Figure 4.1.

#### 4.1.1 Small wetlands

For this Project, wetlands < 0.5 ha in size are considered small wetlands. Detailed paired point analyses (i.e., upland versus wetland) and WFAs were not completed for small wetlands. Instead, information gathered from the large nearby wetlands (i.e., ≥ 0.5 ha) were used for delineating the wetland boundaries.

A total of 39 small wetlands with a total area of 6.01 ha were delineated within the study area. Overall, there is a fairly even mix of small tall shrub swamps and coniferous swamps located within the study area.

#### 4.1.2 Large wetlands

38 large (i.e., ≥ 0.5 ha in size) and / or distinctive wetlands (i.e., those < 0.5 ha in size, but displayed some noteworthy feature in the field, such as being the source of a perennial tributary, being located in a highly disturbed area, etc., with a combined area of 108.5 ha) were delineated on the Project lands. Wetland functional assessments were completed for the 36 wetlands within the study area.

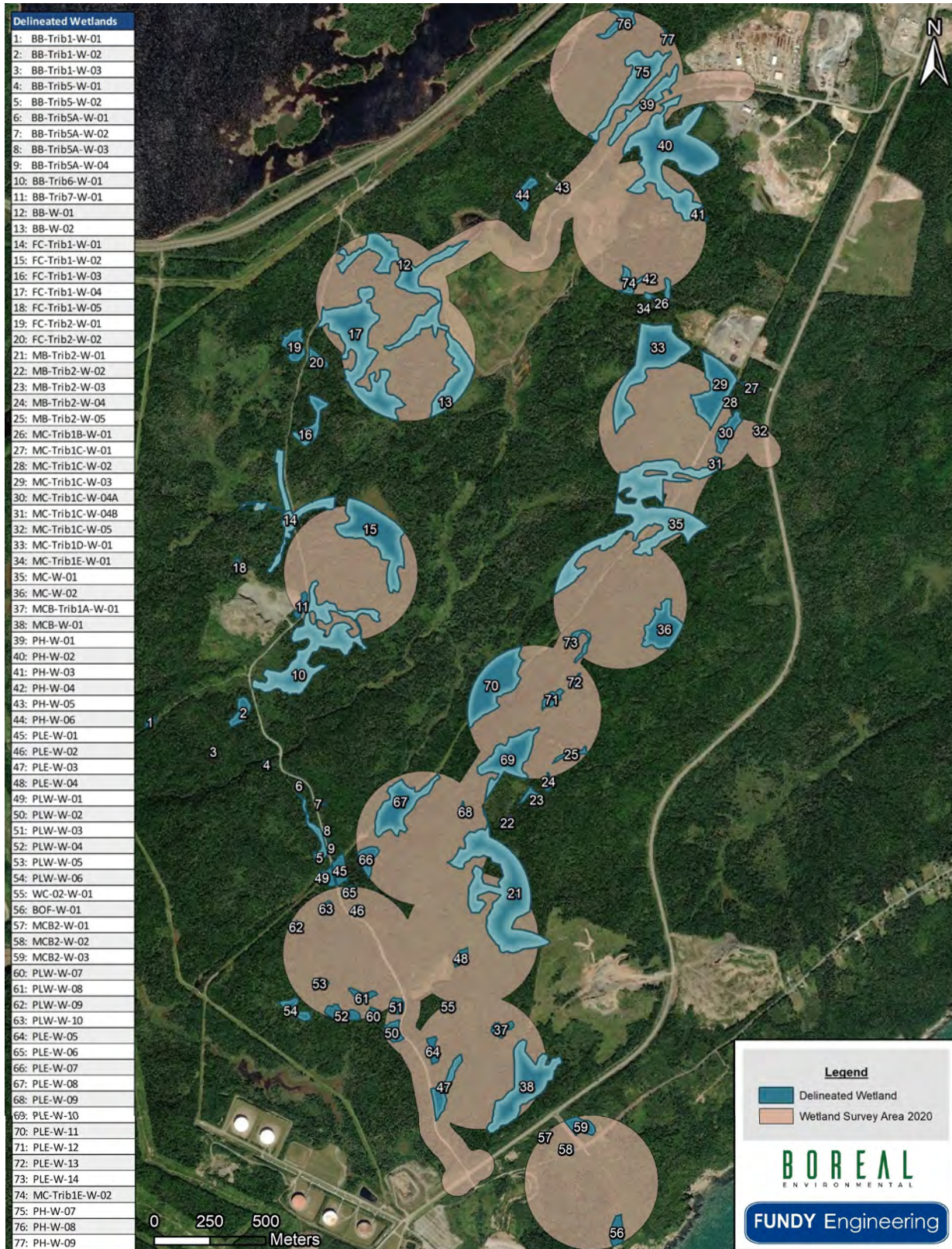


Figure 4-1. Wetlands delineated in the field within the survey area on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

## 5 Archaeological Surveys

### 5.1 Pedestrian survey summary

On August 10<sup>th</sup> & 11<sup>th</sup>, 2020, an archaeological pedestrian survey took place at a proposed wind farm west of Lorneville, NB. Due to their proximity to the former marine shoreline, Turbines 2e, 5e, 6e, 7e, 8e, 9e, 11e, 12e & 13e should be considered as holding high potential for the presence of early postglacial archaeology. Therefore, anywhere ground disturbing activities (such as removing tree stumps, using heavy equipment, etc.) will occur, archeological test pits will be excavated on a 5m grid following NB Archeological Service Unit's *Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick* (2012), and efforts will be made to minimize the amount of ground disturbing activity.

## 6 Conclusion

This addendum is meant to be read in conjunction with the registered BWP EIA and previous documents submitted as part of the EIA.



## **Appendix A**

### Updated Wetland and Watercourse Report

## BURCHILL WIND PROJECT

WATERCOURSE AND WETLAND ASSESSMENTS (REVISED)

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**FUNDY** Engineering

*Serving Our Clients' Needs First*

21 September 2020



Project No: 13972

OFFICES IN SAINT JOHN AND CLYDE RIVER



<b>JOB FILE:</b>		13972	
<b>PROJECT TITLE:</b>		Burchill Wind Project	
<b>VERSION</b>	<b>ISSUANCE DATE</b>	<b>PREPARED BY</b>	<b>REVIEWED BY</b>
0.9 (DRAFT)	22 November 2019	MDA	CC, DM
1.0 (FINAL)	29 November 2019	MDA	CC
1.1 (REVISION)	21 September 2020	MDA	CC

<div style="text-align: center;">  <p><b>FUNDY Engineering</b></p> <p><i>Serving Our Clients' Needs First</i></p> </div> <p><i>This report was prepared for the sole use of the Client. The material and observations presented reflects Fundy Engineering &amp; Consulting Ltd.'s opinion and best judgment based on the information available. Fundy Engineering &amp; Consulting Ltd. accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon the material, observations, and / or opinions by any third-party or for any damages suffered by any third-party resulting from the use of this report.</i></p>	<p style="text-align: center;"><b>PROFESSIONAL SEAL:</b></p> <div style="text-align: center;">  </div>
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The Watercourse and Wetland Assessment report completed for the Burchill Wind Project was done in partnership with Boreal Environmental. Boreal Environmental conducted the bulk of the field assessments while Fundy Engineering did the majority of the desktop analyses and report writing.



## EXECUTIVE SUMMARY

Fundy Engineering & Consulting Ltd. and Boreal Environmental were contracted by Natural Forces to complete watercourse and wetland assessments for the Burchill Wind Project being proposed for west Saint John, New Brunswick. Between 5 and 10 wind turbines are expected to be constructed on the 1 658 ha parcel of Crown land adjacent to the Spruce Lake Industrial Park yielding between 20 MW and 40 MW of electricity to be connected to Saint John Energy's electrical grid.

The scope of work was to: visit the survey area to identify the presence of watercourses, rare plants, and wetlands; ground-truth, or aerially interpret with spot ground-truthing, the flowpaths of watercourses within the survey area; ground-truth, or aerially interpret with spot ground-truthing, the boundaries of wetlands within the survey area; complete wetland functional assessments for wetlands  $\geq 0.5$  ha; and identify the location and abundance of rare plants within the survey area. The work was completed between 19 August 2019 and 15 October 2019 and between 31 July 2020 and 10 September 2020. within a survey area  $\sim 390$  ha in size.

In addition to wetlands, five general types of habitat were observed across the property. All told, 297 plant species were identified on the property. Five rare plants were identified: purple false foxglove (*Agalinis purpurea*); coastal sedge (*Carex exilis*); Wiegand's sedge (*Carex wiegandii*); Loesel's twayblade (*Liparis loeselii*); and cloudberry (*Rubus chamaemorus*). The only species considered as May Be At Risk is purple false foxglove. Locally, it appears to be flourishing in disturbed areas across the property, such as along the pipeline right-of-way, all-terrain vehicle trails, and the sides of Burchill Road. The other four species are considered secure.

Four second order watercourses, Burchill's Brook, Frenchman's Creek, Mill Creek, and Marsh Brook, extend on to the property. Overall, 77 watercourses were identified and delineated on the Project lands. Most of the watercourses are ephemeral and likely do not support fish and / or fish habitat. The watercourses either drain to the Musquash River or the Bay of Fundy.

A total of 39 small wetlands (*i.e.*,  $< 0.5$  ha in size) with a total area of 6.01 ha were delineated on the Project lands. Overall, 38 large (*i.e.*,  $\geq 0.5$  ha in size) and / or distinctive wetlands (*i.e.*, those  $< 0.5$  ha in size, but displayed some noteworthy feature in the field, such as being the source of a perennial tributary, being located in a highly disturbed area, *etc.*, with a combined area of 108.5 ha were delineated on the Project lands. Wetland functional assessments were completed for 36 wetlands and results showed 17 ranked as having a higher wetland condition and seven ranked as having a higher wetland risk.

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## ACRONYMS

ACCDC:	Atlantic Canada Conservation Data Centre
<i>B.Sc.F.</i> :	Bachelor of Science in Forestry
BB:	Burchill's Brook
cm:	centimeter
DFO:	Department of Fisheries and Oceans
<i>e.g.</i> :	( <i>exempli gratia</i> ) for example

<i>EP:</i>	Environmental Professional
<i>etc.:</i>	( <i>et cetera</i> ) and so forth
FC:	Frenchman's Creek
GPS:	Global Positioning System
ha:	hectare
HADD:	Harmful Alteration, Disruption, or Destruction (of fish or fish habitat)
<i>i.e.:</i>	( <i>id est</i> ) namely / that is
ID:	IDentification
LIDAR:	Llght Detecting And Ranging
Ltd.:	Limited
m:	meters
MC:	Mill Creek
MCB:	Maguires Cove Brook
MCBW:	Maguires Cove Brook Wetland
mm:	millimeter
MW:	MegaWatts
N:	North
NBDELG:	New Brunswick Department of Environment and Local Government
NBDNRED:	New Brunswick Department of Natural Resources and Energy Development
OD:	Old Dump
<i>P.Geo.:</i>	Professional Geoscientist
<i>P.Tech.:</i>	Professional Technologist
<i>Ph.D.:</i>	Doctorate of Philosophy
PH:	Paddys Hill
PID:	Property IDentifier
PLE:	PipeLine East
PLW:	PipeLine West
<i>PMP:</i>	Project Management Professional
<i>RPF:</i>	Registered Professional Forester
<i>sp.:</i>	<i>species unknown</i>
Trib:	Tributary
USACE:	United States Army Corps of Engineers
USDA-NRCS:	United States Department of Agriculture – Natural Resources Conservation Service



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W:	West or Wetland depending on the context
WAWA:	Watercourse And Wetland Alteration
WC:	WaterCourse
WESP-AC:	Wetland Ecosystems Services Protocol for Atlantic Canada
WFA:	Wetland Functional Assessment
°:	degrees
':	minutes
":	seconds
%:	percent
®:	registered
>:	greater than
≥:	greater than or equal to
<:	less than
≤:	less than or equal to
~:	approximately
±:	plus or minus

## 1.0 INTRODUCTION

Fundy Engineering & Consulting Ltd. (Fundy Engineering) was contracted by Natural Forces (*i.e.*, the Client) to complete watercourse and wetland assessments (*i.e.*, the Work) for the Burchill Wind Project being proposed for west Saint John (*i.e.*, Saint John County and the City of Saint John Parish), New Brunswick. Fundy Engineering subcontracted Boreal Environmental (Boreal) to assist with the Work. The property subject of the Work is identified in the New Brunswick Geomatics Information Centre database as Property IDentification (PID) number 00412189 (Figure 1). This report describes the results of the Work completed by Fundy Engineering and Boreal.

### 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* [S.N.B. 1989, c. C-6.1]. 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 and Local Government (NBDELG) Watercourse and Wetlands Alteration (WAWA) Program through a WAWA permit. Any project that has the potential to impact a wetland  $\geq 2$  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* [R.S.N.B. 1973, c. C-6]. New Brunswick's fish-bearing wetlands and watercourses are also afforded protection under Section 35(2) of the *Fisheries Act* [R.S.C., 1985, c. F-14] 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 is 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  $\geq 1$  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 NBDELG. A Wetland Functional Assessment (WFA) may also be required to determine wetland functions, values, and benefits and assess the required compensation ratio.



Figure 1. Aerial photograph showing the location of PID 00412189 in west Saint John, New Brunswick being considered for the Burchill Wind Project.

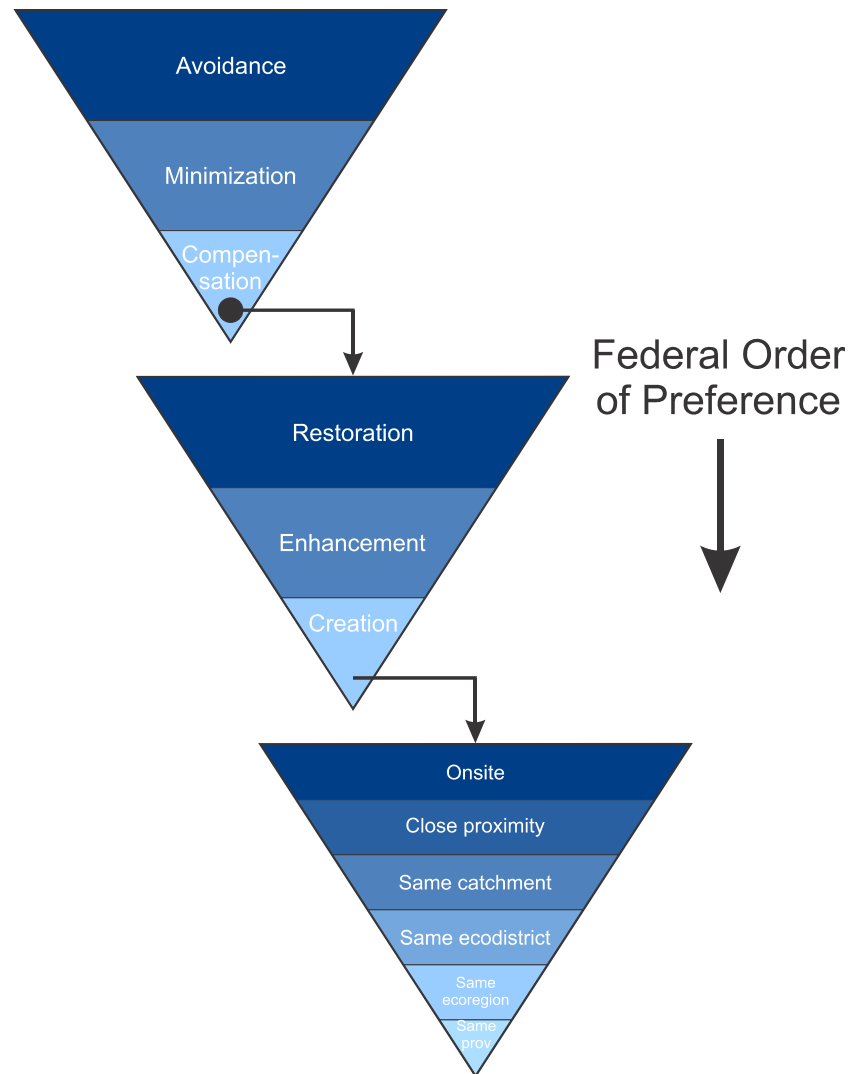


Figure 2. Federal and Provincial Government's preference hierarchy. Based on reports by *Bond et al.* [1992], *Environment Canada* [1996], *Milko* [1998], *Cox and Grose* [2000], and the *Interagency Workshop on Wetland Restoration* [Undated].

### 1.1.1 Definitions

As defined under the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1], a watercourse:

*means the full width and length, including the bed, banks, sides and shoreline, or any part, of a river, creek, stream, spring, brook, lake, pond, reservoir, canal, ditch or other natural or artificial channel open to the atmosphere, the primary function of which is the conveyance or containment of water whether the flow be continuous or not.*

The NBDELG considers watercourses to include any incised channel  $\geq 0.5$  m wide that displays a rock or soil bed.



As defined under the New Brunswick *Clean Environment Act* [R.S.N.B. 1973, c. C-6], a wetland:

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

## 1.2 SCOPE OF WORK

The Burchill Wind Project is being proposed for a portion of the 1 658 ha parcel of Crown land adjacent to the Spruce Lake Industrial Park (*i.e.*, PID 00412189; Figure 1). It is expected that 5 to 10 turbines (Figure 3) with a total installed generating capacity between 20 MegaWatts (MW) and 42 MW will be erected at the site and subsequently be connected to Saint John Energy's electrical grid. As per the Environmental Impact Assessment Regulation [87-83] of the New Brunswick *Clean Environment Act* [R.S.N.B. 1973, c. C-6], any wind farm project exceeding 3 MW of installed capacity must undergo EIA review. Part of the assessment of potential environmental impacts of the Burchill Wind Project includes the assessment of watercourses and wetlands.

The scope of work was to:

- visit the survey area to identify the presence of watercourses, rare plants, and wetlands;
- ground-truth, or aerially interpret with spot ground-truthing, the flowpaths of watercourses within the survey area;
- ground-truth, or aerially interpret with spot ground-truthing, the boundaries of wetlands within the survey area;
- complete wetland functional assessments for wetlands  $\geq 0.5$  ha;
- identify the location and abundance of rare plants within the survey area; and
- generate a report, complete with maps, describing the results of the watercourse delineations, rare plant survey, wetland delineations, and wetland functional assessments.





Figure 3. Aerial photograph showing up to ten turbines on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project. NOTE: the location of the turbines shown is tentative and subject to change based on wind data analysis and field conditions.

## 2.0 METHODOLOGY

### 2.1 WATERCOURSE DELINEATIONS

#### 2.1.1 Desk-Top Assessment

A desk-top assessment of watercourses that may be present at the site is completed by reviewing GeoNB's online maps. The GeoNB database includes watercourses that appear on 1:10 000 scale maps. The watercourses included are those that are on file with the NBDELG and the New Brunswick Department of Natural Resources and Energy Development (NBDNRED). Topographic and Light Detection And Ranging (LIDAR) maps are also reviewed to determine where potential watercourses may be present on the site.

#### 2.1.2 Field Assessment

Watercourses are delineated in the field by first walking the perimeter of the subject area. Potential watercourses are flagged at that time. Later, the potential watercourses are followed into the subject area to confirm their identification and determine their extent. Generally, location measurements (*i.e.*, latitude and longitude) are made every 5 m to 10 m along the flowpath. Assessment of watercourses includes collecting the following information:

- average width;
- average depth;
- substrate materials;
- flow conditions (*i.e.*, ephemeral or perennial);
- streamside vegetation; and
- fish presence.

### 2.2 RARE PLANT SURVEY

The Atlantic Canada Conservation Data Centre (ACCDC) maintains a comprehensive list of plant and animal species for New Brunswick. That list includes a conservation status rank and legal status. The conservation status rank is assessed by the ACCDC in collaboration with other experts.

A rare plant survey is done to determine the presence and locations of any rare plant species and rare vegetation communities. Random meander searches are typically conducted throughout a growing season because the best time to identify specific plants varies (*e.g.*, budding stage, flowering stage, moisture conditions, maturity, *etc.*). During the searches, a complete list of vegetation in the area is compiled.

The conservation ranks for species identified in the field are obtained from the ACCDC database. Those ranks are then used to assess the rarity of the species observed. The locations of any rare plants observed in the field are recorded along with their approximate density.

## 2.3 WETLAND DELINEATIONS

### 2.3.1 Desk-Top Assessment

A desk-top assessment of wetlands that may be present at the site is completed by reviewing GeoNB's online maps. The GeoNB database includes wetlands that appear on 1:10 000 scale maps. The wetlands included are those that are on file with the NBDELG and the NBDNRED. Topographic and LIDAR maps are also reviewed to determine where potential wetlands may be present on the site.

### 2.3.2 Field Assessment

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 New Brunswick *Clean Environment Act* [R.S.N.B. 1973, c. C-6] definition of a wetland (*i.e.*, Section 1.1.1).

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.

#### 2.3.2.1 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 facultative-neutral test of the vegetation as described in detail by *Environmental Laboratory* [1987]; and
- salt deposits, mud casts, and surface soil cracks.

### 2.3.2.2 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].

### 2.3.2.3 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.



### 2.3.2.4 Boundary Delineation

The wetland perimeter is delineated by 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 handheld Global Positioning System (GPS) unit with an estimated accuracy rating of  $\pm 3$  m.

## 2.4 WETLAND FUNCTIONAL ASSESSMENTS

For this Work, WFAs were only completed on wetlands  $\geq 0.5$  ha in size and / or those wetlands considered distinctive.

### 2.4.1 WESP-AC Model

The NBDELG requires that a WFA be conducted using the Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC), which is a standardized method for assessing some of the important natural functions of all types of wetlands in Atlantic Canada. WESP-AC generates normalized scores (*i.e.*, 0 to 10) and ratings (*i.e.*, Lower, Moderate, and Higher) for each function / attribute of a wetland 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, “NB\_WESP-AC\_Nontidal\_Calculator\_SingleSite\_23July2018\_protected.xlsx” model was used for the wetland functional assessments described herein [NBDELG, 2018]. The NonTidal, versus the Tidal, model was chosen because the wetlands are located above the head of tide. The supplementary data contained in SupplInfo\_Nontidal\_WESP-AC.xlsx file were also used for the assessment.

Non-tidal wetlands are vegetated wetlands that do not experience a fluctuation in their surface water levels at any time of the year as a result of oceanic tides. They are commonly categorized as a swamp, marsh, bog, or fen.

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 the wetland attributes summarized in Table 1.

Table 1. Wetland functions and other attributes scored by NonTidal WESP-AC in Atlantic Canada. After NBDELG [2018].

Function or Attribute	Definition	Potential Benefits
<u>Hydrologic Functions</u>		
Water storage and delay	The effectiveness for storing runoff or delaying the downslope movement of surface water for long or short periods	Flood control and maintain ecological systems
Stream flow support	The effectiveness for contributing water to streams especially during the driest part of a growing season	Support fish and other aquatic life
<u>Water Quality Maintenance Functions</u>		
Water cooling	The effectiveness for maintaining or reducing temperature of downslope waters	Support coldwater fish and other aquatic life



Function or Attribute	Definition	Potential Benefits
Sediment retention and stabilization	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 receiving waters and protect shoreline structures from erosion
Phosphorus retention	The effectiveness for retaining phosphorus for long periods (> 1 growing season)	Maintain quality of receiving waters
Nitrate removal and retention	The effectiveness for retaining particulate nitrate and converting soluble nitrate and ammonium to nitrogen gas while generating little or no nitrous oxide (a potent greenhouse gas)	Maintain quality of receiving waters
Organic nutrient export	The effectiveness for producing and subsequently exporting organic nutrients (mainly carbon), either particulate or dissolved	Support food chains in receiving waters

#### Ecological Habitat Functions

Fish habitat	The capacity to support an abundance and diversity of native fish (both anadromous and resident species)	Support recreational and ecological values
Aquatic invertebrate habitat	The capacity to support or contribute to an abundance or diversity of invertebrate animals, which spend all or part of their life cycle underwater or in moist soil and includes dragonflies, midges, clams, snails, water beetles, shrimp, aquatic worms, and others	Support salmon and other aquatic life and maintain regional biodiversity
Amphibian and reptile habitat	The capacity to support or contribute to an abundance or diversity of native frogs, toads, salamanders, and turtles	Maintain regional biodiversity
Waterbird feeding habitat	The capacity to support or contribute to an abundance or diversity of waterbirds that migrate or winter, but do not breed in the region	Support hunting and ecological values and maintain regional biodiversity
Waterbird nesting habitat	The capacity to support or contribute to an abundance or diversity of waterbirds that nest in the region	Maintain regional biodiversity
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 wetlands or water	Maintain regional biodiversity
Native plant habitat and pollinator habitat	The capacity to support or contribute to a diversity of native, hydrophytic, vascular plant species, communities, and / or functional groups, as well as the pollinating insects linked to them	Maintain regional biodiversity and food chains
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, education, or research	Commercial and social benefits of recreation and protection of prior public investments

#### NOTES:

\*A wetland benefit that is not considered a function

### 2.4.2 Desk-Top Assessment

A desk-top assessment is completed prior to visiting the wetland. Aerial images and data from various sources, such as Google Earth, are consulted in order to answer 38, mostly multiple-choice, questions about the wetland.

### 2.4.3 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 66 specific questions related to the wetland. A stressor datasheet is also completed.

## 2.5 ASSESSORS

Matt Alexander, *Ph.D., P.Geo., EP* and Derrick Mitchell, *B.Sc.F., R.P.F.* completed the watercourse and wetland assessments described herein. Derrick took the WESP-AC training in July 2016 in Fredericton, New Brunswick where the instructor was Dr. Paul Adamus. 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. Derrick and Matt have both completed hundreds of wetland delineations in New Brunswick, Nova Scotia, and Prince Edward Island.

### 3.0 SITE DESCRIPTION

#### 3.1 SURVEY AREA

Based on preliminary turbine sighting studies, Natural Forces identified lands where watercourse and wetland surveys were required (*i.e.*, the survey area). Initially, this included the following:

- 30 m buffers along roads required to access turbine sites during construction and operation;
- 30 m buffers along powerline easements;
- 30 m buffers around substations and ancillary equipment; and
- 150 m buffers around turbine bases.

Following discussions with the Regulatory Authorities (*i.e.*, representatives with the NBDELG, NBDNRED, and the Canadian Wildlife Institute), it was agreed that preliminary 150 m buffers would be surveyed in 2019 and that area would be extended to 300 m, as per the Crown Land Policy, around the proposed turbine bases for the 2020 surveys. Therefore, the 2019 Work involved ground-truthing delineation exercises within the initial survey area and aerial photo interpretation and LIDAR interpretation with spot ground-truthing delineation exercises within the expanded survey area (*i.e.*, from 150 m to 300 m from the turbine bases). Additional ground-truthing delineation exercises were done in 2020 to confirm the aerial interpretation with spot ground-truthing delineation exercises.

Figure 4 shows the 2020 survey areas on the Project lands. The total survey area of lands where ground-truthing delineation exercises were completed is approximately 390 ha.





Figure 4. Aerial photograph showing the survey areas on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

### 3.2 HABITAT TYPES OBSERVED

The survey area is located in the Fundy Coastal Ecodistrict of the Fundy Coast Ecoregion [*Ecosystem Classification Working Group, 2007*]. The Fundy Coast Ecoregion spans the entire southern coastline of New Brunswick along the Bay of Fundy from the east side of Passamaquoddy Bay to the east side of Shepody Bay. A mainly coniferous forest, dominated by red spruce, balsam fir, black spruce, white spruce, and tamarack, thrives in the cool, moist climate of the Ecoregion. Cedar is a dominant species in the limestone-derived soils around Saint John. The most common hardwood species include heart-leaved birch, mountain ash, red maple, and some yellow birch. The Fundy Coast Ecoregion also has a rich diversity of wetlands.

In addition to wetlands, five general types of habitat were observed across the Project site. The dominant species observed within each habitat are summarized in Table 2. Photographs are provided in Figure 5 through Figure 13.

Table 2. Habitat types observed, including dominant species, on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

Habitat Type	Stratum	Dominant Species
Type 1 – Shrub land	Trees	<ul style="list-style-type: none"> <li>• No trees</li> </ul>
	Shrubs	<ul style="list-style-type: none"> <li>• Green alder, 30%</li> <li>• White meadowsweet, 30%</li> <li>• Bebb's willow, 25%</li> <li>• Shrubby cinquefoil, 5%</li> </ul>
	Herbs	<ul style="list-style-type: none"> <li>• Meadow hawkweed, 10%</li> <li>• Canada goldenrod, 5%</li> </ul>
	Moss	<ul style="list-style-type: none"> <li>• No moss</li> </ul>
Type 2 – Mixed softwood aged 50 to 100yrs+	Trees	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Red spruce, 25%</li> <li>• Heart-leaved birch, 15%</li> </ul>
	Shrubs	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> </ul>
	Herbs	<ul style="list-style-type: none"> <li>• Common wood fern, 5%</li> <li>• Mountain wood fern, 5%</li> <li>• Wild-Lily-of-the-valley, 5%</li> <li>• Wild sarsaparilla, 2%</li> </ul>
	Moss	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 25%</li> <li>• Three-toothed whipwort, 25%</li> </ul>
Type 3 - Dry with rocky outcrops	Trees	<ul style="list-style-type: none"> <li>• Red spruce, 40%</li> <li>• Balsam fir, 25%</li> <li>• Eastern white cedar, 5%</li> <li>• Heart-leaved birch, 5%</li> </ul>
	Shrubs	<ul style="list-style-type: none"> <li>• Heart-leaved birch, 10%</li> <li>• Balsam fir, 5%</li> <li>• Eastern white cedar, 5%</li> <li>• Red spruce, 5%</li> </ul>



Habitat Type	Stratum	Dominant Species
Type 4 – Dry with mixed softwood and rocky outcrops	Herbs	<ul style="list-style-type: none"> <li>• Bunchberry, 5%</li> <li>• Wild sarsaparilla, 2%</li> </ul>
	Moss	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 60%</li> <li>• Reindeer lichen, 20%</li> </ul>
	Trees	<ul style="list-style-type: none"> <li>• Red spruce, 75%</li> <li>• Balsam fir, 10%</li> </ul>
	Shrubs	<ul style="list-style-type: none"> <li>• Sheep laurel, 5%</li> <li>• Red spruce, 2%</li> </ul>
Type 5 – Mixed softwood	Herbs	<ul style="list-style-type: none"> <li>• Bunchberry, 5%</li> </ul>
	Moss	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 50%</li> <li>• Three-toothed whipwort, 10%</li> <li>• <i>Dicranum sp.</i>, 5%</li> </ul>
	Trees	<ul style="list-style-type: none"> <li>• Red spruce, 60%</li> <li>• Balsam fir, 15%</li> <li>• Heart-leaved birch, 5%</li> <li>• Tamarack, 5%</li> </ul>
	Shrubs	<ul style="list-style-type: none"> <li>• Red spruce, 20%</li> <li>• Mountain holly, 10%</li> <li>• Balsam fir, 5%</li> <li>• Sheep laurel, 2%</li> <li>• Late lowbush blueberry, 1%</li> </ul>
	Herbs	<ul style="list-style-type: none"> <li>• No herbs</li> </ul>
	Moss	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 90%</li> <li>• Reindeer lichen, 5%</li> </ul>



Figure 5. Photograph showing an example of shrub land habitat (*i.e.*, Type 1) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



Figure 6. Photograph showing another example of shrub land habitat (*i.e.*, Type 1) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



Figure 7. Photograph showing an example of the mixed softwood aged 50 to 100+ years habitat (*i.e.*, Type 2) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.





Figure 8. Photograph showing another example of the mixed softwood aged 50 to 100+ years habitat (*i.e.*, Type 2) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



Figure 9. Photograph showing an example of dry with rocky outcrops habitat (*i.e.*, Type 3) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.





Figure 10. Photograph showing an example of dry with rocky outcrops habitat (*i.e.*, Type 3) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



Figure 11. Photograph showing an example of dry with mixed softwood and rocky outcrops habitat (*i.e.*, Type 4) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.





Figure 12. Photograph showing another example of dry with mixed softwood and rocky outcrops habitat (*i.e.*, Type 4) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



Figure 13. Photograph showing an example of mixed softwood habitat (*i.e.*, Type 5) observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

## 4.0 WATERCOURSE DELINEATIONS

### 4.1 DESK-TOP ASSESSMENT

GeoNB mapping shows four named watercourses within the boundaries of the overall site (Figure 14):

- Burchill's Brook;
- Frenchman's Creek;
- Mill Creek; and
- Marsh Brook.

All are second order watercourses. Burchill's Brook and Frenchman's Creek fall within the Musquash River watershed whereas Mill Creek and Marsh Brook drain directly to the Bay of Fundy. Although not confirmed through field assessments, it is believed that the main stems of all these watercourses are salmonid-bearing and support fish habitat.

There are also several unnamed watercourses that appear within the GeoNB mapping database (Figure 14).





Figure 14. Mapped watercourses present on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

## 4.2 FIELD ASSESSMENTS

Depth to bedrock across the Project lands is typically only a few centimetres below the surface and the soils atop the bedrock are poorly drained clays. As a result, many watercourses are present on the lands. Watercourses were delineated in the field between 19 August 2019 and 15 October 2019 and between 31 July 2020 and 10 September 2020. Those watercourses are shown in Figure 15 and Table 3 summarizes their characteristics. Photographs of the watercourses are provided in Appendix I, which includes all photographs taken during the field program.

Overall, 77 watercourses were identified and delineated within the survey area. Most of the watercourses delineated are ephemeral and likely do not support fish and / or fish habitat. Other than Burchill's Brook (BB), Frenchman's Creek (FC), Mill Creek (MC), and Marsh Brook (MB), the only watercourse delineated in the field where fish were observed was Maguires Cove Brook (MCB). Several brook trout (*Salvelinus fontinalis*) were observed in pools below the outlet from the wetland connected to MCB.



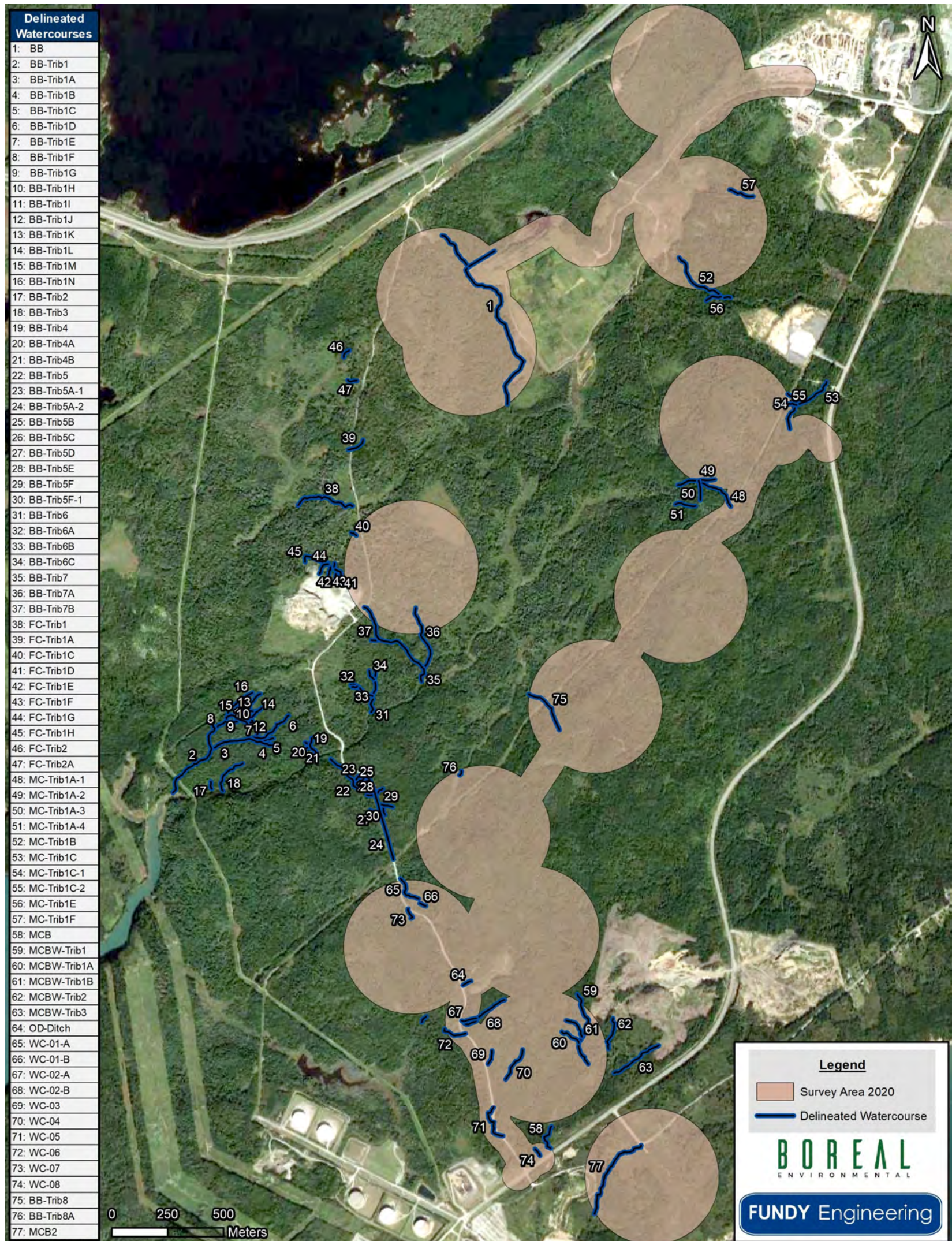


Figure 15. Watercourses delineated in the field within the survey area on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



Table 3. Characteristics of the watercourses identified within the survey area on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

Map ID	Unique ID	Width (cm)	Depth (cm)	Substrate	Flow	Streamside Vegetation	Fish Presence (Observed / Possible / Unlikely)	Comments
1	BB	100 to 300	15 to 100+	Cobble with sand and gravel	Perennial	Good	Observed	
2	BB-Trib1	60 to 180	5 to 15	Exposed bedrock and angular cobble to boulders with heavy siltation in between	Perennial	Excellent	Possible	Considerable woody debris
3	BB-Trib1A							
4	BB-Trib1B							
5	BB-Trib1C							
6	BB-Trib1D							
7	BB-Trib1E							
8	BB-Trib1F							
9	BB-Trib1G	15 to 90	5 to 15	Exposed bedrock and angular rocks with heavy siltation in between	Ephemeral	Excellent	Unlikely	Woody debris and overhanging vegetation are extensive
10	BB-Trib1H							
11	BB-Trib1I							
12	BB-Trib1J							
13	BB-Trib1K							
14	BB-Trib1L							
15	BB-Trib1M							
16	BB-Trib1N							
17	BB-Trib2	10 to 15	5	Silt and some exposed bedrock	Ephemeral	Good	Unlikely	At the top of the slope it flows for about 30 m before going subterranean and the channel is lost
18	BB-Trib3	20 to 30	10	Silt and some exposed bedrock	Ephemeral	Fair	Unlikely	Flows through an open forest area that has a large deer / moose hunting blind adjacent to it
19	BB-Trib4							
20	BB-Trib4A	10 to 20	5 to 10	Silt and exposed bedrock	Ephemeral	Good	Unlikely	Deeply incised channels and flows down a steep bank to Burchill's Brook
21	BB-Trib4B							
22	BB-Trib5	30 to 120	10 to 25	Silt with some exposed angular cobble and boulders	Perennial	Good	Unlikely	Wetlands and groundwater are the source of this watercourse
23	BB-Trib5A-1	30	5 to 10	Silt	Ephemeral	Good	Unlikely	
24	BB-Trib5A-2	60 to 150	10 to 40	Silt and angular cobble and boulders	Perennial	Good	Unlikely	Ditch along the eastern side of Burchill Road that collects water from several watercourses and wetlands
25	BB-Trib5B							
26	BB-Trib5C	30	5 to 10	Silt	Perennial	Good	Unlikely	Drains water from eastern side of Burchill Road to the western side
27	BB-Trib5D							
28	BB-Trib5E	30	5 to 10	Silt	Ephemeral	Good	Unlikely	
29	BB-Trib5F	45	5	Silt	Ephemeral	Good	Unlikely	Flows along an old woods road ( <i>i.e.</i> , within former wheel ruts)
30	BB-Trib5F1	30	5 to 10	Silt	Ephemeral	Good	Unlikely	
31	BB-Trib6							
32	BB-Trib6A	30 to 50	10	Silt	Ephemeral	Good	Unlikely	
33	BB-Trib6B							
34	BB-Trib6C							
35	BB-Trib7	30 to 250	5 to 30	Mostly silt with pebbles to boulders intermixed	Perennial	Excellent	Possible	Considerable woody debris; picks up groundwater along its highly sinuous flowpath

Map ID	Unique ID	Width (cm)	Depth (cm)	Substrate	Flow	Streamside Vegetation	Fish Presence (Observed / Possible / Unlikely)	Comments
36	BB-Trib7A	10 to 60	5 to 15	Silt with some exposed angular cobble to boulders	Ephemeral	Excellent	Unlikely	A small forested wetland is the source, but collects groundwater as it flows and is subterranean in some locations
37	BB-Trib7B	10 to 50	5 to 15	Silt	Ephemeral	Excellent	Unlikely	Collects water from old-growth cedar stand; considerable woody debris
38	FC-Trib1	30 to 200	10 to 50	Silt with some cobble to boulders in steeper gradients	Perennial	Fair	Likely	Drains pond with former beaver activity
39	FC-Trib1A	10 to 50	5 to 10	Silt	Ephemeral	Fair	Unlikely	
40	FC-Trib1C	10 to 80	5 to 10	Silt	Ephemeral	Excellent	Unlikely	Drains surfacewater runoff and groundwater from upgradient quarry / gravel pit; excellent streamshade and considerable woody debris
41	FC-Trib1D							
42	FC-Trib1E							
43	FC-Trib1F							
44	FC-Trib1G							
45	FC-Trib1H							
46	FC-Trib2			To be confirmed in Spring 2020	Ephemeral		Unlikely	
47	FC-Trib2A			To be confirmed in Spring 2020	Ephemeral		Unlikely	
48	MC-Trib1A-1	100	5 to 10	Cobble and gravel	Ephemeral	Good	Unlikely	
49	MC-Trib1A-2							
50	MC-Trib1A-3							
51	MC-Trib1A-4							
52	MC-Trib1B	75 to 100	10 to 20	Sand and silt	Perennial	Good	Possible	
53	MC-Trib1C	30 to 250	5 to 40	Silt and angular cobbles and boulders	Perennial	Excellent	Possible	Considerable woody debris; wetlands are its source
54	MC-Trib1C-1	30 to 45	5 to 25	Silt and angular gravel to boulders	Ephemeral	Good	Unlikely	
55	MC-Trib1C-2	30 to 45	5 to 25	Silt and angular gravel to boulders	Ephemeral	Good	Unlikely	Drains a large wetland to Mill Creek; flows across the Pipeline ROW road
56	MC-Trib1E	30 to 45	5 to 25	Silt and angular gravel to boulders	Ephemeral	Good	Unlikely	
57	MC-Trib1F	30 to 45	5 to 25	Silt and angular gravel to boulders	Ephemeral	Good	Unlikely	
58	MCB	120 to 300	10 to 45	Fines with angular gravel to boulders	Perennial	Excellent	Observed	Considerable woody debris; brook trout were observed
59	MCBW-Trib1	50 to 150	5 to 20	Silt with angular gravel to boulders	Ephemeral	Good	Unlikely	Considerable number of downed trees and woody debris; flows through a mature cedar forest
60	MCBW-Trib1A	50 to 150	5	Silt with angular gravel to boulders	Ephemeral	Good	Unlikely	Sourced from an upslope forested wetland
61	MCBW-Trib1B	50 to 150	5	Silt with angular gravel to boulders	Ephemeral	Good	Unlikely	Considerable woody debris; flows down steep bank
62	MCBW-Trib2	50 to 200	5	Silt with angular gravel to boulders	Ephemeral	Good	Unlikely	Dry at time of delineation
63	MCBW-Trib3	50 to 300	5 to 15	Silt with angular gravel to boulders	Ephemeral	Good	Unlikely	In some locations the watercourse appears to flow adjacent to an old roadbed
64	OD-Ditch	60 to 100	5	Silt and garbage	Ephemeral	Fair	Unlikely	Drainage ditch adjacent to roadway into former dumping area; drains to ditch along Burchill Road
65	WC-01-A	30 to 45	5 to 10	Silt with some angular cobble and boulders	Ephemeral	Fair	Unlikely	Flows along the surface in some areas and subterranean in others; some water flow comes from drainage ditch along Burchill Road
66	WC-01-B							
67	WC-02-A	40 to 250	10 to 20	Silt and angular cobbles and boulders	Ephemeral	Good	Unlikely	Follows a portion of an old woods road; sourced by a forested wetland; some portions of channel are subterranean
68	WC-02-B							
69	WC-03	60 to 100	5 to 10	Silt and angular cobbles and boulders	Ephemeral	Excellent	Unlikely	
70	WC-04	20 to 60	5 to 15	Silt and angular cobbles and boulders	Ephemeral	Good	Unlikely	
71	WC-05	30 to 70	5 to 15	Silt	Ephemeral	Good	Unlikely	Appears to be sourced by the drainage ditch along the western side of Burchill Road; flows into the woods, flows through the woods, then back alongside the road
72	WC-06	20 to 40	5 to 15	Silt	Ephemeral	Good	Unlikely	Sourced from ditch along Burchill Road and drains to wetland

Map ID	Unique ID	Width (cm)	Depth (cm)	Substrate	Flow	Streamside Vegetation	Fish Presence (Observed / Possible / Unlikely)	Comments
73	WC-07	20 to 40	5 to 10	Silt	Ephemeral	Good	Unlikely	A tributary to Maguires Cove Brook
74	WC-08	20 to 50	10 to 15	Silt	Ephemeral	Excellent	Unlikely	
75	BB-Trib8	25 to 100	5 to 15	Cobble and gravel	Perennial	Excellent	Possible	
76	BB-Trib8A	10 to 50	5 to 10	Silt and angular cobbles and boulders	Perennial	Excellent	Unlikely	
77	MCB2	50 to 200	10 to 30	Silt	Perennial	Excellent	Likely	Drains directly to Bay of Fundy at Maguires Cove

NOTES:

\*BB = Burchill's Brook; Trib = Tributary; FC = Frenchman's Creek; MB = Marsh Brook; MC = Mill Creek; MCB = Maguires Cove Brook; MCBW = Maguires Cove Brook Wetland; PH = Paddy's Hill; PLE = PipeLine East; PLW = PipeLine West; WC = Watercourse; OD = Old Dump

#### 4.2.1 Burchill Road Culvert Locations

Noticeable culverts below Burchill Road were recorded during the 2019 field assessments. A summary of those culverts is provided in Table 4.

Table 4. Summary of culverts observed below Burchill Road in west Saint John, New Brunswick.

Culvert	Inside diameter (mm)	Material	Latitude	Longitude	Comments
1	450	Concrete	45°10'27.34"N	66°12'22.73"W	
2	450	Concrete	45°10'29.72"N	66°12'23.68"W	
3	450	Concrete	45°10'32.30"N	66°12'25.40"W	
4	1 800	Corrugated steel	45°10'36.44"N	66°12'30.51"W	Conveys mainstem of Burchill's Brook
5	310	Concrete	45°10'56.95"N	66°12'25.63"W	Considerably undersized
6	450	Concrete	45°11'11.62"N	66°12'27.62"W	Conveys tributary of Frenchman's Creek; likely undersized; full of woody debris



## 5.0 RARE PLANTS

### 5.1 FIELD ASSESSMENT

A vegetation survey was conducted across the Project site between 10 June 2019 and 15 October 2019 and between 31 July 2020 and 10 September 2020 to determine the presence and locations of any rare plant species and rare vegetation communities. All told, 297 plant species were identified on the property (Table 5). According to ACCDC databases, five of those species are considered rare:

- purple false foxglove (*Agalinis purpurea*);
- coastal sedge (*Carex exilis*);
- Wiegand's sedge (*Carex wiegandii*);
- Loesel's twayblade (*Liparis loeselii*); and
- cloudberry (*Rubus chamaemorus*).

Interpretation of the ACCDC S-rank system is provided in Table 6. Figure 16 shows the general location of the rare plants observed at the Project site and the population density. More detailed information is included in the sections that follow.

Table 5. Flora species observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project. Red shaded entries indicate rare or sensitive species.

Common Name	Scientific Name	SRank	SRankDate	Sgsrank
Balsam fir	<i>Abies balsamea</i>	S5	2015 07 15	Secure
Striped maple	<i>Acer pensylvanicum</i>	S5	2015 07 15	Secure
Red maple	<i>Acer rubrum</i>	S5	2015 07 15	Secure
Mountain maple	<i>Acer spicatum</i>	S5	2015 07 15	Secure
Common yarrow	<i>Achillea millefolium</i>	SNA	1999 11 29	Exotic
Bishop's goutweed	<i>Aegopodium podagraria</i>	SNA	2015 07 15	Exotic
<b>Purple false foxglove</b>	<b><i>Agalinis purpurea</i></b>	<b>S1</b>	<b>2015 07 15</b>	<b>May Be At Risk</b>
Redtop	<i>Agrostis gigantea</i>	SNA	2015 07 15	Exotic
Rough bent grass	<i>Agrostis scabra</i>	S5	2015 07 15	Secure
Northern water plantain	<i>Alisma triviale</i>	S5	2015 07 15	Secure
Speckled alder	<i>Alnus incana</i>	S5	2015 07 15	Secure
Green alder	<i>Alnus viridis</i>	S5	2015 07 15	Secure
Woodland angelica	<i>Angelica sylvestris</i>	SNA	2015 07 15	Exotic
Field pussytoes	<i>Antennaria neglecta</i>	SNA	2002 11 12	Exotic
Wild sarsaparilla	<i>Aralia nudicaulis</i>	S5	2015 07 15	Secure
Common lady fern	<i>Athyrium filix-femina</i>	S5	2015 07 15	Secure
Three-toothed whipwort	<i>Bazzania Tricrenata</i>	SU	2015 03 25	
Yellow birch	<i>Betula alleghaniensis</i>	S5	2015 07 15	Secure
Heart-leaved birch	<i>Betula cordifolia</i>	S5	2015 07 15	Secure
Nodding beggarticks	<i>Bidens cernua</i>	S5	2015 07 15	Secure
Devil's beggarticks	<i>Bidens frondosa</i>	S5	2015 07 15	Secure
Bluejoint reed grass	<i>Calamagrostis canadensis</i>	S5	2015 07 15	Secure
Chee reed grass	<i>Calamagrostis epigeios</i>	SNA	2015 07 15	Exotic
Hedge false bindweed	<i>Calystegia sepium</i>	S5	2015 07 15	Secure

Common Name	Scientific Name	SRank	SRankDate	Sgrank
Pennsylvania bittercress	<i>Cardamine pensylvanica</i>	S5	2015 07 15	Secure
Black sedge	<i>Carex arctata</i>	S5	2015 07 15	Secure
Golden sedge	<i>Carex aurea</i>	S4	2015 07 15	Secure
Brownish sedge	<i>Carex brunnescens</i>	S5	2015 07 15	Secure
Silvery sedge	<i>Carex canescens</i>	S5	2015 07 15	Secure
Chestnut sedge	<i>Carex castanea</i>	S4	2015 07 15	Secure
Crawford's sedge	<i>Carex crawfordii</i>	S5	2015 07 15	Secure
Hidden-scaled sedge	<i>Carex cryptolepis</i>	S4	2015 07 15	Secure
White-edged sedge	<i>Carex debilis</i>	S5	2015 07 15	Secure
Two-seeded sedge	<i>Carex disperma</i>	S5	2015 07 15	Secure
Star sedge	<i>Carex echinata</i>	S5	2015 07 15	Secure
<b>Coastal sedge</b>	<b><i>Carex exilis</i></b>	<b>S3</b>	<b>2015 07 15</b>	<b>Secure</b>
Yellow sedge	<i>Carex flava</i>	S5	2015 07 15	Secure
Graceful sedge	<i>Carex gracillima</i>	S5	2015 07 15	Secure
Nodding sedge	<i>Carex gynandra</i>	S5	2015 07 15	Secure
Bladder sedge	<i>Carex intumescens</i>	S5	2015 07 15	Secure
Slender sedge	<i>Carex lasiocarpa</i>	S5	2015 07 15	Secure
Bristly-stalked sedge	<i>Carex leptalea</i>	S5	2015 07 15	Secure
Finely-nerved sedge	<i>Carex leptonevia</i>	S5	2015 07 15	Secure
Sallow sedge	<i>Carex lurida</i>	S5	2015 07 15	Secure
Boreal bog sedge	<i>Carex magellanica</i>	S5	2015 07 15	Secure
Smooth black sedge	<i>Carex nigra</i>	S4S5	2015 07 15	Secure
New England sedge	<i>Carex novae-angliae</i>	S5	2015 07 15	Secure
Pale sedge	<i>Carex pallescens</i>	S5	2015 07 15	Secure
Few-flowered sedge	<i>Carex pauciflora</i>	S4S5	2015 07 15	Secure
Cyperuslike sedge	<i>Carex pseudocyperus</i>	S5	2015 07 15	Secure
Rough sedge	<i>Carex scabrata</i>	S5	2015 07 15	Secure
Broom sedge	<i>Carex scoparia</i>	S5	2015 07 15	Secure
Awl-fruited sedge	<i>Carex stipata</i>	S5	2015 07 15	Secure
Tussock sedge	<i>Carex stricta</i>	S5	2015 07 15	Secure
Blunt broom sedge	<i>Carex tribuloides</i>	S4S5	2015 07 15	Secure
Three-seeded sedge	<i>Carex trisperma</i>	S5	2015 07 15	Secure
Northern beaked sedge	<i>Carex utriculata</i>	S5	2015 07 15	Secure
Greenish sedge	<i>Carex viridula</i>	S4	2015 07 15	Secure
Fox sedge	<i>Carex vulpinoidea</i>	S4S5	2015 07 15	Secure
<b>Wiegand's sedge</b>	<b><i>Carex wiegandii</i></b>	<b>S3</b>	<b>2015 07 15</b>	<b>Secure</b>
Black knapweed	<i>Centaurea nigra</i>	SNA	2015 07 15	Exotic
Leatherleaf	<i>Chamaedaphne calyculata</i>	S5	2015 07 15	Secure
Fireweed	<i>Chamaenerion angustifolium</i>	S5	2015 07 15	Secure
White turtlehead	<i>Chelone glabra</i>	S5	2015 07 15	Secure
American golden saxifrage	<i>Chrysosplenium americanum</i>	S5	2015 07 15	Secure
Small enchanter's nightshade	<i>Circaea alpina</i>	S5	2015 07 15	Secure
Reindeer lichen	<i>Cladonia polyscarpoides</i>	SNA	2015 03 29	Undetermined
Goldthread	<i>Coptis trifolia</i>	S5	2015 07 15	Secure
Alternate-leaved dogwood	<i>Cornus alternifolia</i>	S5	2015 07 15	Secure
Bunchberry	<i>Cornus canadensis</i>	S5	2015 07 15	Secure
Red osier dogwood	<i>Cornus sericea</i>	S5	2015 07 15	Secure

Common Name	Scientific Name	SRank	SRankDate	Sgsrank
Pink lady's-slipper	<i>Cypripedium acaule</i>	S5	2015 07 15	Secure
Poverty oat grass	<i>Danthonia spicata</i>	S5	2015 07 15	Secure
Shrubby cinquefoil	<i>Dasiphora fruticosa</i>	S4	2015 07 15	Secure
Eastern hay-scented fern	<i>Dennstaedtia punctilobula</i>	S5	2015 07 15	Secure
Woolly panic grass	<i>Dichantherium acuminatum</i>	SNA	2018 12 11	Secure
Northern bush honeysuckle	<i>Diervilla lonicera</i>	S5	2015 07 15	Secure
Hairy flat-top white aster	<i>Doellingeria umbellata</i>	S5	2015 07 15	Secure
Round-leaved sundew	<i>Drosera rotundifolia</i>	S5	2015 07 15	Secure
Mountain wood fern	<i>Dryopteris campyloptera</i>	S5	2015 07 15	Secure
Spinulose wood fern	<i>Dryopteris carthusiana</i>	S5	2015 07 15	Secure
Crested wood fern	<i>Dryopteris cristata</i>	S5	2015 07 15	Secure
Evergreen wood fern	<i>Dryopteris intermedia</i>	S5	2015 07 15	Secure
Marginal wood fern	<i>Dryopteris marginalis</i>	S5	2015 07 15	Secure
Large barnyard grass	<i>Echinochloa crus-galli</i>	SNA	2015 07 15	Exotic
Common viper's bugloss	<i>Echium vulgare</i>	SNA	2015 07 15	Exotic
Needle spikerush	<i>Eleocharis acicularis</i>	S5	2015 07 15	Secure
Blunt spikerush	<i>Eleocharis obtusa</i>	S5	2015 07 15	Secure
Common spikerush	<i>Eleocharis palustris</i>	S5	2015 07 15	Secure
Black crowberry	<i>Empetrum nigrum</i>	S5	2015 07 15	Secure
Trailing arbutus	<i>Epigaea repens</i>	S5	2015 07 15	Secure
Northern willowherb	<i>Epilobium ciliatum</i>	S5	2015 07 15	Secure
Bog willowherb	<i>Epilobium leptophyllum</i>	S5	2015 07 15	Secure
Marsh willowherb	<i>Epilobium palustre</i>	S5	2015 07 15	Secure
Helleborine	<i>Epipactis helleborine</i>	SNA	2015 07 15	Exotic
Field horsetail	<i>Equisetum arvense</i>	S5	2015 07 15	Secure
Woodland horsetail	<i>Equisetum sylvaticum</i>	S5	2015 07 15	Secure
Variegated horsetail	<i>Equisetum variegatum</i>	S4	2015 07 15	Secure
Philadelphia fleabane	<i>Erigeron philadelphicus</i>	S4	2015 07 15	Secure
Rough fleabane	<i>Erigeron strigosus</i>	S5	2015 07 15	Secure
Narrow-leaved cottongrass	<i>Eriophorum angustifolium</i>	S5	2015 07 15	Secure
Tussock cottongrass	<i>Eriophorum vaginatum</i>	S5	2015 07 15	Secure
Tawny cottongrass	<i>Eriophorum virginicum</i>	S5	2015 07 15	Secure
Common dog mustard	<i>Erucastrum gallicum</i>	SNA	2015 07 15	Exotic
Spotted Joe-pye-weed	<i>Eupatorium maculatum</i>	S5	2015 07 15	Secure
Common eyebright	<i>Euphrasia nemorosa</i>	SNA	2015 07 15	Exotic
Low rough aster	<i>Eurybia radula</i>	S5	2015 07 15	Secure
Grass-leaved goldenrod	<i>Euthamia graminifolia</i>	S5	2015 07 15	Secure
Wild strawberry	<i>Fragaria virginiana</i>	S5	2015 07 15	Secure
Glossy buckthorn	<i>Frangula alnus</i>	SNA	2015 07 15	Exotic
White ash	<i>Fraxinus americana</i>	S4S5	2015 07 15	Secure
Common hemp-nettle	<i>Galeopsis tetrahit</i>	SNA	2015 07 15	Exotic
Rough bedstraw	<i>Galium asprellum</i>	S5	2015 07 15	Secure
Smooth bedstraw	<i>Galium mollugo</i>	SNA	2015 07 15	Exotic
Three-petaled bedstraw	<i>Galium trifidum</i>	S5	2015 07 15	Secure
Three-flowered bedstraw	<i>Galium triflorum</i>	S5	2015 07 15	Secure
Creeping snowberry	<i>Gaultheria hispida</i>	S5	2015 07 15	Secure
Eastern teaberry	<i>Gaultheria procumbens</i>	S5	2015 07 15	Secure

Common Name	Scientific Name	SRank	SRankDate	Sgsrank
Black huckleberry	<i>Gaylussacia baccata</i>	S5	2015 07 15	Secure
Yellow avens	<i>Geum aleppicum</i>	S5	2015 07 15	Secure
Water avens	<i>Geum rivale</i>	S5	2015 07 15	Secure
Canada manna grass	<i>Glyceria canadensis</i>	S5	2015 07 15	Secure
Common tall manna grass	<i>Glyceria grandis</i>	S5	2015 07 15	Secure
Slender manna grass	<i>Glyceria melicaria</i>	S5	2015 07 15	Secure
Fowl manna grass	<i>Glyceria striata</i>	S5	2015 07 15	Secure
Spurred gentian	<i>Halenia deflexa</i>	S4S5	2015 07 15	Secure
Orange hawkweed	<i>Hieracium aurantiacum</i>	SNA	2015 07 15	Exotic
Meadow hawkweed	<i>Hieracium caespitosum</i>	SNA	2015 07 15	Exotic
Rough hawkweed	<i>Hieracium scabrum</i>	S5	2015 07 15	Secure
Common hop	<i>Humulus lupulus</i>	SU	2015 07 15	Sensitive
American marsh pennywort	<i>Hydrocotyle americana</i>	S5	2015 07 15	Secure
Stairstep moss	<i>Hylocomium splendens</i>	S5	2015 03 31	Secure
Northern St. John's-wort	<i>Hypericum boreale</i>	S5	2002 11 12	Secure
Common St. John's-wort	<i>Hypericum perforatum</i>	SNA	2015 07 15	Exotic
Mountain holly	<i>Ilex mucronata</i>	S5	2015 07 15	Secure
Common winterberry	<i>Ilex verticillata</i>	S5	2015 07 15	Secure
Harlequin blue flag	<i>Iris versicolor</i>	S5	2015 07 15	Secure
Narrow-panicled rush	<i>Juncus brevicaudatus</i>	S5	2015 07 15	Secure
Soft rush	<i>Juncus effusus</i>	S5	2015 07 15	Secure
Thread rush	<i>Juncus filliformis</i>	S5	2015 07 15	Secure
Slender rush	<i>Juncus tenuis</i>	S5	2015 07 15	Secure
Common juniper	<i>Juniperus communis</i>	S5	2015 07 15	Secure
Sheep laurel	<i>Kalmia angustifolia</i>	S5	2015 07 15	Secure
Pale bog laurel	<i>Kalmia polifolia</i>	S5	2015 07 15	Secure
Tamarack	<i>Larix laricina</i>	S5	2015 07 15	Secure
Common Labrador tea	<i>Ledum groenlandicum</i>	S5	2015 07 15	Secure
Oxeye daisy	<i>Leucanthemum vulgare</i>	SNA	2015 07 15	Exotic
Butter-and-eggs	<i>Linaria vulgaris</i>	SNA	2015 07 15	Exotic
Twinflower	<i>Linnaea borealis</i>	S5	2015 07 15	Secure
<b>Loesel's twayblade</b>	<b><i>Liparis loeselii</i></b>	<b>S3</b>	<b>2015 07 15</b>	<b>Secure</b>
Inflated lobelia	<i>Lobelia inflata</i>	S5	2015 07 15	Secure
Canada fly honeysuckle	<i>Lonicera canadensis</i>	S5	2015 07 15	Secure
Mountain fly honeysuckle	<i>Lonicera villosa</i>	S5	2015 07 15	Secure
Garden bird's-foot trefoil	<i>Lotus corniculatus</i>	SNA	2015 07 15	Exotic
Large-leaved lupine	<i>Lupinus polyphyllus</i>	SNA	2015 07 15	Exotic
Hairy woodrush	<i>Luzula acuminata</i>	S5	2015 07 15	Secure
Stiff clubmoss	<i>Lycopodium annotinum</i>	S5	2015 07 15	Secure
Creeping jenny	<i>Lycopodium complanatum</i>	S4S5	2015 07 15	Secure
Round-branched tree-clubmoss	<i>Lycopodium dendroideum</i>	S5	2015 07 15	Secure
Northern water horehound	<i>Lycopus uniflorus</i>	S5	2015 07 15	Secure
Northern starflower	<i>Lysimachia borealis</i>	S5	2015 07 15	Secure
Swamp yellow loosestrife	<i>Lysimachia terrestris</i>	S5	2015 07 15	Secure
Purple loosestrife	<i>Lythrum salicaria</i>	SNA	2015 07 15	Exotic
Wild lily-of-the-valley	<i>Maianthemum canadense</i>	S5	2015 07 15	Secure
Three-leaved false Solomon's seal	<i>Maianthemum trifolium</i>	S5	2015 07 15	Secure

Common Name	Scientific Name	SRank	SRankDate	Sgsrank
White sweet-clover	<i>Melilotus albus</i>	SNA	2015 07 15	Exotic
Wild mint	<i>Mentha arvensis</i>	S5	2015 07 15	Secure
Partridgeberry	<i>Mitchella repens</i>	S5	2015 07 15	Secure
Naked Bishop's-cap	<i>Mitella nuda</i>	S5	2015 07 15	Secure
Pinesap	<i>Monotropa hypopithys</i>	S4	2015 07 15	Secure
Convulsion-root	<i>Monotropa uniflora</i>	S5	2015 07 15	Secure
Sweet gale	<i>Myrica gale</i>	S5	2015 07 15	Secure
Alternate-flowered water milfoil	<i>Myriophyllum alterniflorum</i>	S4S5	2015 07 15	Secure
Mountain holly	<i>Nemopanthus mucronatus</i>	S5	2015 07 15	Secure
Whorled wood aster	<i>Oclemena acuminata</i>	S5	2015 07 15	Secure
Bog aster	<i>Oclemena nemoralis</i>	S5	2015 07 15	Secure
White paniced American-aster (hybrid)	<i>Oclemena x blakei</i>	SNA	2006 06 13	Not Assessed
Red bartsia	<i>Odontites vernus</i>	SNA	2015 07 15	Exotic
Common evening primrose	<i>Oenothera biennis</i>	S5	2015 07 15	Secure
Sensitive fern	<i>Onoclea sensibilis</i>	S5	2015 07 15	Secure
One-sided wintergreen	<i>Orthilia secunda</i>	S5	2015 07 15	Secure
White-grained mountain rice	<i>Oryzopsis asperifolia</i>	S5	2015 07 15	Secure
Interrupted fern	<i>Osmunda claytoniana</i>	S5	2015 07 15	Secure
Royal fern	<i>Osmunda regalis</i>	S5	2015 07 15	Secure
Cinnamon fern	<i>Osmundastrum cinnamomeum</i>	S5	2015 07 15	Secure
Common wood sorrel	<i>Oxalis montana</i>	S5	2015 07 15	Secure
European wood sorrel	<i>Oxalis stricta</i>	S5	2015 07 15	Secure
Golden groundsel	<i>Packera aurea</i>	S4S5	2015 07 15	Secure
Virginia creeper	<i>Parthenocissus quinquefolia</i>	SNA	2015 07 15	Exotic
Reed canary grass	<i>Phalaris arundinacea</i>	S5	2015 07 15	Secure
Northern beech fern	<i>Phegopteris connectilis</i>	S5	2015 07 15	Secure
Common Timothy	<i>Phleum pratense</i>	SNA	2015 07 15	Exotic
Black chokeberry	<i>Photinia melanocarpa</i>	S5	2015 07 15	Secure
Eastern ninebark	<i>Physocarpus opulifolius</i>	SNA	2015 07 15	Exotic
Black spruce	<i>Picea mariana</i>	S5	2015 07 15	Secure
Red spruce	<i>Picea rubens</i>	S5	2015 07 15	Secure
Club spur orchid	<i>Platanthera clavellate</i>	S4S5	2015 07 15	Secure
White bog orchid	<i>Platanthera dilatata</i>	S4	2015 07 15	Secure
Small round-leaved orchid	<i>Platanthera orbiculate</i>	S4	2015 07 15	Secure
Red-stemmed feather moss	<i>Pleurozium schreberi</i>	S5	2015 03 31	Secure
Canada blue grass	<i>Poa compressa</i>	SNA	2015 07 15	Exotic
Wood blue grass	<i>Poa nemoralis</i>	SNA	2015 07 15	Exotic
Fowl blue grass	<i>Poa palustris</i>	S5	2015 07 15	Secure
Fringed black bindweed	<i>Polygonum cillinode</i>	S5	2015 07 15	Secure
Marshpepper smartweed	<i>Polygonum hydropiper</i>	SNA	2015 07 15	Exotic
Spotted lady's thumb	<i>Polygonum persicaria</i>	SNA	2015 07 15	Exotic
Rock polypody	<i>Polypodium virginianum</i>	S5	2015 07 15	Secure
Balsam poplar	<i>Populus balsamifera</i>	S5	2015 07 15	Secure
Trembling aspen	<i>Populus tremuloides</i>	S5	2015 07 15	Secure
Ribbon-leaved pondweed	<i>Potamogeton epiphydrus</i>	S5	2015 07 15	Secure
Common silverweed	<i>Potentilla anserina</i>	S5	2015 07 15	Secure
Rough cinquefoil	<i>Potentilla norvegica</i>	S5	2015 07 15	Secure



Common Name	Scientific Name	SRank	SRankDate	Sgsrank
Old field cinquefoil	<i>Potentilla simplex</i>	S5	2015 07 15	Secure
Gall of the Earth	<i>Prenanthes trifoliolata</i>	S5	2015 07 15	Secure
Common self-heal	<i>Prunella vulgaris</i>	S5	2015 07 15	Secure
Pin cherry	<i>Prunus pensylvanica</i>	S5	2015 07 15	Secure
Bracken fern	<i>Pteridium aquilinum</i>	S5	2015 07 15	Secure
Knight's plume moss	<i>Ptilium crista-castrensis</i>	S5	2015 03 31	Secure
Common buttercup	<i>Ranunculus acris</i>	SNA	2015 07 15	Exotic
Bristly buttercup	<i>Ranunculus hispidus</i>	S4S5	2015 07 15	Secure
Creeping buttercup	<i>Ranunculus repens</i>	SNA	2015 07 15	Exotic
Alder-leaved buckthorn	<i>Rhamnus alnifolia</i>	S4S5	2015 07 15	Secure
European buckthorn	<i>Rhamnus cathartica</i>	SNA	2015 07 15	Exotic
Little yellow rattle	<i>Rhinanthus minor</i>	SNA	2015 07 15	Secure
Rhodora	<i>Rhododendron canadense</i>	S5	2015 07 15	Secure
Skunk currant	<i>Ribes glandulosum</i>	S5	2015 07 15	Secure
Smooth gooseberry	<i>Ribes hirtellum</i>	S5	2015 07 15	Secure
Bristly black currant	<i>Ribes lacustre</i>	S5	2015 07 15	Secure
Swamp red currant	<i>Ribes triste</i>	S5	2015 07 15	Secure
Smooth rose	<i>Rosa blanda</i>	S5	2015 07 15	Secure
Shining rose	<i>Rosa nitida</i>	S5	2015 07 15	Secure
Rugosa rose	<i>Rosa rugosa</i>	SNA	2015 07 15	Exotic
Alleghaney blackberry	<i>Rubus allegheniensis</i>	S5	2015 07 15	Secure
Smooth blackberry	<i>Rubus canadensis</i>	S5	2015 07 15	Secure
<b>Cloudberry</b>	<b><i>Rubus chamaemorus</i></b>	<b>S3S4</b>	<b>2015 07 15</b>	<b>Secure</b>
Bristly dewberry	<i>Rubus hispidus</i>	S5	2015 07 15	Secure
Red raspberry	<i>Rubus idaeus</i>	S5	2015 07 15	Secure
Dwarf red raspberry	<i>Rubus pubescens</i>	S5	2015 07 15	Secure
Curled dock	<i>Rumex crispus</i>	SNA	2015 07 15	Exotic
Greater water dock	<i>Rumex orbiculatus</i>	S5	2015 07 15	Secure
Bebb's willow	<i>Salix bebbiana</i>	S5	2015 07 15	Secure
Pussy willow	<i>Salix discolor</i>	S5	2015 07 15	Secure
Shining willow	<i>Salix lucida</i>	S5	2015 07 15	Secure
Balsam willow	<i>Salix pyrifolia</i>	S5	2015 07 15	Secure
Red elderberry	<i>Sambucus racemosa</i>	S5	2015 07 15	Secure
Northern pitcher plant	<i>Sarracenia purpurea</i>	S5	2015 07 15	Secure
Black-girdled bulrush	<i>Scirpus atrocinctus</i>	S5	2015 07 15	Secure
Common woolly bulrush	<i>Scirpus cyperinus</i>	S5	2015 07 15	Secure
Mosquito bulrush	<i>Scirpus hattorianus</i>	S5	2015 07 15	Secure
Small-fruited bulrush	<i>Scirpus microcarpus</i>	S5	2015 07 15	Secure
Autumn hawkbit	<i>Scorzoneroides autumnalis</i>	SNA	2015 07 15	Exotic
White stonecrop	<i>Sedum album</i>	SNA	2015 07 15	Exotic
Sticky ragwort	<i>Senecio viscosus</i>	SNA	2015 07 15	Exotic
Bladder campion	<i>Silene vulgaris</i>	SNA	2015 07 15	Exotic
Mountain blue-eyed-grass	<i>Sisyrinchium montanum</i>	S5	2015 07 15	Secure
Bittersweet nightshade	<i>Solanum dulcamara</i>	SNA	2015 07 15	Exotic
Canada goldenrod	<i>Solidago canadensis</i>	S5	2015 07 15	Secure
Giant goldenrod	<i>Solidago gigantea</i>	S5	2015 07 15	Secure
Downy goldenrod	<i>Solidago puberula</i>	S5	2015 07 15	Secure

Common Name	Scientific Name	SRank	SRankDate	Sgsrank
Rough-stemmed goldenrod	<i>Solidago rugosa</i>	S5	2015 07 15	Secure
American mountain ash	<i>Sorbus americana</i>	S5	2015 07 15	Secure
American burreed	<i>Sparganium americanum</i>	S5	2015 07 15	Secure
Broad-fruited burreed	<i>Sparganium eurycarpum</i>	S4S5	2015 07 15	Secure
White meadowsweet	<i>Spiraea alba</i>	S5	2015 07 15	Secure
Steeplebush	<i>Spiraea tomentosa</i>	S5	2015 07 15	Secure
Clasping-leaved twisted-stalk	<i>Streptopus amplexifolius</i>	S5	2015 07 15	Secure
Lance-leaved aster	<i>Symphyotrichum lanceolatum</i>	S5	2015 07 15	Secure
Calico aster	<i>Symphyotrichum lateriflorum</i>	S5	2015 07 15	Secure
New York aster	<i>Symphyotrichum novi-belgii</i>	S5	2015 07 15	Secure
Purple-stemmed aster	<i>Symphyotrichum puniceum</i>	S5	2015 07 15	Secure
Common tansy	<i>Tanacetum vulgare</i>	SNA	2015 07 15	Exotic
Common dandelion	<i>Taraxacum officinale</i>	SNA	2015 07 15	Exotic
Tall meadow-rue	<i>Thalictrum pubescens</i>	S5	2015 07 15	Secure
New York fern	<i>Thelypteris noveboracensis</i>	S5	2015 07 15	Secure
Eastern marsh fern	<i>Thelypteris palustris</i>	S5	2015 07 15	Secure
Eastern white cedar	<i>Thuja occidentalis</i>	S5	2015 07 15	Secure
Fraser's marsh-St. John's-wort	<i>Triadenum fraseri</i>	S5	2015 07 15	Secure
Rabbit's-foot clover	<i>Trifolium arvense</i>	SNA	2015 07 15	Exotic
Red clover	<i>Trifolium pratense</i>	SNA	2015 07 15	Exotic
Painted trillium	<i>Trillium undulatum</i>	S5	2015 07 15	Secure
Coltsfoot	<i>Tussilago farfara</i>	SNA	2015 07 15	Exotic
Broad-leaved cattail	<i>Typha latifolia</i>	S5	2015 07 15	Secure
Late lowbush blueberry	<i>Vaccinium angustifolium</i>	S5	2015 07 15	Secure
Velvet-leaved blueberry	<i>Vaccinium myrtilloides</i>	S5	2015 07 15	Secure
Small cranberry	<i>Vaccinium oxycoccos</i>	S5	2015 07 15	Secure
Mountain cranberry	<i>Vaccinium vitis-idaea</i>	S4S5	2015 07 15	Secure
American speedwell	<i>Veronica americana</i>	S5	2015 07 15	Secure
Common speedwell	<i>Veronica officinalis</i>	S5	2015 07 15	Exotic
Marsh speedwell	<i>Veronica scutellata</i>	S5	2015 07 15	Secure
Thyme-leaved speedwell	<i>Veronica serpyllifolia</i>	SNA	2015 07 15	Secure
Hobblebush	<i>Viburnum lantanooides</i>	S5	2015 07 15	Secure
Northern wild raisin	<i>Viburnum nudum</i>	S5	2015 07 15	Secure
Tufted vetch	<i>Vicia cracca</i>	SNA	2015 07 15	Exotic
Marsh blue violet	<i>Viola cucullata</i>	S5	2015 07 15	Secure
Lance-leaved violet	<i>Viola lanceolata</i>	S4	2015 07 15	Secure
Small white violet	<i>Viola macloskeyi</i>	S5	2015 07 15	Secure
Kidney-leaved white violet	<i>Viola renifolia</i>	S4S5	2015 07 15	Secure

Table 6. The Atlantic Canada Conservation Data Centre's Sub-national (*i.e.*, provincial) rarity rank (S-rank) of species and S-rank definitions.

ACCDC S-rank	Definition
S1	<b>Extremely rare:</b> may be especially vulnerable to extirpation; typically five or fewer occurrences or very few remaining individuals.
S2	<b>Rare:</b> may be vulnerable to extirpation due to rarity or other factors; six to 20 occurrences or few remaining individuals.
S3	<b>Uncommon:</b> found only in a restricted range, even if abundant at some locations; 21 to 100 occurrences.
S4	<b>Usually widespread, fairly common:</b> apparently secure with many occurrences, but of longer-term concern ( <i>e.g.</i> , watch list); 100 + occurrences.
S5	<b>Abundant:</b> widespread and secure under present conditions.
S#S#	<b>Numeric range rank:</b> a range between two consecutive ranks for a species / community; denotes uncertainty about the exact rarity ( <i>e.g.</i> , S1S2).
SH	<b>Historical:</b> previously occurred in the province but may have been overlooked during the past 20 years to 70 years; presence is suspected and will likely be rediscovered.
SU	<b>Unrankable:</b> possibly in peril, but status is uncertain; need more information.
SX	<b>Extinct / Extirpated:</b> believed to be extirpated from its former range.
S?	<b>Unranked:</b> not yet ranked.
SA	<b>Accidental:</b> accidental or casual, infrequent, and far outside usual range; includes species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds, or even thousands of miles outside their usual range.
SE	<b>Exotic:</b> an exotic established in the province ( <i>e.g.</i> , Purple Loosestrife or Coltsfoot); may be native in nearby regions.
SE#	<b>Exotic numeric:</b> an established exotic that has been assigned a rank.
SP	<b>Potential:</b> potentially occurs, but no occurrences have been reported.
SR	<b>Reported:</b> no persuasive documentation ( <i>e.g.</i> , misidentified specimen).
SRF	<b>Reported falsely:</b> erroneously reported and the error has persisted in the literature.
SZ	<b>Zero:</b> not of practical conservation concern because there are no definable occurrences, although the species is native and appears regularly; an SZ rank is generally used for occasional long distance migrants.



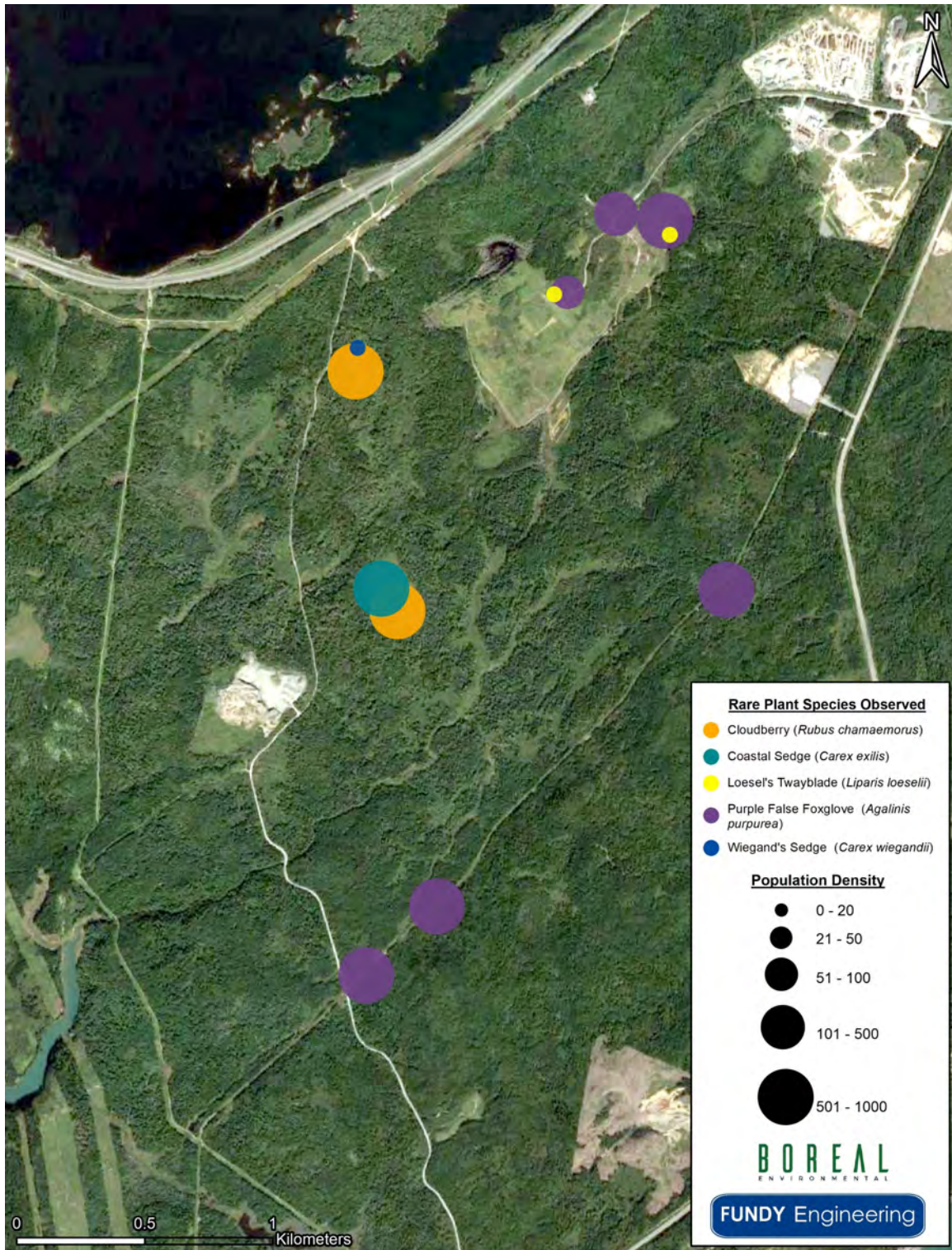


Figure 16. Location and population density of rare plants observed on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

### 5.1.1 Purple False Foxglove

*Agalinis purpurea* (Figure 17) is an annual forb native to eastern Canada. In late summer or early fall, the plant, which stands 10 cm to 120 cm tall, produces purple flowers that last about a month. It is hemiparasitic on a variety of hosts, particularly graminoids and appears to thrive in areas with occasional disturbance. According to the ACCDC databases, it is listed as S1 and May Be At Risk in New Brunswick (Table 5).

*Purpurea* was found at several locations on the property, but mainly in disturbed areas, such as along all-terrain vehicle trails, the pipeline right-of-way, and along the edges of roadways growing up through cracks in the asphalt (Figure 16). Specific locations in the field where observations were made along with approximate densities are provided in Table 7.



Figure 17. Photographs of *Agalinis purpurea* specimens identified on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

Table 7. Locations of *Agalinis purpurea* identified on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

Latitude	Longitude	Approximate Density
45°11'11.99"N	66°11'10.34"W	Several hundred
45°10'20.31"N	66°12'19.19"W	Several hundred
45°10'22.96"N	66°12'15.84"W	Several hundred
45°10'27.24"N	66°12'8.64"W	Several hundred
45°10'30.56"N	66°12'3.35"W	Several hundred
45°10'33.09"N	66°11'59.28"W	Several hundred
45°11'6.99"N	66°11'17.20"W	Several hundred
45°11'11.10"N	66°11'11.64"W	Several hundred



Latitude	Longitude	Approximate Density
45°11'58.88"N	66°11'33.76"W	Several hundred
45°11'57.93"N	66°11'30.91"W	Several hundred
45°11'11.17"N	66°11'11.02"W	A few hundred
45°11'48.04"N	66°11'39.65"W	A few hundred
45°11'58.94"N	66°11'28.48"W	5
45°11'56.05"N	66°11'24.49"W	50+
45°11'55.70"N	66°11'22.68"W	50+
45°11'56.38"N	66°11'22.42"W	50+
45°11'57.01"N	66°11'22.13"W	50+
45°11'58.11"N	66°11'21.09"W	50+
45°11'57.40"N	66°11'20.60"W	50+
45°11'55.90"N	66°11'20.90"W	50+

### 5.1.2 Coastal Sedge

Several hundred specimens of *Carex exilis* were observed (Figure 18) throughout the bog with central coordinates 45°11'10.01"N and 66°12'10.22"W (Figure 16). This species of sedge is found in open peatlands and patterned fens, which distinguishes it from all other *Carex* species. It blooms in late May through early June and fruiting occurs in early June through late July. The ACCDC lists the coastal sedge as being uncommon but secure in New Brunswick (Table 5).



Figure 18. Photograph of *Carex exilis* specimens identified on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

### 5.1.3 Wiegand's Sedge

Wiegand's sedge (*Carex wiegandii*) is a grass-like densely clumped sedge found in thin peatlands and bogs and acidic swamps in the shade of conifers or alder thickets. It generally has numerous flowering / fruiting stems 10 cm to 100 cm long with four to six flower / fruit clusters (Figure 19). The ACCDC lists Wiegand's sedge as being uncommon but secure in New Brunswick (Table 5). Three clumps of *wiegandii* were observed at 45°11'41.11"N and 66°12'17.20"W (Figure 16) within a swamp.



Figure 19. Photographs of *Carex wiegandii* specimens identified on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

### 5.1.4 Loesel's Twayblade

Loesel's twayblade (*Liparis loeselii*) was found in three locations on the property (Table 8; Figure 16). *Loeselii* (Figure 20) is a small (*i.e.*, 15 cm to 20 cm tall) bright yellowish green orchid often overlooked in fens, bogs, and disturbed habitats because of its size. It has two dark green, often glossy, basal leaves that appear in the spring and produces up to 18 small flowers in June and July. The ACCDC lists Loesel's twayblade as being uncommon but secure in New Brunswick (Table 5).

Table 8. Locations of *Liparis loeselii* identified on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

Latitude	Longitude	Approximate Density
45°11'47.77"N	66°11'42.01"W	Nine plants over 1 m <sup>2</sup>
45°11'55.27"N	66°11'21.28"W	Seven plants over 10 m <sup>2</sup>
45°11'54.90"N	66°11'21.09"W	Three plants over 1 m <sup>2</sup>





Figure 20. Photograph of *Liparis loeselii* specimens identified on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

#### 5.1.5 Cloudberry

Cloudberry (*Rubus chamaemorus*) was found throughout the two bogs at the Project site (Figure 16). *Chamaemorus* (Figure 21) is a 10 cm to 25 cm tall rhizomatous herb that produces an amber-coloured edible fruit in the fall similar to raspberries or blackberries. It is typically found in cool boggy places and calcareous soils. The ACCDC lists the cloudberry as being uncommon but secure in New Brunswick (Table 5).





Figure 21. Photograph of *Rubus chamaemorus* identified on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



## 6.0 WETLAND DELINEATIONS

### 6.1 DESK-TOP ASSESSMENT

GeoNB mapping shows several large wetlands within the boundaries of the property (Figure 22). Several of the wetlands are contiguous with on-site watercourses, such as Burchill's Brook, Frenchman's Creek, Mill Creek, and Marsh Brook. The wetlands at the mouth of each of those aforementioned watercourses are considered provincially significant because they are tidal wetlands.

### 6.2 FIELD ASSESSMENTS

Wetlands were delineated in the field between 19 August 2019 and 15 October 2019 and between 31 July 2020 and 10 September 2020. Those wetlands are shown in Figure 23 and summarized in sections below.

#### 6.2.1 *Note on Hydric Soils*

The soils within the study area are extremely shallow and sit atop bedrock. *Wicklund and Langmaid* [1953] described the soils in the area as Lorneville silty clay loam derived from marine deposits. The Lorneville series comprises red coloured fine-textured soils occurring along the coast. The soils are described as being poorly drained. Water is removed from the soil so slowly that the water table remains at or on the surface for the greater part of the time the soil is not frozen. These conditions are consistent across the site. Because of this, digging test pits and assessing the soils was considered extraordinary considering the landscape. Representatives with the NBDELG and NBDNRED were consulted and agreed that test pitting was not required for soils assessments.

#### 6.2.2 *Boundary Delineation*

Wetland boundaries were delineated in the field by assessing the relationship between hydrological indicators, hydrophytic vegetation, and hydric soils. Each datum pint in the field was spaced about 5 m to 10 m apart.



Figure 22. Mapped wetlands present on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



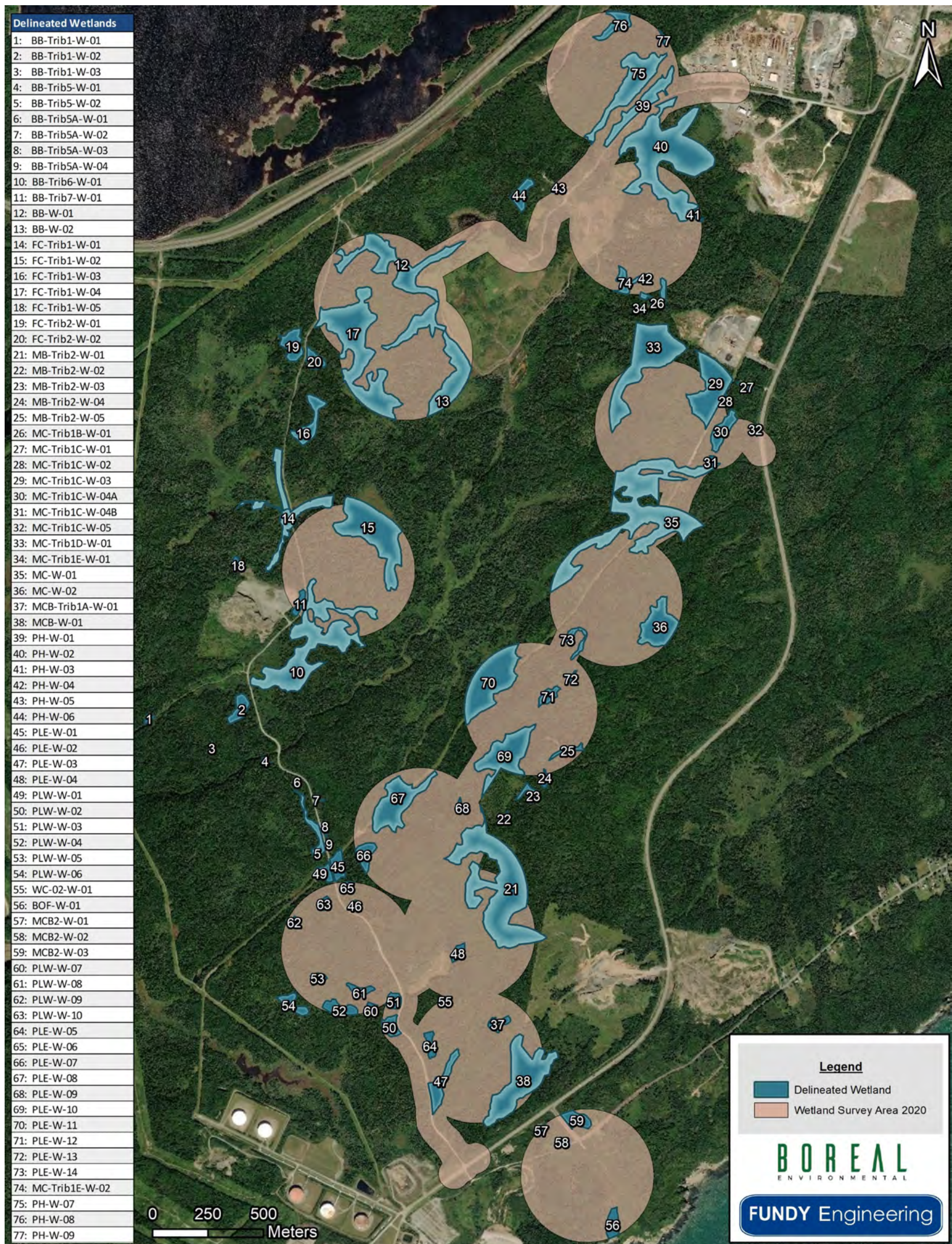


Figure 23. Wetlands delineated in the field within the survey area on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



### 6.2.3 Small Wetlands

For this Project, wetlands < 0.5 ha in size are considered small wetlands. Detailed paired point analyses (*i.e.*, upland versus wetland) and WFAs were not completed for small wetlands. Instead, information gathered from the large nearby wetlands (*i.e.*,  $\geq 0.5$  ha) were used for delineating the wetland boundaries.

A total of 39 small wetlands with a total area of 6.01 ha were delineated within the study area (Table 9). Overall, there is a fairly even mix of small tall shrub swamps and coniferous swamps located within the study area.

Table 9. Summary of small wetlands (*i.e.*, < 0.5 ha) delineated on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

Map ID	Unique ID*	Classification	Size (ha)
1	BB-Trib1-W-01	Black spruce tall shrub swamp	0.12
3	BB-Trib1-W-03	Coniferous riparian linked swamp	0.03
4	BB-Trib5-W-01	Coniferous riparian linked swamp	0.04
6	BB-Trib5A-W-01	Coniferous riparian linked swamp	0.04
7	BB-Trib5A-W-02	Coniferous riparian linked swamp	0.04
8	BB-Trib5A-W-03	Coniferous basin swamp	0.03
9	BB-Trib5A-W-04	Coniferous basin swamp	0.03
18	FC-Trib1-W-05	Tall shrub swamp	0.21
22	MB-Trib2-W-02	Coniferous basin swamp	0.05
23	MB-Trib2-W-03	Coniferous basin swamp	0.38
24	MB-Trib2-W-04	Coniferous basin swamp	0.12
25	MB-Trib2-W-05	Coniferous basin swamp	0.22
27	MC-Trib1C-W-01	Tall shrub swamp	0.19
28	MC-Trib1C-W-02	Coniferous swamp	0.03
31	MC-Trib1C-W-04B	Tall shrub swamp	0.12
32	MC-Trib1C-W-05	Tall shrub swamp	0.04
34	MC-Trib1E-W-01	Riverine tall shrub swamp	0.02
37	MCB-Trib1A-W-01	Balsam fir riparian linked slope swamp	0.38
41	PH-W-03	Coniferous basin swamp	0.21
42	PH-W-04	Tall shrub swamp	0.07
43	PH-W-05	Tall shrub basin swamp	0.03
46	PLE-W-02	Tall shrub riparian linked swamp	0.05
48	PLE-W-04	Coniferous basin swamp	0.30
51	PLW-W-03	Coniferous basin swamp	0.39
53	PLW-W-05	Tall shrub swamp	0.21
55	WC-02-W-01	Mixed forest riparian linked slope swamp	0.04
57	MCB2-W-01	Tall shrub basin swamp	0.08
58	MCB2-W-02	Tall shrub basin swamp	0.13
60	PLW-W-07	Mature cedar basin swamp	0.14
61	PLW-W-08	Mature cedar slope swamp	0.36
62	PLW-W-09	Mature cedar basin swamp	0.11

Map ID	Unique ID*	Classification	Size (ha)
63	PLW-W-10	Mature cedar basin swamp	0.19
64	PLE-W-05	Mature cedar slope swamp	0.35
65	PLE-W-06	Mature cedar slope swamp	0.16
68	PLE-W-09	Coniferous basin swamp	0.08
71	PLE-W-12	Tall shrub basin swamp	0.44
72	PLE-W-13	Tall shrub basin swamp	0.09
73	PLE-W-14	Tall shrub drainageway swamp	0.41
77	PH-W-09	Coniferous basin swamp	0.08

## NOTES:

\*BB = Burchill's Brook; Trib = Tributary; W = Wetland; FC = Frenchman's Creek; MB = Marsh Brook; MC = Mill Creek; MCB = Maguires Cove Brook; PH = Paddy's Hill; PLE = PipeLine East; PLW = PipeLine West; WC = Watercourse

#### 6.2.4 Large and / or Distinctive Wetlands

For this Project, wetlands  $\geq 0.5$  ha in size are considered large wetlands. Distinctive wetlands are those small wetlands (*i.e.*,  $< 0.5$  ha) that displayed some noteworthy feature in the field (*e.g.*, the source of a perennial tributary, located in a highly disturbed area, *etc.*). Detailed paired point analyses (*i.e.*, upland versus wetland) and functional assessments were completed for all large and / or distinctive wetlands and the results are provided below (Table 10).

Overall, 38 large and / or distinctive wetlands with a combined area of 108.5 ha were delineated. Two of the wetlands are located outside of the current project area (*i.e.*, PH-W-06 and PLW-W-06). Therefore, their WFAs are not included in Section 7.0.

Table 10. Summary of large (i.e., > 0.5 ha) and / or distinctive wetlands delineated within the survey area on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

Map ID	Unique ID*	Classification	Size (ha)	Wetland				Upland				
				Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover	Classification	Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover
2	BB-Trib1-W-02	Eastern white cedar tall shrub swamp	0.68	<ul style="list-style-type: none"> <li>• Eastern white cedar, 50%</li> <li>• Balsam fir, 20%</li> <li>• Black spruce, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 50%</li> <li>• Eastern white cedar, 20%</li> <li>• Balsam fir, 10%</li> <li>• Black spruce, 20%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 15%</li> <li>• Fowl manna grass, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 90%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>• Balsam fir, 30%</li> <li>• Eastern white cedar, 20%</li> <li>• Red spruce, 20%</li> <li>• Heart-leaved birch, 20%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 20%</li> <li>• Heart-leaved birch, 15%</li> <li>• Red spruce, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 60%</li> </ul>
5	BB-Trib5-W-02	Coniferous riparian linked swamp	0.71	<ul style="list-style-type: none"> <li>• Eastern white cedar, 35%</li> <li>• Balsam fir, 30%</li> <li>• Black spruce, 15%</li> <li>• Red maple, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 30%</li> <li>• Balsam fir, 10%</li> <li>• Eastern white cedar, 10%</li> <li>• Red spruce, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Fowl manna grass, 30%</li> <li>• Bunchberry, 10%</li> <li>• Spinulose woodfern, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 90%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>• Balsam fir, 35%</li> <li>• Heart-leaved birch, 20%</li> <li>• Eastern white cedar, 15%</li> <li>• Red spruce, 15%</li> <li>• Red maple, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 20%</li> <li>• Heart-leaved birch, 15%</li> <li>• Red spruce, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 10%</li> <li>• Evergreen woodfern, 10%</li> <li>• Twinflower, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 60%</li> </ul>
10	BB-Trib6-W-01	Mature eastern white cedar (150 years old) swamp	7.54	<ul style="list-style-type: none"> <li>• Eastern white cedar, 85%</li> <li>• Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 2%</li> </ul>		<ul style="list-style-type: none"> <li>• <i>Rhytidadelphus sp.</i>, 80%</li> <li>• <i>Hylocomiastrum sp.</i>, 10%</li> </ul>	Immature softwood (40 years old)	<ul style="list-style-type: none"> <li>• Balsam fir, 65%</li> <li>• Heart-leaved birch, 10%</li> <li>• Eastern white cedar, 5%</li> <li>• Red spruce, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> </ul>		<ul style="list-style-type: none"> <li>• Three-toothed whipwort, 15%</li> </ul>
11	BB-Trib7-W-01	Coniferous basin swamp	0.29 <sup>†</sup>	<ul style="list-style-type: none"> <li>• Eastern white cedar, 30%</li> <li>• Tamarack, 20%</li> <li>• Balsam fir, 20%</li> <li>• Black spruce, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 35%</li> <li>• Balsam fir, 10%</li> <li>• Red maple, 3%</li> </ul>	<ul style="list-style-type: none"> <li>• Broad-leaved cattail, 15%</li> <li>• Three-seeded sedge, 15%</li> <li>• Spinulose woodfern, 15%</li> <li>• Allegheny blackberry, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 90%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 50%</li> <li>• Heart-leaved birch, 20%</li> <li>• Red maple, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Evergreen woodfern, 15%</li> <li>• Bunchberry 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 50%</li> </ul>
12	BB-W-01	Mature coniferous slope swamp	4.25 <sup>§</sup>	<ul style="list-style-type: none"> <li>• Eastern white cedar, 45%</li> <li>• Balsam fir, 20%</li> <li>• Heart-leaved birch, 10%</li> <li>• Red maple, 5%</li> <li>• Tamarack, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 15%</li> <li>• Mountain holly, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Cinnamon fern, 10%</li> <li>• Bunchberry, 5%</li> <li>• Three-seeded sedge, 3%</li> <li>• Wood sorrel, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 90%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Red spruce, 35%</li> <li>• Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Red spruce, 15%</li> <li>• Balsam fir, 10%</li> <li>• Sheep laurel, 5%</li> <li>• Late lowbush blueberry, 1%</li> </ul>	<ul style="list-style-type: none"> <li>• Starflower, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 60%</li> <li>• Stairstep moss, 10%</li> </ul>
13	BB-W-02	Mixed forested swamp basin	4.41 <sup>§</sup>	<ul style="list-style-type: none"> <li>• Tamarack, 20%</li> <li>• Red maple, 20%</li> <li>• Heart-leaved birch, 15%</li> <li>• Balsam fir, 5%</li> <li>• Black spruce, 5%</li> <li>• Red spruce, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• American mountain ash, 5%</li> <li>• Black spruce, 5%</li> <li>• Balsam fir, 2%</li> <li>• Sheep laurel, 10%</li> <li>• Northern wild raisin, 2%</li> <li>• Heart-leaved birch, 2%</li> <li>• Mountain holly, 1%</li> </ul>	<ul style="list-style-type: none"> <li>• Three-seeded sedge, 30%</li> <li>• Cinnamon fern, 20%</li> <li>• Bunchberry, 20%</li> <li>• Slender manna grass, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 90%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Red spruce, 35%</li> <li>• Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Red spruce, 15%</li> <li>• Balsam fir, 10%</li> <li>• Sheep laurel, 5%</li> <li>• Late lowbush blueberry, 1%</li> </ul>		<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 60%</li> <li>• Stairstep moss, 10%</li> </ul>
14	FC-Trib1-W-01	Coniferous swamp	2.76	<ul style="list-style-type: none"> <li>• Balsam fir, 50%</li> <li>• Tamarack, 30%</li> <li>• Black spruce, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 20%</li> <li>• Sheep laurel, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Three-seeded sedge, 30%</li> <li>• Bunchberry, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 90%</li> <li>• Three-toothed whipwort, 5%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Red spruce, 25%</li> <li>• Heart-leaved birch, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• American mountain ash, 5%</li> <li>• Balsam fir, 5%</li> <li>• Northern wild raisin, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Evergreen woodfern, 10%</li> <li>• Bunchberry 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Dicranum sp.</i>, 10%</li> </ul>



Map ID	Unique ID*	Classification	Size (ha)	Wetland				Upland				
				Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover	Classification	Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover
15	FC-Trib1-W-02	Bog	5.35	<ul style="list-style-type: none"> <li>Black spruce, 50%</li> <li>Balsam fir, 10%</li> <li>Tamarack, 10%</li> <li>Heart-leaved birch, 2%</li> </ul>	<ul style="list-style-type: none"> <li>Black spruce, 10%</li> <li>Sheep laurel, 10%</li> <li>American mountain ash, 5%</li> <li>Mountain holly, 5%</li> <li>Balsam fir, 3%</li> <li>Common Labrador tea, 1%</li> <li>Velvet-leaved blueberry, 1%</li> </ul>	<ul style="list-style-type: none"> <li>Three-seeded sedge, 25%</li> <li>Three-leaved false Solomon's seal, 10%</li> <li>Bunchberry, 10%</li> </ul>	<ul style="list-style-type: none"> <li><i>Sphagnum sp.</i>, 100%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>Red spruce, 20%</li> <li>Balsam fir, 20%</li> <li>Black spruce, 10%</li> <li>Tamarack, 10%</li> <li>Heart-leaved birch, 5%</li> <li>American mountain ash, 3%</li> </ul>	<ul style="list-style-type: none"> <li>Black spruce, 15%</li> <li>Sheep laurel, 15%</li> <li>Northern wild raisin, 2%</li> <li>American mountain ash, 1%</li> </ul>	<ul style="list-style-type: none"> <li>Bunchberry, 20%</li> </ul>	<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 50%</li> <li><i>Dicranum sp.</i>, 10%</li> </ul>
16	FC-Trib1-W-03	Coniferous basin swamp	1.16	<ul style="list-style-type: none"> <li>Eastern white cedar, 30%</li> <li>Tamarack, 20%</li> <li>Balsam fir, 20%</li> <li>Black spruce, 15%</li> </ul>	<ul style="list-style-type: none"> <li>Speckled alder, 35%</li> <li>Balsam fir, 10%</li> <li>Red maple, 3%</li> </ul>	<ul style="list-style-type: none"> <li>Broad-leaved cattail, 15%</li> <li>Three-seeded sedge, 15%</li> <li>Spinulose woodfern, 15%</li> <li>Allegheny blackberry, 2%</li> </ul>	<ul style="list-style-type: none"> <li><i>Sphagnum sp.</i>, 75%</li> <li>Red-stemmed feather moss</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>Balsam fir, 50%</li> <li>Heart-leaved birch, 20%</li> <li>Red maple, 10%</li> </ul>	<ul style="list-style-type: none"> <li>Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>Evergreen woodfern, 15%</li> <li>Bunchberry 10%</li> </ul>	<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 50%</li> </ul>
17	FC-Trib1-W-04	Eastern white cedar swamp	7.66	<ul style="list-style-type: none"> <li>Eastern white cedar, 40%</li> <li>Black spruce, 10%</li> <li>Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Common Labrador tea, 15%</li> <li>Balsam fir, 10%</li> <li>Mountain holly, 10%</li> <li>Black spruce, 5%</li> <li>Common winterberry, 5%</li> <li>Eastern white cedar, 5%</li> <li>Sheep laurel, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Three-seeded sedge, 20%</li> <li>Bog aster, 15%</li> <li>Bunchberry, 15%</li> <li>Cinnamon fern, 10%</li> <li>Fowl manna grass, 3%</li> </ul>	<ul style="list-style-type: none"> <li><i>Rhytidiadelphus sp.</i>, 80%</li> <li><i>Hylocomiastrum sp.</i>, 10%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>Heart-leaved birch, 10%</li> <li>Red maple, 10%</li> <li>Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>American mountain ash, 20%</li> <li>Mountain holly, 20%</li> <li>Northern wild raisin, 20%</li> <li>Sheep laurel, 10%</li> <li>Balsam fir, 5%</li> <li>Speckled alder, 5%</li> <li>Velvet-leaved blueberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Bunchberry, 30%</li> <li>Twinflower, 5%</li> <li>Creeping snowberry, 2%</li> <li>Eastern teaberry, 1%</li> </ul>	
19	FC-Trib2-W-01	Tall shrub swamp	1.01	<ul style="list-style-type: none"> <li>Balsam fir, 15%</li> <li>Red maple, 15%</li> </ul>	<ul style="list-style-type: none"> <li>Speckled alder, 25%</li> <li>Mountain holly, 20%</li> <li>Red maple, 20%</li> <li>Balsam fir, 15%</li> </ul>	<ul style="list-style-type: none"> <li>Three-seeded sedge, 25%</li> <li>Hairy flat-top white aster, 20%</li> <li>Broad-leaved cattail, 15%</li> <li>Bladder sedge, 5%</li> <li>Bunchberry, 5%</li> <li>Crested wood fern, 5%</li> <li>Dwarf red raspberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li><i>Sphagnum sp.</i>, 95%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>Balsam fir,</li> <li>Red spruce</li> <li>Heart-leaved birch</li> </ul>	<ul style="list-style-type: none"> <li>Balsam fir</li> </ul>		<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 30%</li> <li>Three-toothed whipwort, 5%</li> </ul>
20	FC-Trib2-W-02	Tall shrub swamp	0.50	<ul style="list-style-type: none"> <li>Heart-leaved birch, 10%</li> <li>Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Bristly dewberry, 50%</li> <li>Mountain holly, 30%</li> <li>Northern wild raisin, 20%</li> <li>American mountain ash, 20%</li> <li>Speckled alder, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Bunchberry, 25%</li> <li>Hairy flat-top white aster, 20%</li> <li>Bog aster, 5%</li> <li>Spinulose wood fern, 5%</li> <li>Three-seeded sedge, 5%</li> </ul>	<ul style="list-style-type: none"> <li><i>Sphagnum sp.</i>, 95%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>Balsam fir, 35%</li> <li>Heart-leaved birch, 20%</li> <li>Red spruce, 10%</li> </ul>	<ul style="list-style-type: none"> <li>Balsam fir, 25%</li> <li>Sheep laurel, 15%</li> <li>Mountain holly, 10%</li> <li>American mountain ash, 5%</li> <li>Velvet-leaved blueberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Bunchberry, 40%</li> </ul>	<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 25%</li> </ul>

Map ID	Unique ID*	Classification	Size (ha)	Wetland				Upland				
				Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover	Classification	Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover
21	MB-Trib2-W-01	Coniferous slope swamp	10.05	<ul style="list-style-type: none"> <li>Balsam fir, 30%</li> <li>Red spruce, 25%</li> <li>Heart-leaved birch, 10%</li> <li>Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Red spruce, 25%</li> <li>Balsam fir, 15%</li> <li>Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Bunchberry, 25%</li> <li>Three-seeded sedge, 15%</li> <li>Evergreen woodfern, 5%</li> <li>Spinulose woodfern, 5%</li> </ul>	<ul style="list-style-type: none"> <li><i>Sphagnum sp.</i>, 95%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>Black spruce, 35%</li> <li>Red spruce, 30%</li> <li>Balsam fir, 5%</li> <li>Heart-leaved birch, 2%</li> </ul>	<ul style="list-style-type: none"> <li>Sheep laurel, 20%</li> <li>Mountain holly, 5%</li> <li>Velvet-leaved blueberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Bunchberry, 15%</li> <li>Creeping snowberry, 10%</li> <li>Mountain cranberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 70%</li> <li>Reindeer lichen, 10%</li> <li><i>Dicranum sp.</i>, 10%</li> </ul>
26	MC-Trib1B-W-01	Riverine tall shrub swamp	0.48 <sup>†</sup>	<ul style="list-style-type: none"> <li>Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Speckled alder, 50%</li> <li>Balsam fir, 5%</li> <li>Eastern white cedar, 2%</li> </ul>	<ul style="list-style-type: none"> <li>Flat-topped aster, 20%</li> <li>Slender manna grass, 20%</li> <li>Nodding sedge, 15%</li> <li>Rough-stemmed goldenrod, 10%</li> <li>Tall meadow-rue, 5%</li> <li>Swamp yellow loosestrife, 2%</li> <li>Northern water horehound, 2%</li> <li>Three-flowered bedstraw, 2%</li> </ul>		Mature softwood	<ul style="list-style-type: none"> <li>Red spruce, 60%</li> <li>Balsam fir, 10%</li> <li>Eastern white cedar, 5%</li> <li>Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Balsam fir, 40%</li> </ul>		<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 15%</li> <li><i>Dicranum sp.</i>, 10%</li> <li>Three-toothed whipwort, 10%</li> </ul>
29	MC-Trib1C-W-03	Mature eastern white cedar (100 years+ old) riparian linked swamp	3.34	<ul style="list-style-type: none"> <li>Eastern white cedar, 85%</li> <li>Red spruce, 5%</li> </ul>		<ul style="list-style-type: none"> <li>Spinulose wood fern, 1%</li> <li>Eastern white cedar, 1%</li> </ul>	<ul style="list-style-type: none"> <li><i>Rhytidiadelphus sp.</i>, 50%</li> <li>Red-stemmed feather moss, 25%</li> <li>Stairstep moss, 20%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>Balsam fir, 50%</li> <li>Heart-leaved birch, 25%</li> <li>Yellow birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Balsam fir, 10%</li> </ul>		
30	MC-Trib1C-W-04A	Mature eastern white cedar (40 years+ old) riparian linked swamp	0.94	<ul style="list-style-type: none"> <li>Eastern white cedar, 90%</li> <li>Red spruce, 5%</li> </ul>		<ul style="list-style-type: none"> <li>Spinulose wood fern, 10%</li> <li>Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li><i>Sphagnum sp.</i>, 100%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>Balsam fir, 50%</li> <li>Heart-leaved birch, 25%</li> <li>Yellow birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Balsam fir, 10%</li> </ul>		
33	MC-Trib1D-W-01	Mature eastern white cedar (100 years+ old) swamp	5.53	<ul style="list-style-type: none"> <li>Eastern white cedar, 70%</li> <li>Black spruce, 10%</li> </ul>	<ul style="list-style-type: none"> <li>Eastern white cedar, 20%</li> <li>Sheep laurel, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Three-seeded sedge, 15%</li> <li>Three-leaved false Solomon's seal, 10%</li> <li>Dwarf red raspberry, 5%</li> <li>Naked Bishop's-cap, 5%</li> <li>One-sided wintergreen, 5%</li> <li>Bristly-stalked sedge, 3%</li> <li>Bunchberry, 2%</li> <li>Fowl manna grass, 2%</li> <li>Twinflower, 2%</li> </ul>	<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 80%</li> <li>Knight's plume moss, 5%</li> <li><i>Rhytidiadelphus sp.</i>, 5%</li> <li><i>Sphagnum sp.</i>, 5%</li> </ul>	Mature softwood (80 years+ old)	<ul style="list-style-type: none"> <li>Red spruce, 30%</li> <li>Balsam fir, 20%</li> <li>Heart-leaved birch, 10%</li> </ul>	<ul style="list-style-type: none"> <li>Balsam fir, 25%</li> <li>Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Bunchberry, 30%</li> <li>Twinflower, 5%</li> <li>Goldthread, 1%</li> </ul>	<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 50%</li> <li>Stairstep moss, 25%</li> <li>Three-toothed whipwort, 5%</li> </ul>
35	MC-W-01	Mature eastern white cedar swamp	10.64	<ul style="list-style-type: none"> <li>Eastern white cedar, 85%</li> <li>Red spruce, 5%</li> </ul>		<ul style="list-style-type: none"> <li>Twinflower, 5%</li> <li>Bunchberry, 3%</li> <li>Spinulose woodfern, 2%</li> <li>Dwarf red raspberry, 1%</li> </ul>	<ul style="list-style-type: none"> <li>Red-stemmed feather moss, 80%</li> <li>Stairstep moss, 10%</li> <li>Three-toothed whipwort, 5%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>Balsam fir, 40%</li> <li>Heart-leaved birch, 35%</li> <li>Red spruce, 5%</li> </ul>	<ul style="list-style-type: none"> <li>Balsam fir, 5%</li> <li>Heart-leaved birch, 5%</li> </ul>		<ul style="list-style-type: none"> <li>Three-toothed whipwort, 15%</li> <li>Red-stemmed feather moss, 5%</li> </ul>

Map ID	Unique ID*	Classification	Size (ha)	Wetland				Upland				
				Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover	Classification	Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover
36	MC-W-02	Mature eastern white cedar basin swamp	2.39	<ul style="list-style-type: none"> <li>• Eastern white cedar, 60%</li> <li>• Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> <li>• Mountain holly, 10%</li> <li>• Northern wild raisin, 5%</li> <li>• Canada fly honeysuckle, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Three-seeded sedge, 40%</li> <li>• Bunchberry, 15%</li> <li>• Woodland horsetail, 15%</li> <li>• Hairy flat-top white aster, 10%</li> <li>• Bladder sedge, 2%</li> <li>• Twinflower, 2%</li> <li>• Wild sarsaparilla, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 75%</li> <li>• Red-stemmed feather moss</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 50%</li> <li>• Red spruce, 20%</li> <li>• Heart-leaved birch, 10%</li> <li>• Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> <li>• Northern wild raisin, 2%</li> <li>• Canada fly honeysuckle, 1%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 10%</li> <li>• Evergreen wood fern, 10%</li> <li>• Starflower, 2%</li> <li>• Wild lily-of the valley, 1%</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
38	MCB-W-01	Tall shrub riparian linked basin swamp	4.98	<ul style="list-style-type: none"> <li>• Eastern white cedar, 40%</li> <li>• Black spruce, 15%</li> <li>• Tamarack, 15%</li> <li>• Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Tamarack, 15%</li> <li>• Speckled alder, 15%</li> <li>• Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Three-seeded sedge, 50%</li> <li>• Fowl manna grass, 20%</li> <li>• Bunchberry, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 95%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Heart-leaved birch, 35%</li> <li>• Red spruce, 10%</li> <li>• Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> <li>• Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 25%</li> <li>• Evergreen woodfern, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 50%</li> </ul>
39	PH-W-01	Tall shrub basin swamp	1.82	<ul style="list-style-type: none"> <li>• Balsam fir, 25%</li> <li>• Tamarack, 15%</li> <li>• Black spruce, 10%</li> <li>• Red maple, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 60%</li> <li>• Tamarack, 15%</li> <li>• Balsam fir, 10%</li> <li>• Red spruce, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Three-seeded sedge, 30%</li> <li>• Broad-leaved cattail, 15%</li> <li>• Fowl manna grass, 10%</li> <li>• Spinulose woodfern, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 100%</li> </ul>	Mixed forest	<ul style="list-style-type: none"> <li>• Balsam fir, 70%</li> <li>• Red spruce, 10%</li> <li>• Heart-leaved birch, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 20%</li> <li>• Heart-leaved birch, 5%</li> <li>• Mountain holly, 5%</li> <li>• Red spruce, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 70%</li> </ul>
40	PH-W-02	Eastern white cedar swamp	9.67	<ul style="list-style-type: none"> <li>• Eastern white cedar, 75%</li> <li>• Black spruce, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Eastern white cedar, 5%</li> <li>• American mountain ash, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Three-seeded sedge, 30%</li> <li>• Cinnamon fern, 20%</li> <li>• Bunchberry, 5%</li> <li>• New York fern, 5%</li> <li>• Wild sarsaparilla, 5%</li> <li>• Bladder sedge, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 100%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 75%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 20%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 30%</li> <li>• Three-toothed whipwort, 30%</li> <li>• Stairstep moss, 30%</li> </ul>
44	PH-W-06	Coniferous basin swamp	0.72	OUTSIDE OF THE 2020 SURVEY AREA								
45	PLE-W-01	Coniferous tall shrub riparian linked swamp	0.61	<ul style="list-style-type: none"> <li>• Balsam fir, 20%</li> <li>• Black spruce, 20%</li> <li>• Eastern white cedar, 5%</li> <li>• Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 20%</li> <li>• Balsam fir, 10%</li> <li>• Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Broad-leaved cattail, 25%</li> <li>• Three-seeded sedge, 15%</li> <li>• Fowl manna grass, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 90%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>• Balsam fir, 35%</li> <li>• Heart-leaved birch, 20%</li> <li>• Eastern white cedar, 15%</li> <li>• Red spruce, 15%</li> <li>• Red maple, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 20%</li> <li>• Heart-leaved birch, 15%</li> <li>• Red spruce, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 10%</li> <li>• Evergreen woodfern, 10%</li> <li>• Twinflower, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 60%</li> </ul>
47	PLE-W-03	Coniferous basin swamp	1.14	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Eastern white cedar, 30%</li> <li>• Black spruce, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 10%</li> <li>• Spinulose woodfern, 10%</li> <li>• Manna grass, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 95%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Heart-leaved birch, 35%</li> <li>• Red spruce, 10%</li> <li>• Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> <li>• Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 25%</li> <li>• Evergreen woodfern, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 50%</li> </ul>
49	PLW-W-01	Spruce tall shrub riparian linked swamp	0.37 <sup>1</sup>	<ul style="list-style-type: none"> <li>• Black spruce, 20%</li> <li>• Balsam fir, 10%</li> <li>• Eastern white cedar, 10%</li> <li>• Heart-leaved birch, 5%</li> <li>• Tamarack, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 30%</li> <li>• Balsam fir, 10%</li> <li>• Eastern white cedar, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Broad-leaved cattail, 15%</li> <li>• Three-seeded sedge, 20%</li> <li>• Fowl manna grass, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 90%</li> </ul>	Immature mixed forest (40 years old)	<ul style="list-style-type: none"> <li>• Balsam fir, 35%</li> <li>• Heart-leaved birch, 20%</li> <li>• Eastern white cedar, 15%</li> <li>• Red spruce, 15%</li> <li>• Red maple, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 20%</li> <li>• Heart-leaved birch, 15%</li> <li>• Red spruce, 15%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 10%</li> <li>• Evergreen woodfern, 10%</li> <li>• Twinflower, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 60%</li> </ul>



Map ID	Unique ID*	Classification	Size (ha)	Wetland				Upland				
				Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover	Classification	Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover
50	PLW-W-02	Eastern white cedar basin swamp	0.55	<ul style="list-style-type: none"> <li>• Eastern white cedar, 30%</li> <li>• Black spruce, 15%</li> <li>• Balsam fir, 10%</li> <li>• Heart-leaved birch, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 50%</li> <li>• Balsam fir, 10%</li> <li>• Black spruce, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 10%</li> <li>• Spinulose woodfern, 10%</li> <li>• Manna grass, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 95%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Black spruce, 35%</li> <li>• Red spruce, 30%</li> <li>• Balsam fir, 10%</li> <li>• Heart-leaved birch, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Sheep laurel, 20%</li> <li>• Mountain holly, 10%</li> <li>• Velvet-leaved blueberry, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 15%</li> <li>• Creeping snowberry, 10%</li> <li>• Mountain cranberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 75%</li> </ul>
52	PLW-W-04	Mature eastern white cedar slope swamp	0.66	<ul style="list-style-type: none"> <li>• Eastern white cedar, 50%</li> <li>• Balsam fir, 15%</li> <li>• Red spruce, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Three-seeded sedge, 40%</li> <li>• Bunchberry, 15%</li> <li>• Wild sarsaparilla, 10%</li> <li>• Common wood sorrel, 3%</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	Mature mixed wood	<ul style="list-style-type: none"> <li>• Heart-leaved birch, 25%</li> <li>• Red spruce, 25%</li> <li>• Balsam fir, 20%</li> <li>• Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 15%</li> <li>• Wild sarsaparilla, 5%</li> <li>• Starflower, 1%</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
54	PLW-W-06	Tall shrub swamp	0.61	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 50%</li> <li>• Balsam fir, 10%</li> <li>• Black spruce, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 10%</li> <li>• Spinulose woodfern, 10%</li> <li>• Manna grass, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 95%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Black spruce, 35%</li> <li>• Red spruce, 30%</li> <li>• Balsam fir, 10%</li> <li>• Heart-leaved birch, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Sheep laurel, 20%</li> <li>• Mountain holly, 10%</li> <li>• Velvet-leaved blueberry, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 15%</li> <li>• Creeping snowberry, 10%</li> <li>• Mountain cranberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 75%</li> </ul>
56	BOF-W-01	Tall shrub slope swamp	0.58	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 60%</li> <li>• White meadowsweet, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Yellow sedge, 25%</li> <li>• Thread rush, 20%</li> <li>• Dwarf red raspberry, 10%</li> <li>• Grass-leaved goldenrod, 10%</li> <li>• Bluejoint reed grass, 5%</li> <li>• Coltsfoot, 5%</li> <li>• Purple-stemmed aster, 5%</li> <li>• Soft rush, 5%</li> <li>• Wild mint, 5%</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>	Tall shrub	<ul style="list-style-type: none"> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Speckled alder, 70%</li> <li>• Alleghaney blackberry, 5%</li> <li>• White meadowsweet, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Mountain woodfern, 50%</li> <li>• Rough-stemmed goldenrod, 2%</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
59	MCB2-W-03	Tall shrub basin swamp	0.67	<ul style="list-style-type: none"> <li>• Heart-leaved birch, 2%</li> <li>• Tamarack, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Mountain holly, 5%</li> <li>• Speckled alder, 5%</li> <li>• White meadowsweet, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Whorled wood aster, 20%</li> <li>• Bunchberry, 18%</li> <li>• Dwarf red raspberry, 10%</li> <li>• Hairy flat-top white aster, 5%</li> <li>• Nodding sedge, 5%</li> <li>• Soft rush, 5%</li> <li>• Spotted lady's thumb, 5%</li> <li>• Three-seeded sedge, 5%</li> <li>• Tussock cottongrass, 3%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 95%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Heart-leaved birch, 15%</li> <li>• Eastern white cedar, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> <li>• American mountain ash, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Evergreen wood fern, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Red-stemmed feather moss, 50%</li> </ul>
66	PLE-W-07	Mature eastern white cedar slope swamp	0.69	<ul style="list-style-type: none"> <li>• Eastern white cedar, 50%</li> <li>• Balsam fir, 20%</li> <li>• Black spruce, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Twinflower, 10%</li> <li>• Bunchberry, 5%</li> <li>• Wild lily-of-the-valley, 3%</li> <li>• Spinulose wood fern, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 75%</li> <li>• Red-stemmed feather moss</li> </ul>	Mature mixed wood	<ul style="list-style-type: none"> <li>• Balsam fir, 40%</li> <li>• Heart-leaved birch, 20%</li> <li>• Eastern white cedar, 10%</li> <li>• Red spruce, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Twinflower, 10%</li> <li>• Bunchberry, 5%</li> <li>• Wild lily-of-the-valley, 3%</li> <li>• Spinulose wood fern, 2%</li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>

Map ID	Unique ID*	Classification	Size (ha)	Wetland				Upland				
				Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover	Classification	Dominant Trees	Dominant Shrubs	Dominant Herbs	Moss Cover
67	PLE-W-08	Mature eastern white cedar slope swamp	3.19	<ul style="list-style-type: none"> <li>• Eastern white cedar, 65%</li> <li>• Balsam fir, 20%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> <li>• Speckled alder, 3%</li> <li>• American mountain ash, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Twinflower, 20%</li> <li>• Dwarf red raspberry, 10%</li> <li>• Common lady fern, 5%</li> <li>• Northern beech fern, 5%</li> <li>• Wild sarsaparilla, 3%</li> <li>• Cinnamon fern, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 15%</li> <li>• Common lady fern, 10%</li> <li>• Dwarf red raspberry, 10%</li> <li>• Wild sarsaparilla, 5%</li> </ul>	Mature soft wood	<ul style="list-style-type: none"> <li>• Balsam fir, 70%</li> <li>• Heart-leaved birch, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 15%</li> <li>• Spinulose wood fern, 10%</li> <li>• Common wood sorrel, 5%</li> <li>• Wild lily-of-the-valley, 5%</li> <li>• Creeping snowberry, 2%</li> <li>• Starflower, 2%</li> </ul>	•
69	PLE-W-10	Mature coniferous basin swamp	3.30	<ul style="list-style-type: none"> <li>• Eastern white cedar, 25%</li> <li>• Red spruce, 15%</li> <li>• Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Mountain holly, 20%</li> <li>• Balsam fir, 15%</li> <li>• Red spruce, 5%</li> <li>• Speckled alder, 5%</li> <li>• Sheep laurel, 1%</li> </ul>	<ul style="list-style-type: none"> <li>• Cinnamon fern, 50%</li> <li>• Tussock sedge, 20%</li> <li>• Three-seeded sedge, 10%</li> <li>• Bunchberry, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 75%</li> <li>• Red-stemmed feather moss</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 50%</li> <li>• Red spruce, 20%</li> <li>• Heart-leaved birch, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> <li>• Mountain holly, 2%</li> </ul>	•	•
70	PLE-W-11	Mature coniferous slope swamp	4.50	<ul style="list-style-type: none"> <li>• Eastern white cedar, 40%</li> <li>• Balsam fir, 35%</li> <li>• Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• American mountain ash, 5%</li> <li>• Balsam fir, 5%</li> <li>• Canada fly honeysuckle, 3%</li> </ul>	•	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 75%</li> <li>• Red-stemmed feather moss</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Balsam fir, 50%</li> <li>• Red spruce, 25%</li> <li>• Heart-leaved birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Bunchberry, 30%</li> <li>• Spinulose wood fern, 10%</li> <li>• American mountain ash, 3%</li> <li>• Common wood sorrel, 2%</li> </ul>	•
74	MC-Trib1E-W-02		0.52	OUTSIDE OF THE 2020 SURVEY AREA								
75	PH-W-07	Mature eastern white cedar basin swamp	3.34	<ul style="list-style-type: none"> <li>• Eastern white cedar, 80%</li> <li>• Balsam fir, 10%</li> </ul>	<ul style="list-style-type: none"> <li>• Mountain holly, 20%</li> <li>• Eastern white cedar, 10%</li> <li>• Black spruce, 5%</li> <li>• Sheep laurel, 3%</li> <li>• Balsam fir, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• Three-seeded sedge, 10%</li> <li>• <b>• Cloudberry, 10%</b></li> <li>• Bristly-stalked sedge, 5%</li> <li>• Cinnamon fern, 5%</li> <li>• Wild lily-of-the-valley, 5%</li> <li>• Bunchberry, 2%</li> <li>• Starflower, 2%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 100%</li> </ul>	Mature softwood	<ul style="list-style-type: none"> <li>• Red spruce, 40%</li> <li>• Balsam fir, 10%</li> <li>• Eastern white cedar, 10%</li> <li>• Red maple, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Mountain holly, 5%</li> <li>• Sheep laurel, 2%</li> <li>• American mountain ash, 1%</li> </ul>	<ul style="list-style-type: none"> <li>• Wild lily-of-the-valley, 2%</li> <li>• Starflower, 1%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 70%</li> </ul>
76	PH-W-08	Mature eastern white cedar basin swamp	0.89	<ul style="list-style-type: none"> <li>• Eastern white cedar, 50%</li> <li>• Balsam fir, 10%</li> <li>• Red spruce, 10%</li> <li>• Tamarack, 5%</li> <li>• Yellow birch, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Twinflower, 40%</li> <li>• Three-seeded sedge, 10%</li> <li>• Wild sarsaparilla, 5%</li> <li>• Cinnamon fern, 3%</li> <li>• Common lady fern, 2%</li> <li>• Tall meadow-rue, 1%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 100%</li> </ul>	Mature mixed wood	<ul style="list-style-type: none"> <li>• Eastern white cedar, 20%</li> <li>• Red spruce, 20%</li> <li>• Balsam fir, 10%</li> <li>• Red maple, 5%</li> </ul>	<ul style="list-style-type: none"> <li>• Balsam fir, 10%</li> <li>• Heart-leaved birch, 20%</li> </ul>	<ul style="list-style-type: none"> <li>• Starflower, 3%</li> <li>• Wild lily-of-the-valley, 1%</li> </ul>	<ul style="list-style-type: none"> <li>• <i>Sphagnum sp.</i>, 70%</li> </ul>

NOTES:

\*BB = Burchill's Brook; Trib = Tributary; W = Wetland; FC = Frenchman's Creek; MB = Marsh Brook; MC = Mill Creek; MCB = Maguires Cove Brook; PH = Paddy's Hill; PLE = PipeLine East; PLW = PipeLine West; WC = Watercourse

†Considered distinctive because it is the source of BB-Trib7 and is impacted by activities within the adjacent rock quarry

§During the 2019 delineation season, it was believed that BB-W-01 and BB-W-02 were separate wetlands, but additional delineation during the 2020 season revealed they are one large wetland; however, to avoid confusion with the earlier report, they were kept separate within this report

‡Considered distinctive because it is the source of MC-Trib1B

¶Considered distinctive because it is located along the pipeline right-of-way and is impacted regularly by all-terrain vehicles

## 7.0 WETLAND FUNCTIONAL ASSESSMENTS

### 7.1 WESP-AC MODEL RESULTS

WFAs were completed for 36 wetlands within the survey area (*n.b.*, 38 wetlands are listed, but WFAs for two were not completed as they fall outside of the survey area). The full WESP-AC Model results for the wetlands assessed are included in Appendix II. A summary of the WFA scoring is provided in Table 11. The wetland functions are grouped as follows:

- hydrologic group:
  - water storage and delay;
- water quality support group:
  - sediment retention and stabilization;
  - phosphorous retention;
  - nitrate removal and retention; and
  - carbon sequestration;
- aquatic support group:
  - streamflow support;
  - aquatic invertebrate habitat;
  - organic nutrient export; and
  - water cooling;
- aquatic habitat group:
  - anadromous fish habitat;
  - resident fish habitat;
  - amphibian and turtle habitat;
  - waterbird feeding habitat; and
  - waterbird nesting habitat;
- transition habitat:
  - songbird, raptor, and mammal habitat;
  - native plant habitat; and
  - pollinator habitat;
- wetland condition (*i.e.*, wetland ecological condition); and
- wetland risk (*i.e.*, average of sensitivity and stressors).

The WFA results were plotted on a condition risk matrix shown in Figure 24. All of the wetlands assessed, save for two, scored a moderate to higher condition rating. Wetlands with a moderate risk rating were the lowest group. None of the wetlands assessed showed a higher condition rating combined with a higher risk rating. Seven of the assessed wetlands have a higher risk rating and include:

- BB-Trib5-W-02 (*i.e.*, 5);
- BB-Trib7-W-01 (*i.e.*, 11);
- BB-W-01 (*i.e.*, 12);



- PH-W-01 (*i.e.*, 39);
- PLE-W-01 (*i.e.*, 45);
- PLW-W-01 (*i.e.*, 49); and
- PLW-W-02 (*i.e.*, 50).

Results of the WFAs suggest that those wetlands in the survey area that have the highest condition rating have the lowest risk rating whereas those wetlands with the highest risk rating have a moderate condition rating.

Table 11. Summary of wetland functional assessments completed for large (*i.e.*,  $\geq 0.5$  ha) and / or distinctive wetlands identified within the survey area on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.

Unique ID (Map ID)	Description	WESP-AC Summary Ratings for Grouped Functions					Wetland Condition	Wetland Risk
		Hydrologic	Water Quality Support	Aquatic Support	Aquatic Habitat	Transition Habitat		
BB-Trib1-W-02 (2)	Function Score (Normalized)	1.88	6.24	6.01	1.62	7.00	-	-
	Function Rating	Lower	Higher	Moderate	Lower	Moderate	-	-
	Benefits Score (Normalized)	0.37	4.91	2.45	1.30	4.05	7.83	0.98
	Benefits Rating	Lower	Moderate	Moderate	Lower	Moderate	HIGHER	LOWER
BB-Trib5-W-02 (5)	Function Score (Normalized)	2.66	5.00	3.85	1.30	7.68	-	-
	Function Rating	Moderate	Moderate	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	1.58	4.77	2.08	2.87	9.75	3.49	4.56
	Benefits Rating	Lower	Moderate	Moderate	Lower	Higher	MODERATE	HIGHER
BB-Trib6-W-01 (10)	Function Score (Normalized)	6.25	2.57	6.75	3.84	9.40	-	-
	Function Rating	Higher	Lower	Higher	Moderate	Higher	-	-
	Benefits Score (Normalized)	1.68	3.78	3.57	3.04	4.77	7.59	2.26
	Benefits Rating	Lower	Lower	Moderate	Lower	Moderate	HIGHER	LOWER
BB-Trib7-W-01 (11)	Function Score (Normalized)	4.06	3.76	5.08	3.97	8.51	-	-
	Function Rating	Moderate	Moderate	Moderate	Moderate	Higher	-	-
	Benefits Score (Normalized)	4.15	7.27	5.24	3.39	4.20	3.49	7.89
	Benefits Rating	Moderate	Moderate	Higher	Moderate	Higher	MODERATE	HIGHER
BB-W-01 (12)	Function Score (Normalized)	5.83	3.41	6.17	6.98	9.86	-	-
	Function Rating	Higher	Moderate	Higher	Higher	Higher	-	-
	Benefits Score (Normalized)	0.42	7.02	5.47	7.33	10.00	6.39	6.10
	Benefits Rating	Lower	Moderate	Higher	Higher	Higher	MODERATE	HIGHER
BB-W-02 (13)	Function Score (Normalized)	2.40	5.76	4.74	1.72	8.73	-	-
	Function Rating	Lower	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.52	10.00	2.66	0.73	3.83	7.11	0.44

Unique ID (Map ID)	Description	WESP-AC Summary Ratings for Grouped Functions					Wetland Condition	Wetland Risk
		Hydrologic	Water Quality Support	Aquatic Support	Aquatic Habitat	Transition Habitat		
	Benefits Rating	Lower	Higher	Moderate	Lower	Moderate	HIGHER	LOWER
FC-Trib1-W-01 (14)	Function Score (Normalized)	6.15	3.30	8.66	6.49	9.42	-	-
	Function Rating	Higher	Moderate	Higher	Higher	Higher	-	-
	Benefits Score (Normalized)	0.29	8.79	6.95	4.80	4.02	6.39	5.49
	Benefits Rating	Lower	Higher	Higher	Moderate	Moderate	MODERATE	HIGHER
FC-Trib1-W-02 (15)	Function Score (Normalized)	4.69	6.32	4.30	0.54	8.42	-	-
	Function Rating	Moderate	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.37	1.23	2.17	0.61	8.75	8.55	1.18
	Benefits Rating	Lower	Lower	Moderate	Lower	Higher	HIGHER	LOWER
FC-Trib1-W-03 (16)	Function Score (Normalized)	2.81	6.37	4.62	1.74	8.42	-	-
	Function Rating	Moderate	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.42	0.29	2.38	1.81	7.21	7.83	0.11
	Benefits Rating	Lower	Lower	Moderate	Lower	Higher	HIGHER	LOWER
FC-Trib1-W-04 (17)	Function Score (Normalized)	2.08	6.50	6.09	2.05	9.52	-	-
	Function Rating	Lower	Higher	Higher	Lower	Higher	-	-
	Benefits Score (Normalized)	0.42	1.10	2.67	1.04	8.75	8.55	1.23
	Benefits Rating	Lower	Lower	Moderate	Lower	Higher	HIGHER	LOWER
FC-Trib2-W-01 (19)	Function Score (Normalized)	2.92	3.23	7.39	5.61	9.69	-	-
	Function Rating	Moderate	Moderate	Higher	Moderate	Higher	-	-
	Benefits Score (Normalized)	0.39	3.48	4.31	3.85	4.57	7.59	1.61
	Benefits Rating	Lower	Lower	Moderate	Moderate	Moderate	HIGHER	LOWER
FC-Trib2-W-02 (20)	Function Score (Normalized)	2.40	4.75	4.10	1.59	7.88	-	-
	Function Rating	Lower	Moderate	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.42	3.46	2.34	0.65	3.44	4.22	1.77
	Benefits Rating	Lower	Lower	Moderate	Lower	Moderate	MODERATE	LOWER



Unique ID (Map ID)	Description	WESP-AC Summary Ratings for Grouped Functions					Wetland Condition	Wetland Risk
		Hydrologic	Water Quality Support	Aquatic Support	Aquatic Habitat	Transition Habitat		
MB-Trib2-W-01 (21)	Function Score (Normalized)	1.04	8.41	6.08	1.85	8.82	-	-
	Function Rating	Lower	Higher	Higher	Higher	Lower	-	-
	Benefits Score (Normalized)	1.30	0.73	0.66	0.65	3.94	8.55	1.08
	Benefits Rating	Lower	Lower	Lower	Lower	Moderate	HIGHER	LOWER
MC-Trib1B-W-01 (26)	Function Score (Normalized)	6.67	2.34	7.92	4.46	9.59	-	-
	Function Rating	Higher	Lower	Higher	Moderate	Higher	-	-
	Benefits Score (Normalized)	1.43	8.62	6.35	3.35	4.51	7.11	2.11
	Benefits Rating	Lower	Higher	Higher	Moderate	Moderate	HIGHER	LOWER
MC-Trib1C-W-03 (29)	Function Score (Normalized)	1.20	7.95	4.17	1.68	8.05	-	-
	Function Rating	Lower	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	4.45	2.99	0.61	1.43	4.17	3.25	4.29
	Benefits Rating	Moderate	Lower	Lower	Lower	Moderate	MODERATE	MODERATE
MC-Trib1C-W-04A (30)	Function Score (Normalized)	2.66	6.27	4.13	1.69	7.66	-	-
	Function Rating	Moderate	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	1.33	0.29	4.44	0.52	3.57	5.66	1.27
	Benefits Rating	Lower	Lower	Moderate	Lower	Moderate	MODERATE	LOWER
MC-Trib1D-W-01 (33)	Function Score (Normalized)	5.63	6.21	4.72	1.88	8.33	-	-
	Function Rating	Higher	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	1.63	1.49	5.07	0.47	3.73	4.70	0.96
	Benefits Rating	Lower	Lower	Higher	Lower	Moderate	MODERATE	LOWER
MC-W-01 (35)	Function Score (Normalized)	4.48	3.74	4.21	6.21	9.20	-	-
	Function Rating	Moderate	Moderate	Moderate	Moderate	Higher	-	-
	Benefits Score (Normalized)	0.22	10.00	5.52	5.53	9.17	4.94	2.28
	Benefits Rating	Lower	Higher	Higher	Moderate	Higher	MODERATE	LOWER
MC-W-02	Function Score (Normalized)	3.59	6.38	5.95	1.78	9.12	-	-

Unique ID (Map ID)	Description	WESP-AC Summary Ratings for Grouped Functions					Wetland Condition	Wetland Risk
		Hydrologic	Water Quality Support	Aquatic Support	Aquatic Habitat	Transition Habitat		
(36)	Function Rating	Moderate	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.29	0.29	2.29	2.12	7.50	7.83	0.11
	Benefits Rating	Lower	Lower	Moderate	Lower	Higher	HIGHER	LOWER
MCB-W-01 (38)	Function Score (Normalized)	7.19	2.73	6.15	6.68	9.09	-	-
	Function Rating	Higher	Lower	Higher	Higher	Higher	-	-
	Benefits Score (Normalized)	1.91	8.90	8.15	5.01	4.61	5.66	1.56
PH-W-01 (39)	Benefits Rating	Lower	Higher	Higher	Moderate	Moderate	MODERATE	LOWER
	Function Score (Normalized)	2.55	2.72	3.41	5.42	9.26	-	-
	Function Rating	Moderate	Lower	Higher	Higher	Higher	-	-
	Benefits Score (Normalized)	1.63	5.86	5.64	7.96	9.99	4.94	5.97
PH-W-02 (40)	Benefits Rating	Lower	Moderate	Higher	Higher	Higher	MODERATE	HIGHER
	Function Score (Normalized)	4.79	3.38	8.06	4.18	9.51	-	-
	Function Rating	Moderate	Moderate	Higher	Moderate	Higher	-	-
	Benefits Score (Normalized)	1.68	2.89	6.57	3.17	4.70	6.39	2.26
PH-W-06 (44)	Benefits Rating	Lower	Lower	Higher	Moderate	Moderate	MODERATE	LOWER
	Function Score (Normalized)	OUTSIDE OF THE 2020 SURVEY AREA					-	-
	Function Rating	OUTSIDE OF THE 2020 SURVEY AREA					-	-
	Benefits Score (Normalized)	OUTSIDE OF THE 2020 SURVEY AREA					-	-
PLE-W-01 (45)	Benefits Rating	OUTSIDE OF THE 2020 SURVEY AREA					-	-
	Function Score (Normalized)	0.00	10.00	1.55	4.03	8.74	-	-
	Function Rating	Lower	Higher	Lower	Moderate	Higher	-	-
	Benefits Score (Normalized)	0.37	3.95	2.77	4.46	4.76	3.98	5.22
PLE-W-03 (47)	Benefits Rating	Lower	Lower	Moderate	Moderate	Moderate	MODERATE	HIGHER
	Function Score (Normalized)	1.88	6.89	3.78	1.60	7.16	-	-
	Function Rating	Lower	Higher	Lower	Lower	Moderate	-	-

Unique ID (Map ID)	Description	WESP-AC Summary Ratings for Grouped Functions					Wetland Condition	Wetland Risk
		Hydrologic	Water Quality Support	Aquatic Support	Aquatic Habitat	Transition Habitat		
	Benefits Score (Normalized)	0.87	3.79	3.39	1.43	4.12	4.94	2.07
	Benefits Rating	Lower	Lower	Moderate	Lower	Moderate	MODERATE	LOWER
PLW-W-01 (49)	Function Score (Normalized)	0.00	10.00	1.49	3.98	8.49	-	-
	Function Rating	Lower	Higher	Lower	Moderate	Higher	-	-
	Benefits Score (Normalized)	0.32	3.95	2.67	4.37	4.68	2.53	5.21
	Benefits Rating	Lower	Lower	Moderate	Moderate	Moderate	LOWER	HIGHER
PLW-W-02 (50)	Function Score (Normalized)	2.66	5.68	4.89	1.93	8.28	-	-
	Function Rating	Moderate	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.37	3.85	2.42	0.89	3.94	4.94	4.91
	Benefits Rating	Lower	Lower	Moderate	Lower	Moderate	MODERATE	HIGHER
PLW-W-04 (52)	Function Score (Normalized)	5.63	4.21	5.60	1.92	8.32	-	-
	Function Rating	Higher	Moderate	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.50	1.10	2.54	1.90	7.24	4.22	1.21
	Benefits Rating	Lower	Lower	Moderate	Lower	Higher	MODERATE	LOWER
PLW-W-06 (54)	Function Score (Normalized)	6.67	2.22	7.92	4.53	9.72	-	-
	Function Rating	Higher	Lower	Higher	Moderate	Higher	-	-
	Benefits Score (Normalized)	0.50	8.62	4.83	5.63	8.07	7.11	2.49
	Benefits Rating	Lower	Higher	Moderate	Moderate	Higher	HIGHER	LOWER
PLW-W-04 (56)	Function Score (Normalized)	0.68	8.07	6.08	2.69	6.38	-	-
	Function Rating	Lower	Higher	Higher	Moderate	Moderate	-	-
	Benefits Score (Normalized)	1.81	5.27	0.62	1.16	4.83	3.98	4.07
	Benefits Rating	Lower	Moderate	Lower	Lower	Moderate	MODERATE	MODERATE
MCB2-W-03 (59)	Function Score (Normalized)	1.09	5.03	5.03	2.78	6.70	-	-
	Function Rating	Lower	Moderate	Moderate	Moderate	Moderate	-	-
	Benefits Score (Normalized)	3.95	7.19	0.63	0.60	4.70	3.01	3.55



Unique ID (Map ID)	Description	WESP-AC Summary Ratings for Grouped Functions					Wetland Condition	Wetland Risk
		Hydrologic	Water Quality Support	Aquatic Support	Aquatic Habitat	Transition Habitat		
	Benefits Rating	Moderate	Moderate	Lower	Lower	Moderate	LOWER	MODERATE
PLE-W-07 (66)	Function Score (Normalized)	2.81	3.05	4.72	1.47	7.44	-	-
	Function Rating	Moderate	Lower	Moderate	Lower	Moderate	-	-
	Benefits Score (Normalized)	0.42	1.16	2.33	1.74	6.81	7.83	1.60
	Benefits Rating	Lower	Lower	Moderate	Lower	Higher	HIGHER	LOWER
PLE-W-08 (67)	Function Score (Normalized)	2.81	3.05	4.72	1.26	7.43	-	-
	Function Rating	Moderate	Lower	Moderate	Lower	Moderate	-	-
	Benefits Score (Normalized)	0.42	1.16	2.32	2.84	8.93	7.83	1.76
	Benefits Rating	Lower	Lower	Moderate	Lower	Higher	HIGHER	LOWER
PLE-W-10 (69)	Function Score (Normalized)	3.13	6.37	4.52	1.27	8.44	-	-
	Function Rating	Moderate	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.00	1.10	1.21	3.08	9.02	7.83	0.88
	Benefits Rating	Lower	Lower	Lower	Lower	Higher	HIGHER	LOWER
PLE-W-11 (70)	Function Score (Normalized)	2.81	6.35	5.20	1.27	7.87	-	-
	Function Rating	Moderate	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	0.00	4.85	1.29	3.05	8.99	7.83	2.97
	Benefits Rating	Lower	Moderate	Lower	Lower	Higher	HIGHER	MODERATE
MC-Trib1E-W-02 (74)	Function Score (Normalized)	OUTSIDE OF THE 2020 SURVEY AREA						
	Function Rating							
	Benefits Score (Normalized)							
	Benefits Rating							
PH-W-07 (75)	Function Score (Normalized)	3.13	5.36	4.43	1.49	8.55	-	-
	Function Rating	Moderate	Moderate	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	1.68	1.02	5.22	1.84	7.24	7.83	0.58
	Benefits Rating	Lower	Lower	Higher	Lower	Lower	HIGHER	LOWER

Unique ID (Map ID)	Description	WESP-AC Summary Ratings for Grouped Functions					Wetland Condition	Wetland Risk
		Hydrologic	Water Quality Support	Aquatic Support	Aquatic Habitat	Transition Habitat		
PH-W-08 (76)	Function Score (Normalized)	3.13	6.49	4.43	1.82	8.70	-	-
	Function Rating	Moderate	Higher	Moderate	Lower	Higher	-	-
	Benefits Score (Normalized)	1.55	0.29	4.98	2.02	7.37	7.83	0.36
	Benefits Rating	Lower	Lower	Moderate	Lower	Higher	HIGHER	LOWER

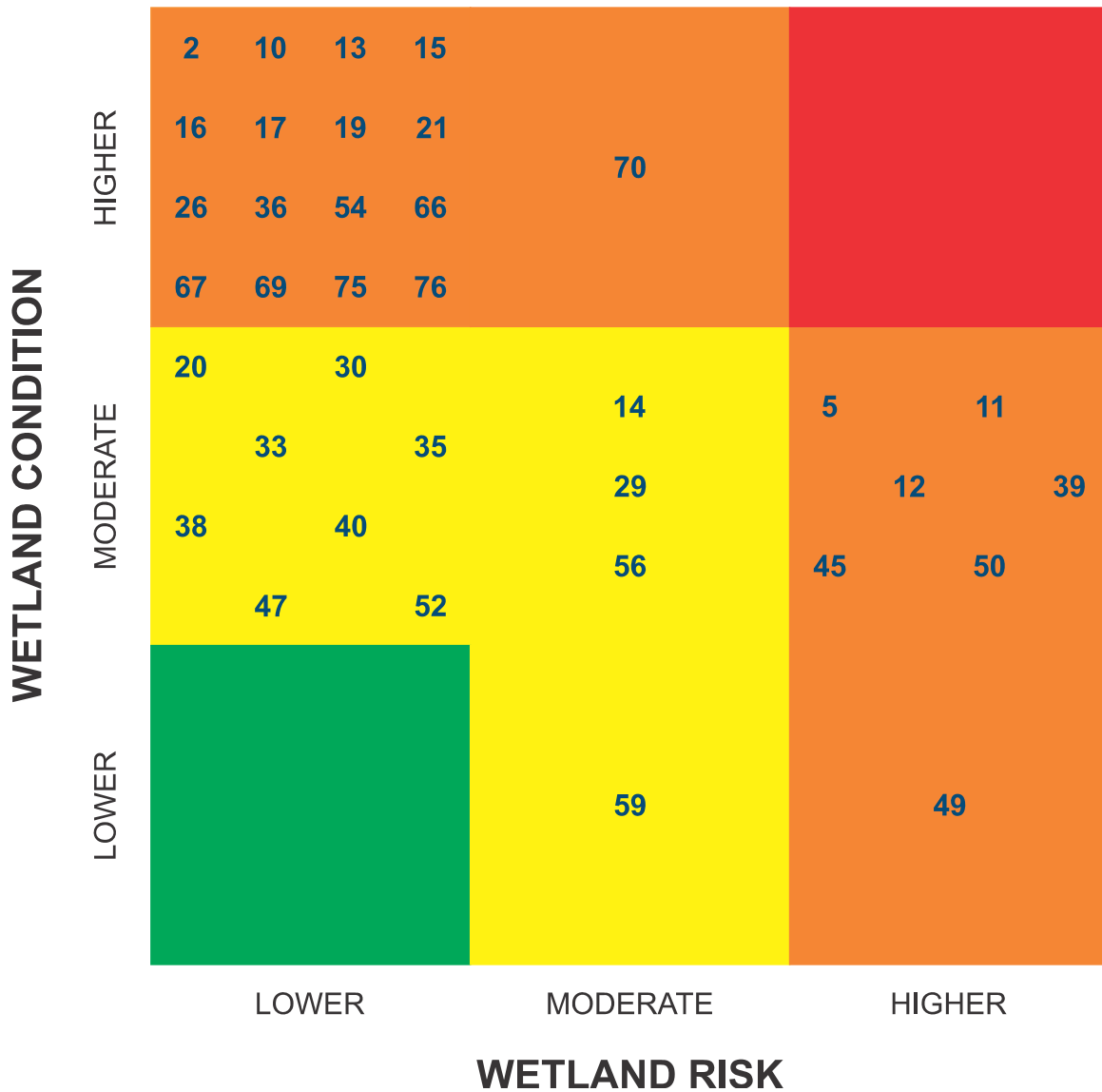


Figure 24. Condition risk assessment for large (*i.e.*,  $\geq 0.5$  ha) and / or distinctive wetlands identified within the survey area on the lands in west Saint John, New Brunswick being considered for the Burchill Wind Project.



## 8.0 SUMMARY

Watercourse and wetland assessments were completed on portions of PID 00412189 in west Saint John, New Brunswick in support of the Burchill Wind Project being proposed by Natural Forces.

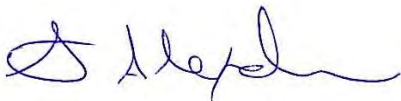
The following is a summary of the findings:

- in addition to wetlands, five general types of habitat were observed across the property;
- all told, 297 plant species were identified on the property;
- five rare species were identified, one of which (*i.e.*, purple false foxglove) May Be At Risk while the other four are considered secure;
- overall, 77 watercourses were identified and delineated on the Project lands;
- most of the watercourses are ephemeral and likely do not support fish and / or fish habitat;
- a total of 39 small wetlands (*i.e.*, < 0.5 ha in size) with a total area of 6.01 ha were delineated on the Project lands;
- overall, 38 large (*i.e.*, ≥ 0.5 ha in size) and / or distinctive wetlands with a combined area of 108.5 ha were delineated on the Project lands; and
- wetland functional assessments were completed for 36 wetlands and results showed 17 ranked as having a higher wetland condition and seven ranked as having a higher wetland risk.

## 8.1 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* and reviewed by Ms. Crystal Caines, *P.Tech., PMP* and Mr. Derrick Mitchell, *B.Sc.F., R.P.F.* Please feel free to contact the undersigned at 506.674.9422 or via email at [matt.alexander@fundyeng.com](mailto:matt.alexander@fundyeng.com) if any clarification is required.

**Respectfully Submitted,**  
**FUNDY ENGINEERING & CONSULTING LTD.**



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

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## 10.0 REPORT DISCLAIMERS AND DISCLOSURES

The sole purpose of this report and the associated services performed by Fundy Engineering & Consulting Ltd. was to complete watercourse and wetland assessments in support of an Environmental Impact Assessment for the proposed Burchill Wind Project in west Saint John, New Brunswick. The scope of services was defined at the Project outset between Fundy Engineering and Natural Forces personnel.

The observations made and the facts presented in this report are based on desktop assessments and field assessments conducted during spring, summer, and fall 2019 and summer 2020. Site conditions at the time of visitation / sampling only are reflected in this document. Certain data presented are based on statements, recollections, and observations of various individuals and where this is the case, sources are indicated. No independent confirmation of that information was made.

This report was prepared on behalf of and for the exclusive use of Natural Forces. 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. Fundy Engineering makes no guarantee that the Client will be successful in the regulatory approval process.



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## **Appendix I:**

### Watercourse and Wetland Photographs

**WATERCOURSES**



BB

Washed out crossing on BB along the water pipeline that extends from Spruce Lake to Coleson Cove.



BB

Washed out crossing on BB along the water pipeline that extends from Spruce Lake to Coleson Cove.



BB

Washed out crossing on BB along the water pipeline that extends from Spruce Lake to Coleson Cove.



BB

~ 1 800 mm corrugated steel culvert that conveys BB under Burchill Road.



BB

Upstream of confluence with BB-Trib4.



BB

Upstream of confluence with BB-Trib4.



BB

Small waterfall on BB mid-way between BB-Trib3 and BB-Trib4.



BB

Small waterfall on BB near confluence with BB-Trib2.





BB

Looking upstream on BB at confluence with BB-Trib7.



BB

Looking downstream on BB at confluence with BB-Trib7.



BB

Looking upstream on BB adjacent to the northwest corner of the Spruce Lake Landfill site.



BB

Looking downstream on BB adjacent to the northwest corner of the Spruce Lake Landfill site.





**BB-Trib1**

**BB-Trib1 as it flows across Cheeseman Beach Road from BB-Trib1-W-01.**



**BB-Trib1**

**BB-Trib1 as it flows across Cheeseman Beach Road from BB-Trib1-W-01.**



**BB-Trib1**

**600 mm ID concrete culvert that conveys BB-Trib1 to BB under the water pipeline that extends from Spruce Lake to Coleson Cove.**



**BB-Trib1**





BB-Trib1



BB-Trib1A



BB-Trib1C



BB-Trib1D



BB-Trib1D



BB-Trib1E



BB-Trib1F



BB-Trib2





BB-Trib3



BB-Trib3



BB-Trib3

Large hunting blind located atop a ridge near the source of BB-Trib3.



BB-Trib3

Large hunting blind located atop a ridge near the source of BB-Trib3.





BB-Trib5



BB-Trib5A-1



BB-Trib5C



BB-Trib5D

450 mm ID concrete culvert that conveys BB-Trib5D under Burchill Road.



BB-Trib5F



BB-Trib6A



BB-Trib6A



BB-Trib6B





BB-Trib7



BB-Trib7

310 mm ID concrete culvert that conveys BB-Trib7 from BB-Trib7-W-01 under Burchill Road.



BB-Trib7



BB-Trib7

BB-Trib7 upstream of confluence with BB-Trib7B





BB-Trib7

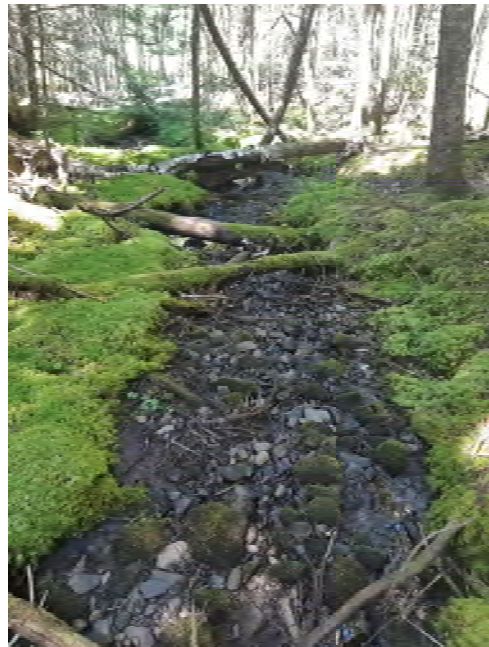
BB-Trib7 upstream of confluence with BB.



BB-Trib7A



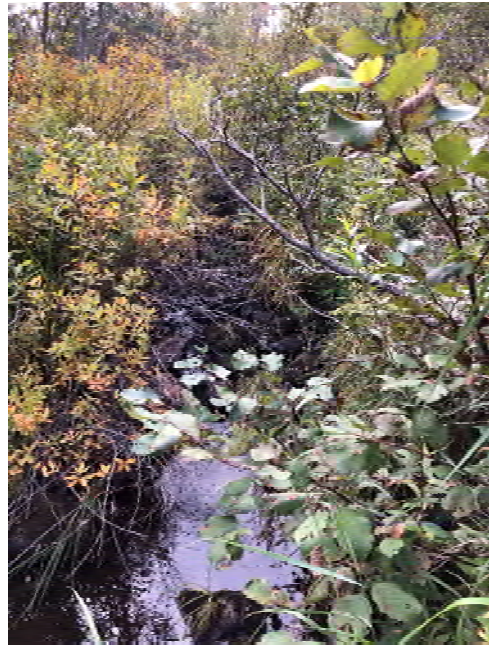
BB-Trib8



BB-Trib8



FC-Trib1



FC-Trib1

450 mm ID concrete culvert that conveys FC-Trib1 under Burchill Road.



FC-Trib1



FC-Trib1C





FC-Trib1D



FC-Trib1E



MC-Trib1B



MC-Trib1C

Access road that allows vehicles to ford the tributary.





MC-Trib1C

Access road that allows vehicles to ford the tributary.



MC-Trib1C



MC-Trib1C



MC-Trib1C



MC-Trib1F



MCB



MCB-Trib1B



MCBW-Trib1





MCBW-Trib1



MCBW-Trib1



MCBW-Trib1



MCBW-Trib1A





MCBW-Trib2



MCBW-Trib2



MCBW-Trib3



MCBW-Trib3



MCB2



MCB2



OD-Ditch



WC-01A





WC-01A



WC-02A



WC-02B



WC-03





WC-04



WC-05



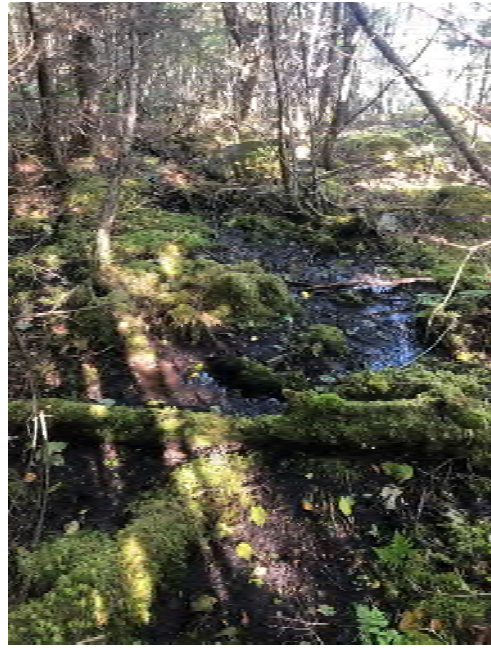
WC-05



WC-05



WC-06



WC-07



## WETLANDS



BB-Trib1-W-01

BB-Trib1-W-01 adjacent to Cheeseman Beach Road. Under high runoff conditions, water flows from the wetland by flowing across the road.



BB-Trib1-W-01



BB-Trib1-W-03



BB-Trib5-W-02





BB-Trib5-W-02



BB-Trib5-W-02



BB-Trib6-W-01 (Upland)



BB-Trib6-W-01 (Upland)





BB-Trib6-W-01 (Wetland)



BB-Trib6-W-01 (Wetland)



BB-Trib7-W-01



BB-Trib7-W-01





BB-W-01



BB-W-01



BB-W-01



BB-W-02



BB-W-02



BB-W-02





BB-W-02 (Upland)



BB-W-02 (Upland)



FC-Trib1-W-01



FC-Trib1-W-01



FC-Trib1-W-01



FC-Trib1-W-01





FC-Trib1-W-01



FC-Trib1-W-01



FC-Trib1-W-01



FC-Trib1-W-01





FC-Trib1-W-01 (Upland)



FC-Trib1-W-01 (Upland)



FC-Trib1-W-02 (Upland)



FC-Trib1-W-02 (Upland)



FC-Trib1-W-02 (Wetland)



FC-Trib1-W-02 (Wetland)





FC-Trib1-W-04 (Upland)



FC-Trib1-W-04 (Upland)



FC-Trib1-W-04 (Wetland)



FC-Trib1-W-04 (Wetland)



FC-Trib2-W-01 (Upland)



FC-Trib2-W-01 (Upland)





FC-Trib2-W-01 (Wetland)



FC-Trib2-W-01 (Wetland)



FC-Trib2-W-02 (Upland)



FC-Trib2-W-02 (Upland)



FC-Trib2-W-02 (Wetland)



FC-Trib2-W-02 (Wetland)





MB-Trib2-W-01 (Upland)



MB-Trib2-W-01 (Upland)



MB-Trib2-W-01 (Wetland)



MB-Trib2-W-01 (Wetland)



MC-Trib1B-W-01 (Upland)



MC-Trib1B-W-01 (Upland)





MC-Trib1B-W-01 (Wetland)



MC-Trib1B-W-01 (Wetland)



MC-Trib1C-W-01



MC-Trib1C-W-01





MC-Trib1C-W-03

Under high runoff conditions, water flows from the wetland across the pipeline right-of-way road to MC-Trib1C-2.



MC-Trib1C-W-03



MC-Trib1C-W-03



MC-Trib1C-W-03





MC-Trib1C-W-03 (Upland)



MC-Trib1C-W-03 (Upland)



MC-Trib1C-W-03 (Wetland)



MC-Trib1C-W-03 (Wetland)





MC-Trib1C-W-04A



MC-Trib1C-W-04A



MC-Trib1C-W-04B



MC-Trib1C-W-05





MC-Trib1D-W-01 (Upland)



MC-Trib1D-W-01 (Upland)



MC-Trib1D-W-01 (Wetland)



MC-Trib1D-W-01 (Wetland)



MC-W-01 (Upland)



MC-W-01 (Upland)





MC-W-01 (Wetland)



MC-W-01 (Wetland)



MCB-W-01



MCB-W-01



MCB-W-01 (Upland)



MCB-W-01 (Upland)



Looking from the edge of the property towards the knob of rock being quarried with large deer stand in the middle of the clearcut.



MCB-Trib1A-W-01 (Wetland)



MCB-Trib1A-W-01 (Upland)



PH-W-01



PH-W-01





PH-W-01



PH-W-01



PH-W-01



PH-W-02 (Wetland)





PH-W-02 (Wetland)



PH-W-05



PLE-W-01



PLE-W-02 (Upland)



PLE-W-02



PLE-W-03





PLE-W-03



PLW-W-01



PLW-W-01



PLW-W-02





WC-02-W-01



BB-W-02



PLE-W-10 (upland)



PLE-W-10 (wetland)





PLE-W-13 (upland)



PLE-W-13 (wetland)



PLE-W-11 (upland)



PLE-W-11 (wetland)



MC-W-02 (upland)



MC-W-02 (wetland)





PH-W-07 (upland)



PH-W-07 (wetland)



PH-W-08 (upland)



PH-W-08 (wetland)



BB-W-01 (upland)



BB-W-01 (wetland)





PLW-W-04 (upland)



PLW-W-04 (wetland)



BOF-W-01 (upland)



BOF-W-01 (wetland)



MCB2-W-03 (upland)



MCB2-W-03 (wetland)



GENERAL INTEREST PHOTOS



Roadside Cross

Mark Bernatchez died by tragic accident 25 June 2005 on King William Road near intersection with Burchill Road.



Deer baiting between MC-Trib1C-W-04A and MC-Trib1C-W-04B.



RC airplane field atop former Spruce Lake Landfill.



Looking from atop former Spruce Lake Landfill towards leachate treatment wetland.



Temporary wind data collection tower atop former Spruce Lake Landfill.



Bedrock outcrop along BB downstream of confluence with BB-Trib4.



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**Appendix II:**

WESP-AC Model Results

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - BB-Trib6-W-01
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	14 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.181083
Longitude (decimal degrees):	-66.206548
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	7.6
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	



Date: 14 October 2019		Site Identifier: BB-Trib6-W01		Investigator: Derrick Mitchell	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb/">http://www.snb.ca/geonb/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: <0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: <0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	1 0 0 0 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Neary Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: <0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	1 0 0 0 0 0 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is: <50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] <50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: <5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. SKIP to OF10.	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is: <100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria. [FAv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
0.5 - 1 km, but separated by those features.	0			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	1	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP.AC.	1	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases, levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.20	[FA, NR, Sens, SFsv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is: Mostly true. 0 Somewhat true. 1 Mostly untrue. 0		[NRv, PRv, SRv, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is: Northward (N, NE), north-facing contributing area. 0 Southward (S, SW), south-facing contributing area. 0 Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat). 1		[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is: <10 m. 0 10 - 50 m. 0 50 - 100 m. 0 100 - 1000 m. 1 1- 2 km. 0 >2 km, or wetland lacks an inlet and outlet. 0		Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column. 2428		This layer was provided by Dr. Dan McKenney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCv, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: [Mark just the first choice that is true.] Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatlas.com/atlantic/salmon/canada-east/index.1.html">http://www.salmonatlas.com/atlantic/salmon/canada-east/index.1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> 0 Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. 0 Is probably not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. 0 Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked). 1		Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented [mark all applicable]: Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer. 0 Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. 0 Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. 0 Presence of one or more of the nesting songbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). 0 None of the above, or no data. 0		Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMv, EC, PHv, POLv, SBMv, Sens, WBFv, WBNv]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBA_Canada. The AA is all or part of an officially designated IBA. Enter 1, yes, 0= no. 0		The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMv, WBFv, WBNv]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank. 0		This was provided by Dr. David Leske. [WBNv]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0. 0		[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC or agencies for more recent information. 0		[PU]
OF34	Conservation Investment	The AA 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 (not 0). 0		[PU]
OF35	Mitigation Investment	The AA 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		[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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		[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8). See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank. 0		If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/er/DC/catalogue-E.asp">http://www.snb.ca/geonb1/er/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available. New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. 0 Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. 1 Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place. 0 Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement. 0		"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

Date: 14 October 2019		Site Identifier: BB-Trib6-W-01		Investigator: Derrick Mitchell	
<p><b>Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage &amp; Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A. Moss and/or lichen cover more than 25% of the ground.</b> Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B. Moss and/or lichen cover less than 25% of the ground.</b> Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0	Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]	
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>					
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]	
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include tamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	5	Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]	
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP to F9 (N fixers).</p>					
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	0	[PH, POL, SBM, Sens]	
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	1	Estimate the diameters at chest height. If small-diameter trees are overtopped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]	
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	0	[AM, INV, NR, PH, SBM, Sens]	
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	0	Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]	
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	0	Exclude temporary "burn piles." [AM, INV, POL, SBM]	



F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of Sphagnum moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	1	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) bare ground is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
		Many (e.g., wetland-upland "mosaic"; >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly: [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat: to 40 cm depth or greater.	1	
		Shallow Peat or organic: <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	1	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rains/storms), but which is still a wetland, is:	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1% . In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0
		25-50% of the AA never contains surface water.	0
		50-75% of the AA never contains surface water.	0
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	1
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0
		1-20% of the AA.	1
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA. True for many fringe wetlands.	0
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:	[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0
		5-25% of the water is shaded.	0
		25-50% of the water is shaded.	0
		50-75% of the water is shaded.	0
		>75% of the water is shaded.	1
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0
		1-20% of the AA, or <1% but >0.01 ha.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA.	1
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0
		10 cm - 50 cm change.	1
		0.5 - 1 m change.	0
		1-2 m change.	0
		>2 m change.	0
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			
			0
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	1
		10 - 50 cm deep.	0
		0.5 - 1 m deep.	0
		1 - 2 m deep.	0
		>2 m deep. True for many fringe wetlands.	0
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0
		One depth class that comprises 50-90% of the AA's inundated area.	1
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq.m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	0
		5-30% of the water.	1
		30-70% of the water.	0
		70-95% of the water.	0
		>95% of the water.	0
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
			0
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		5-30% of the ponded water.	0
		30-70% of the ponded water.	0
		70-99% of the ponded water.	0
		100% of the ponded water.	0
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0
		1 - 9 m.	0
		10 - 29 m.	0
		30 - 49 m.	0
		50 - 100 m.	0
		> 100 m, or open water is absent at that time.	0
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0
		1-25% of the water edge.	0
		25-50% of the water edge.	0
		50-75% of the water edge.	0
		>75% of the water edge.	0
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0
		1-25% of the emergent vegetation.	0
		25-75% of the emergent vegetation.	0
		>75% of the emergent vegetation.	0



F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCV, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
		During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
F44	Tributary Channel	Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
		At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
			0	
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1 = yes, 0 = no.	0	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
F48	TDS and/or Conductivity	Neither of above. Enter "1".	1	
		The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
F49	Beaver Probability	Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
		Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
F50	Groundwater Strength of Evidence	Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
		Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
F51	Internal Gradient	Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
		The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	1	
6-10%.	0			
>10%.	0			
<b>Note for the next three questions:</b> If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	1	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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.]</i>		[AM, FAv, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[FAv, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcar worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data
S1	<b>Aberrant Timing of Water Inputs</b>			
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>			
	Stormwater from impervious surfaces that drains directly to the wetland.			1
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.			
	Regular removal of surface or groundwater for irrigation or other consumptive use.			
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.			1
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).			
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.			
	Artificial drains or ditches in or near the wetland.			1
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).			
	Logging within the wetland.			
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.			
	Straightening, ditching, dredging, and/or lining of tributary channels.			
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
		Severe (3 points)	Medium (2 points)	Mild (1 point)
	Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.
	When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.
	<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>			
	Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.
	Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.
				Sum= 3
				Stressor subscore= 0.25
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>			
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>			
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.			
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )			
	Road salt.			
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.			
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
		Severe (3 points)	Medium (2 points)	Mild (1 point)
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.
				Sum= 0
				Stressor subscore= 0.00
S3	<b>Accelerated Inputs of Nutrients</b>			
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
	Stormwater or wastewater effluent (including failing septic systems), landfills.			
	Fertilizers applied to lawns, ag lands, or other areas in the CA.			
	Livestock, dogs.			
	Artificial drainage of upslope lands.			
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
		Severe (3 points)	Medium (2 points)	Mild (1 point)
	Type of loading:	High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.
				Sum= 0
				Stressor subscore= 0.00

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	0
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	0
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	0
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum= 0
				Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	
				Sum= 0
				Stressor subscore= 0.00



## Assessment Area (AA) Results:

Wetland ID: BB-Trib6-W-01

Date: 14 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.181083, -66.206548

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.93	Moderate	1.68	Lower	3.99	1.75
Stream Flow Support (SFS)	6.25	Moderate	3.06	Moderate	3.33	1.78
Water Cooling (WC)	6.38	Higher	3.21	Moderate	4.25	1.93
Sediment Retention & Stabilisation (SR)	2.18	Moderate	1.69	Lower	4.65	1.02
Phosphorus Retention (PR)	3.10	Moderate	1.24	Lower	5.10	1.46
Nitrate Removal & Retention (NR)	0.84	Lower	4.94	Moderate	4.35	5.50
Carbon Sequestration (CS)	6.08	Higher			7.18	
Organic Nutrient Export (OE)	7.80	Higher			6.47	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	2.34	Lower	3.78	Moderate	4.70	3.28
Amphibian & Turtle Habitat (AM)	5.19	Moderate	4.24	Moderate	6.04	4.66
Waterbird Feeding Habitat (WBF)	4.71	Moderate	2.50	Moderate	3.74	2.50
Waterbird Nesting Habitat (WBN)	2.54	Moderate	2.50	Moderate	2.17	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.34	Higher	2.50	Lower	7.75	2.50
Pollinator Habitat (POL)	10.00	Higher	0.00	Lower	9.25	0.00
Native Plant Habitat (PH)	7.07	Higher	6.53	Higher	5.94	5.67
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			0.00	Lower		2.00
Wetland Ecological Condition (EC)			7.59	Higher		8.61
Wetland Stressors (STR) (higher score means more stress)			4.52	Moderate		3.92
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	6.25	Higher	1.68	Lower	3.99	1.75
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.57	Lower	3.78	Lower	6.25	4.08
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.75	Higher	3.57	Moderate	5.58	2.81
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	3.84	Moderate	3.04	Lower	4.22	3.30
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.40	Higher	4.77	Moderate	8.45	4.19
WETLAND CONDITION (EC)			7.59	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			2.26	Lower		2.96

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - FC-Trib2-W-02
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	14 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.192947
Longitude (decimal degrees):	-66.206379
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.5
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	



Date: 14 October 2019		Site Identifier: FC-Trib2-W-02		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [ <i>This is nearly always the answer in relatively undeveloped landscapes</i> ] >1000 hectares.	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [ <i>This is often the answer in relatively undeveloped landscapes</i> ] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[Fv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	1	
		50 - 100 m.	0	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
OF18	Relative Elevation in Watershed	Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
		In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.20	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF23	Unvegetated Surface in the Contributing Area	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatlas.com/atlantic/salmon/canada-east/index_1.html">http://www.salmonatlas.com/atlantic/salmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 0 1 0	Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	0 0 0 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	1 2 0 5 0 4	Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP to F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	0 1	[PH, POL, SBM, Sens]
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	0 0 1 1 0 0 0 0	Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	0 0 1 0	[AM, INV, NR, PH, SBM, Sens]
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	1 0 0	Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	1 0	Exclude temporary "burn piles." [AM, INV, POL, SBM]



F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the un-flooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the un-flooded parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	1	
		Intermediate.	0	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	1	
		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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	1	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]



F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	1	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	1	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	1	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



<b>Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.</b>	<b>Data</b>
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<b>S1</b>	<b>Aberrant Timing of Water Inputs</b>		
<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>			
Stormwater from impervious surfaces that drains directly to the wetland.			
Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.			
Regular removal of surface or groundwater for irrigation or other consumptive use.			
Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.			
A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).			
Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.			
Artificial drains or ditches in or near the wetland.			
Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).			
Logging within the wetland.			
Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.			
Straightening, ditching, dredging, and/or lining of tributary channels.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>			
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.
			Sum= 0
			Stressor subscore= 0.00
<b>S2</b>	<b>Accelerated Inputs of Contaminants and/or Salts</b>		
<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.			
Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )			
Road salt.			
Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.
Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.
			Sum= 0
			Stressor subscore= 0.00
<b>S3</b>	<b>Accelerated Inputs of Nutrients</b>		
<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.			
Fertilizers applied to lawns, ag lands, or other areas in the CA.			
Livestock, dogs.			
Artificial drainage of upslope lands.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Type of loading:	High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.
Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.
			Sum= 0
			Stressor subscore= 0.00

S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: FC-Trib2-W-02

Date: 14 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.192947, -66.206379

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	5.71	Higher	0.42	Lower	6.12	0.50
Stream Flow Support (SFS)	2.40	Lower	3.27	Moderate	1.28	1.91
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	5.13	Moderate	1.45	Lower	6.67	0.88
Phosphorus Retention (PR)	4.81	Higher	1.09	Lower	6.31	1.32
Nitrate Removal & Retention (NR)	3.17	Moderate	4.56	Moderate	5.78	5.17
Carbon Sequestration (CS)	7.00	Higher			7.58	
Organic Nutrient Export (OE)	5.19	Moderate			5.09	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	4.47	Moderate	0.92	Moderate	5.45	1.74
Amphibian & Turtle Habitat (AM)	2.65	Lower	1.08	Lower	4.70	2.75
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.93	Moderate	2.50	Lower	5.75	2.50
Pollinator Habitat (POL)	7.54	Moderate	0.00	Lower	6.07	0.00
Native Plant Habitat (PH)	8.20	Higher	4.54	Moderate	6.39	3.94
Public Use & Recognition (PU)			2.23	Lower		1.92
Wetland Sensitivity (Sens)			0.40	Lower		2.32
Wetland Ecological Condition (EC)			4.22	Moderate		6.67
Wetland Stressors (STR) (higher score means more stress)			3.14	Moderate		3.41
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.40	Lower	0.42	Lower	6.12	0.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	4.75	Moderate	3.46	Lower	7.08	3.81
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.10	Moderate	2.34	Moderate	4.20	1.56
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.59	Lower	0.65	Lower	2.82	1.65
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.88	Higher	3.44	Moderate	6.23	3.04
WETLAND CONDITION (EC)			4.22	Moderate		6.67
WETLAND RISK (average of Sensitivity & Stressors)			1.77	Lower		2.87

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - BB-Trib1-W-02
Investigator Name:	Matt Alexander
Date of Field Assessment:	11 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.178466
Longitude (decimal degrees):	66.210666
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.68
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	Old apple orchard adjacent to this wetland next to Burchill Road. Former homestead existed in this area. Twentieth century garbage piles (bottles, cans, car parts, etc.) strewn about the forest.

Date: 11 September 2019		Site Identifier: BB-Trib1-W-02		Investigator: Matt Alexander	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. SKIP to OF10.	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[Fv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	1	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
0.5 - 1 km, but separated by those features.	1			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	1	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.18	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2314	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatlas.com/atlanticsalmon/canada-east/index_1.html">http://www.salmonatlas.com/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC or agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>2</p> <p>1</p> <p>1</p> <p>4</p> <p>1</p> <p>2</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>1</p> <p>0</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>1</p> <p>0</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>1</p> <p>0</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	1	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0		
Sum=				0		
Stressor subscore=				0.00		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	0	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	0	
	Sum=				0	
	Stressor subscore=				0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	0	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	0	
Sum=				0		
Stressor subscore=				0.00		

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				1
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				1
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				1
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	0
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	2
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	1
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum= 4
				Stressor subscore= 0.33
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	0
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	0
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	0
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	0
				Sum= 0
				Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: BB-Trib1-W-02

Date: 11 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.178466, 66.210666

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	4.67	Moderate	0.37	Lower	5.32	0.45
Stream Flow Support (SFS)	1.88	Lower	3.48	Moderate	1.00	2.03
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.73	Lower	8.33	0.44
Phosphorus Retention (PR)	4.37	Higher	0.00	Lower	6.00	0.33
Nitrate Removal & Retention (NR)	2.84	Moderate	7.19	Moderate	5.58	7.50
Carbon Sequestration (CS)	8.22	Higher			8.11	
Organic Nutrient Export (OE)	5.14	Moderate			5.06	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	8.21	Higher	0.76	Lower	6.76	1.66
Amphibian & Turtle Habitat (AM)	2.70	Lower	2.16	Lower	4.72	3.40
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.29	Moderate	5.00	Moderate	5.21	5.00
Pollinator Habitat (POL)	7.50	Moderate	0.00	Lower	6.04	0.00
Native Plant Habitat (PH)	5.71	Moderate	4.32	Moderate	5.39	3.75
Public Use & Recognition (PU)			2.26	Lower		1.94
Wetland Sensitivity (Sens)			1.51	Lower		2.66
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			0.45	Lower		2.42
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.88	Lower	0.37	Lower	5.32	0.45
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.24	Higher	4.91	Moderate	7.67	5.13
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.01	Moderate	2.45	Moderate	4.98	1.63
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.62	Lower	1.30	Lower	2.83	2.04
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.00	Moderate	4.05	Moderate	5.79	3.96
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			0.98	Lower		2.54

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - BB-Trib5-W-02
Investigator Name:	Matt Alexander
Date of Field Assessment:	17 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.174268
Longitude (decimal degrees):	66.206582
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.71
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	75
What percent (approx.) of the <b>wetland</b> were you able to visit?	75
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	Catches runoff from Burchill Road.

Date: 17 September 2019		Site Identifier: BB-Trib5-W-02		Investigator: Matt Alexander	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 1 0 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	3	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	1	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	0	
		>500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	1	
		None of the above (the closest patches or corridors that large are >1 km away).	0	
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
		>10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP-AC.	1	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.16	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true. Mostly untrue.	0 1 0	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2314	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC or agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 0 1 0	Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1. A2. B1. B2.</p>	0 0 0 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m. deciduous trees taller than 3 m. coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees. deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees. coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation. deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	4 2 3 3 2 1	Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover. those species together do not comprise &gt; 50% of such cover.</p>	1 0	[PH, POL, SBM, Sens]
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall. broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall. coniferous, 10-19 cm diameter. broad-leaved deciduous 10-19 cm diameter. coniferous, 20-40 cm diameter. broad-leaved deciduous 20-40 cm diameter. coniferous, &gt;40 cm diameter. broad-leaved deciduous &gt;40 cm diameter.</p>	1 0 1 0 1 1 1 0	Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA. <b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one. <b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	1 0 0 0	[AM, INV, NR, PH, SBM, Sens]
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter. Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km. Several (&gt;8/hectare) but above not true.</p>	0 0 1	Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria. Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	0 1	Exclude temporary "burn piles." [AM, INV, POL, SBM]

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the un-flooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the un-flooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	1	
		Neither of above. Enter "1".	0	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	1	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	Unknown if new or expanded within 20 years or not.	1	
		More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
F58	Visibility	Burned >30 years ago, or no evidence of a burn and no data.	1	
		The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	0	
F59	Non-consumptive Uses - Actual or Potential	>50%.	1	
		Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
F60	Unvisited Core Area	Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
		The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	1	
>95% of the AA with or without inhabited building nearby.	0			
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
None of the above.	1			
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				1
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	1	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	1	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	1	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	1	
			Sum=	4	
			Stressor subscore=	0.33	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				1
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	0
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3
				Sum=	4
				Stressor subscore=	0.44
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					1
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	0
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3
				Sum=	4
				Stressor subscore=	0.44

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				1
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	0
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	3
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum= 5
				Stressor subscore= 0.42
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	0
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	0
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	0
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	0
				Sum= 0
				Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: BB-Trib5-W-02

Date: 17 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.174268, 66.206582

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	4.13	Moderate	1.58	Lower	4.90	1.65
Stream Flow Support (SFS)	2.66	Lower	2.97	Moderate	1.42	1.73
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	5.94	Higher	2.06	Lower	7.22	1.25
Phosphorus Retention (PR)	4.51	Higher	4.55	Moderate	6.10	4.44
Nitrate Removal & Retention (NR)	1.74	Lower	5.50	Moderate	4.90	6.00
Carbon Sequestration (CS)	6.49	Higher			7.36	
Organic Nutrient Export (OE)	3.70	Moderate			4.30	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	4.90	Moderate	0.60	Lower	5.60	1.57
Amphibian & Turtle Habitat (AM)	2.17	Lower	4.78	Moderate	4.44	4.99
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.00	Moderate	10.00	Higher	4.97	10.00
Pollinator Habitat (POL)	8.84	Higher	10.00	Higher	7.12	10.00
Native Plant Habitat (PH)	4.72	Moderate	8.49	Higher	4.99	7.36
Public Use & Recognition (PU)			2.19	Lower		1.89
Wetland Sensitivity (Sens)			1.53	Lower		2.66
Wetland Ecological Condition (EC)			3.49	Moderate		6.25
Wetland Stressors (STR) (higher score means more stress)			7.58	Higher		5.05
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.66	Moderate	1.58	Lower	4.90	1.65
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	5.00	Moderate	4.77	Moderate	6.88	4.95
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	3.85	Moderate	2.08	Moderate	4.21	1.42
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.30	Lower	2.87	Lower	2.67	2.99
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.68	Higher	9.75	Higher	6.41	9.56
WETLAND CONDITION (EC)			3.49	Moderate		6.25
WETLAND RISK (average of Sensitivity & Stressors)			4.56	Higher		3.85

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - BB-Trib7-W-01
Investigator Name:	Matt Alexander
Date of Field Assessment:	12 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.182871
Longitude (decimal degrees):	66.207452
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.31
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	Catches runoff from pit/quarry. Flow to the wetland is flashy as observed during a precipitation event.

Date: 12 September 2019		Site Identifier: BB-Trib7-W-01		Investigator: Matt Alexander	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one.		This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
		New Brunswick	1		
		Nova Scotia	0		
		Prince Edward Island	0		
		Newfoundland-Labrador	0		
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
		<0.01 hectare (about 10 m x 10 m).	1		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	1		
		>100 hectares.	0		
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is:		See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		100 to 1000 hectares.	0		
		>1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	1		
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is:		To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
		<50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes]	1		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	0		
		50-500 m, and not separated.	0		
		50-500 m, but separated by those features.	0		
		0.5 - 5 km, and not separated.	0		
		0.5 - 5 km, but separated by those features.	0		
		None of the above (the closest patches or corridors which are that large are >5 km away).	0		
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is:		In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
		<5% of the land.	0		
		5 to 20% of the land.	0		
		20 to 60% of the land.	0		
		60 to 90% of the land.	0		
		>90% of the land. SKIP to OF10.	1		
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly:		[AM, SBM]	
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0		
		Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0		
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is:		"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	
		<100 m.	0		
		100 - 500 m.	0		
		0.5 - 1 km.	0		
		1 - 5 km.	1		
		>5 km.	0		

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	1	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
OF15	Tidal Proximity	<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
OF18	Relative Elevation in Watershed	Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
		In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.18	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
		The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
OF22	Wetland as a % of Its Contributing Area (Catchment)	Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
		From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
OF23	Unvegetated Surface in the Contributing Area	0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
		The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	0	
OF23	Unvegetated Surface in the Contributing Area	10 to 25%.	0	
		>25%.	1	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 1 0	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 1 0 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2314	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC or agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>2</p> <p>2</p> <p>3</p> <p>3</p> <p>2</p> <p>2</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>0</p> <p>1</p> <p>0</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>1</p> <p>0</p> <p>0</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unfllooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unfllooded parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
F22	Fringe Wetland	some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainsloms), but which is still a wetland, is:		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0	
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	1	
		25-50% of the AA never contains surface water.	0	
		50-75% of the AA never contains surface water.	0	
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	0	
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0	
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:		If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0	
		1-20% of the AA.	1	
		20-50% of the AA.	0	
		50-95% of the AA.	0	
		>95% of the AA. True for many fringe wetlands.	0	
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:		[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0	
		5-25% of the water is shaded.	1	
		25-50% of the water is shaded.	0	
		50-75% of the water is shaded.	0	
		>75% of the water is shaded.	0	
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:		Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0	
		1-20% of the AA, or <1% but >0.01 ha.	0	
		20-50% of the AA.	1	
		50-95% of the AA.	0	
		>95% of the AA.	0	
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:		Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0	
		10 cm - 50 cm change.	0	
		0.5 - 1 m change.	1	
		1-2 m change.	0	
		>2 m change.	0	
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:		If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	0	
		10 - 50 cm deep.	1	
		0.5 - 1 m deep.	0	
		1 - 2 m deep.	0	
		>2 m deep. True for many fringe wetlands.	0	
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):		Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0	
		One depth class that comprises 50-90% of the AA's inundated area.	1	
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0	
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:		Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	1	
		5-30% of the water.	0	
		30-70% of the water.	0	
		70-95% of the water.	0	
		>95% of the water.	0	
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:		[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		5-30% of the ponded water.	0	
		30-70% of the ponded water.	0	
		70-99% of the ponded water.	0	
		100% of the ponded water.	0	
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:		"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0	
		1 - 9 m.	1	
		10 - 29 m.	0	
		30 - 49 m.	0	
		50 - 100 m.	0	
		> 100 m, or open water is absent at that time.	0	
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:		If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	1	
		1-25% of the water edge.	0	
		25-50% of the water edge.	0	
		50-75% of the water edge.	0	
		>75% of the water edge.	0	
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:		Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0	
		1-25% of the emergent vegetation.	0	
		25-75% of the emergent vegetation.	1	
		>75% of the emergent vegetation.	0	

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	1	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	1	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	1	
		Neither of above. Enter "1".	0	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	1	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	0	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	1	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat - almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	1	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	1	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	0	
		>50%.	1	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	1	
		>95% of the AA with or without inhabited building nearby.	0	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.			1	
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	3	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	1	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	2	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	3	
			Sum=	9	
			Stressor subscore=	0.75	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.			1	
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	2
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3
				Sum=	6
				Stressor subscore=	0.67
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.				1	
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	3
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3
				Sum=	7
				Stressor subscore=	0.78

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				1
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				1
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				1
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	3
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	2
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	3
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum= 9
				Stressor subscore= 0.75
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	
				Sum= 0
				Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: BB-Trib7-W-01

Date: 12 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.182871, 66.207452

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.25	Lower	4.15	Moderate	3.46	4.20
Stream Flow Support (SFS)	4.06	Moderate	3.10	Moderate	2.17	1.80
Water Cooling (WC)	4.85	Moderate	6.11	Higher	3.23	3.67
Sediment Retention & Stabilisation (SR)	4.03	Moderate	3.22	Lower	5.92	1.95
Phosphorus Retention (PR)	3.30	Moderate	8.23	Higher	5.24	7.78
Nitrate Removal & Retention (NR)	3.13	Moderate	7.50	Higher	5.76	7.78
Carbon Sequestration (CS)	4.49	Moderate			6.50	
Organic Nutrient Export (OE)	5.45	Higher			5.23	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	4.42	Moderate	3.88	Moderate	5.43	3.34
Amphibian & Turtle Habitat (AM)	5.29	Moderate	4.55	Moderate	6.09	4.85
Waterbird Feeding Habitat (WBF)	5.36	Moderate	4.17	Moderate	4.27	4.17
Waterbird Nesting Habitat (WBN)	2.20	Moderate	2.50	Moderate	1.88	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.39	Higher	2.50	Lower	7.78	2.50
Pollinator Habitat (POL)	8.70	Higher	0.00	Lower	7.01	0.00
Native Plant Habitat (PH)	4.82	Moderate	5.68	Moderate	5.03	4.93
Public Use & Recognition (PU)			2.08	Lower		1.81
Wetland Sensitivity (Sens)			5.78	Higher		3.94
Wetland Ecological Condition (EC)			3.49	Moderate		6.25
Wetland Stressors (STR) (higher score means more stress)			10.00	Higher		6.56
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	4.06	Moderate	4.15	Moderate	3.46	4.20
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.76	Moderate	7.27	Moderate	6.18	6.81
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.08	Moderate	5.24	Higher	4.72	3.31
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	3.97	Moderate	3.39	Moderate	4.27	3.58
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.51	Higher	4.20	Moderate	7.20	3.70
WETLAND CONDITION (EC)			3.49	Moderate		6.25
WETLAND RISK (average of Sensitivity & Stressors)			7.89	Higher		5.25

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - BB-W-02
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	14 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.193464
Longitude (decimal degrees):	-66.201101
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1.2
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	80
What percent (approx.) of the <b>wetland</b> were you able to visit?	80
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 14 October 2019		Site Identifier: BB-W-02		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.24	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	1	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	0	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about:		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatlas.com/atlantic/salmon/canada-east/index_1.html">http://www.salmonatlas.com/atlantic/salmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>4</p> <p>3</p> <p>1</p> <p>1</p> <p>0</p> <p>0</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>0</p> <p>1</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unfllooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unfllooded parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	1	
		Intermediate.	0	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	1	
		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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	1	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat - almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.			
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.			
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.			
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.			
			Sum=	0		
			Stressor subscore=	0.00		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
				Sum=	0	
				Stressor subscore=	0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
			Sum=	0		
			Stressor subscore=	0.00		

S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: BB-W-02

Date: 14 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.193464, -66.201101

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	6.11	Higher	0.52	Lower	6.43	0.60
Stream Flow Support (SFS)	2.40	Lower	3.74	Moderate	1.28	2.18
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	6.75	Higher	10.00	Higher	7.78	10.00
Phosphorus Retention (PR)	4.98	Higher	10.00	Higher	6.44	10.00
Nitrate Removal & Retention (NR)	2.56	Moderate	10.00	Higher	5.41	10.00
Carbon Sequestration (CS)	8.20	Higher			8.10	
Organic Nutrient Export (OE)	5.97	Higher			5.50	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.69	Higher	1.03	Moderate	5.87	1.80
Amphibian & Turtle Habitat (AM)	2.87	Lower	1.22	Lower	4.82	2.83
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.23	Moderate	2.50	Lower	6.00	2.50
Pollinator Habitat (POL)	9.09	Higher	0.00	Lower	7.32	0.00
Native Plant Habitat (PH)	8.82	Higher	5.12	Moderate	6.64	4.44
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			0.67	Lower		2.40
Wetland Ecological Condition (EC)			7.11	Higher		8.33
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.40	Lower	0.52	Lower	6.43	0.60
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	5.76	Higher	10.00	Higher	7.51	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.74	Moderate	2.66	Moderate	4.52	1.75
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.72	Lower	0.73	Lower	2.89	1.70
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.73	Higher	3.83	Moderate	6.99	3.38
WETLAND CONDITION (EC)			7.11	Higher		8.33
WETLAND RISK (average of Sensitivity & Stressors)			0.44	Lower		2.37

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - FC-Trib1-W-01
Investigator Name:	Matt Alexander
Date of Field Assessment:	12 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.186357
Longitude (decimal degrees):	66.207911
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1.2
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 12 September 2019		Site Identifier: FC-Trib1-W-01		Investigator: Matt Alexander	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 1 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 1 0 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	1	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	1	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
OF15	Tidal Proximity	<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
OF18	Relative Elevation in Watershed	Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
		In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.15	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF23	Unvegetated Surface in the Contributing Area	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	1 0 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2314	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 1 0 0	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC at agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>2</p> <p>2</p> <p>3</p> <p>3</p> <p>2</p> <p>2</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>1</p> <p>0</p> <p>0</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 1 0 0 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 1 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 1 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 1 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 1 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 1 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 1	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	1 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 1 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 1 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 1 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	1	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	1	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	1	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCV, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	1	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRV, PH, PRV, SRV]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	1	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	1	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	1	
		Neither of above. Enter "1".	0	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRV, PH, PRV, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	1	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	0	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRV, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRV, PH, POL, PRV, SBM, Sens, SRV, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	1	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
None of the above.	1			
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.		[PH, PR]



<b>Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.</b>	<b>Data</b>
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<b>S1</b>	<b>Aberrant Timing of Water Inputs</b>				
<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
Stormwater from impervious surfaces that drains directly to the wetland.					1
Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
Regular removal of surface or groundwater for irrigation or other consumptive use.					
Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
Artificial drains or ditches in or near the wetland.					
Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
Logging within the wetland.					
Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
Straightening, ditching, dredging, and/or lining of tributary channels.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.		2
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.		1
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.		2
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.		2
				Sum=	7
				Stressor sub-score=	0.58
<b>S2</b>	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					1
Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a>					
Road salt.					
Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		0
Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		1
AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		0
				Sum=	1
				Stressor sub-score=	0.11
<b>S3</b>	<b>Accelerated Inputs of Nutrients</b>				
<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>					
Stormwater or wastewater effluent (including failing septic systems), landfills.					1
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:	High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		0
Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		1
AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		3
				Sum=	4
				Stressor sub-score=	0.44

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	2
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	1
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				0.42
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	0
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	0
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	0
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	0
				Sum=
				Stressor subscore=
				0.00

## Assessment Area (AA) Results:

Wetland ID: FC-Trib1-W-01

Date: 12 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.186357, 66.207911

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	1.28	Lower	0.29	Lower	2.72	0.38
Stream Flow Support (SFS)	6.15	Moderate	5.66	Moderate	3.28	3.30
Water Cooling (WC)	5.45	Higher	6.74	Higher	3.63	4.06
Sediment Retention & Stabilisation (SR)	2.41	Moderate	6.85	Moderate	4.81	4.16
Phosphorus Retention (PR)	3.92	Moderate	5.90	Higher	5.69	5.67
Nitrate Removal & Retention (NR)	1.72	Lower	10.00	Higher	4.89	10.00
Carbon Sequestration (CS)	3.77	Moderate			6.19	
Organic Nutrient Export (OE)	7.65	Higher			6.39	
Anadromous Fish Habitat (FA)	7.01	Higher	5.82	Higher	4.29	4.30
Resident Fish Habitat (FR)	5.87	Moderate	5.92	Higher	3.50	4.20
Aquatic Invertebrate Habitat (INV)	10.00	Higher	7.32	Higher	7.52	5.19
Amphibian & Turtle Habitat (AM)	5.08	Moderate	4.11	Moderate	5.99	4.59
Waterbird Feeding Habitat (WBF)	7.12	Higher	2.50	Moderate	5.67	2.50
Waterbird Nesting Habitat (WBN)	4.22	Moderate	0.00	Lower	3.61	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.76	Higher	0.00	Lower	8.09	0.00
Pollinator Habitat (POL)	9.43	Higher	0.00	Lower	7.59	0.00
Native Plant Habitat (PH)	8.05	Higher	6.02	Moderate	6.33	5.23
Public Use & Recognition (PU)			2.00	Lower		1.75
Wetland Sensitivity (Sens)			6.58	Higher		4.17
Wetland Ecological Condition (EC)			6.39	Moderate		7.92
Wetland Stressors (STR) (higher score means more stress)			4.40	Moderate		3.88
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	6.15	Higher	0.29	Lower	2.72	0.38
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.30	Moderate	8.79	Higher	5.79	8.30
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	8.66	Higher	6.95	Higher	6.36	4.69
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	6.49	Higher	4.80	Moderate	5.30	3.85
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.42	Higher	4.02	Moderate	7.72	3.49
WETLAND CONDITION (EC)			6.39	Moderate		7.92
WETLAND RISK (average of Sensitivity & Stressors)			5.49	Higher		4.03

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - FC-Trib1-W-02
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	14 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.185552
Longitude (decimal degrees):	-66.204419
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	5.1
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	80
What percent (approx.) of the <b>wetland</b> were you able to visit?	80
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 14 October 2019		Site Identifier: FC-Trib1-W-02		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. ≥1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 1 0 0 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[Fw, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	1	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	1	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	0			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.18	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	1 0 0 0 0	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>1</p> <p>0</p> <p>0</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>2</p> <p>2</p> <p>2</p> <p>1</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>0</p> <p>1</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>0</p> <p>1</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	1	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	1	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

		Data																																								
S1	<p><b>Aberrant Timing of Water Inputs</b></p> <p><i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i></p> <p>Stormwater from impervious surfaces that drains directly to the wetland.</p> <p>Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.</p> <p>Regular removal of surface or groundwater for irrigation or other consumptive use.</p> <p>Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.</p> <p>A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).</p> <p>Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.</p> <p>Artificial drains or ditches in or near the wetland.</p> <p>Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).</p> <p>Logging within the wetland.</p> <p>Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.</p> <p>Straightening, ditching, dredging, and/or lining of tributary channels.</p> <p><i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Severe (3 points)</th> <th style="text-align: center;">Medium (2 points)</th> <th style="text-align: center;">Mild (1 point)</th> <th></th> </tr> </thead> <tbody> <tr> <td>Spatial extent of timing shift within the wetland:</td> <td style="text-align: center;">&gt;95% of wetland.</td> <td style="text-align: center;">5-95% of wetland.</td> <td style="text-align: center;">&lt;5% of wetland.</td> <td></td> </tr> <tr> <td>When most of the timing shift began:</td> <td style="text-align: center;">&lt;3 yrs ago.</td> <td style="text-align: center;">3-9 yrs ago.</td> <td style="text-align: center;">10-100 yrs ago.</td> <td></td> </tr> <tr> <td colspan="5"><i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i></td> </tr> <tr> <td>Input timing now vs. previously:</td> <td style="text-align: center;">Shift of weeks.</td> <td style="text-align: center;">Shift of days.</td> <td style="text-align: center;">Shift of hours or minutes.</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Flashiness or muting:</td> <td style="text-align: center;">Became very flashy or controlled.</td> <td style="text-align: center;">Intermediate.</td> <td style="text-align: center;">Became mildly flashy or controlled.</td> <td style="text-align: center;">0</td> </tr> <tr> <td colspan="4" style="text-align: right;">Sum=</td> <td style="text-align: center;">0</td> </tr> <tr> <td colspan="4" style="text-align: right;">Stressor subscore=</td> <td style="text-align: center;">0.00</td> </tr> </tbody> </table>		Severe (3 points)	Medium (2 points)	Mild (1 point)		Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.		When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.		<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	Sum=				0	Stressor subscore=				0.00	
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S2	<p><b>Accelerated Inputs of Contaminants and/or Salts</b></p> <p><i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i></p> <p>Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.</p> <p>Metals &amp; chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1</a>)</p> <p>Road salt.</p> <p>Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.</p> <p><i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Severe (3 points)</th> <th style="text-align: center;">Medium (2 points)</th> <th style="text-align: center;">Mild (1 point)</th> <th></th> </tr> </thead> <tbody> <tr> <td>Usual toxicity of most toxic contaminants:</td> <td style="text-align: center;">Industrial effluent, mining waste, unmanaged landfill.</td> <td style="text-align: center;">Cropland, managed landfill, pipeline or transmission rights-of-way.</td> <td style="text-align: center;">Low density residential.</td> <td></td> </tr> <tr> <td>Frequency &amp; duration of input:</td> <td style="text-align: center;">Frequent and year-round.</td> <td style="text-align: center;">Frequent but mostly seasonal.</td> <td style="text-align: center;">Infrequent &amp; during high runoff events mainly.</td> <td></td> </tr> <tr> <td>AA proximity to main sources (actual or potential):</td> <td style="text-align: center;">0 - 15 m.</td> <td style="text-align: center;">15-100 m. or in groundwater.</td> <td style="text-align: center;">In more distant part of contributing area.</td> <td></td> </tr> <tr> <td colspan="4" style="text-align: right;">Sum=</td> <td style="text-align: center;">0</td> </tr> <tr> <td colspan="4" style="text-align: right;">Stressor subscore=</td> <td style="text-align: center;">0.00</td> </tr> </tbody> </table>		Severe (3 points)	Medium (2 points)	Mild (1 point)		Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		Sum=				0	Stressor subscore=				0.00											
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S3	<p><b>Accelerated Inputs of Nutrients</b></p> <p><i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i></p> <p>Stormwater or wastewater effluent (including failing septic systems), landfills.</p> <p>Fertilizers applied to lawns, ag lands, or other areas in the CA.</p> <p>Livestock, dogs.</p> <p>Artificial drainage of upslope lands.</p> <p><i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i></p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Severe (3 points)</th> <th style="text-align: center;">Medium (2 points)</th> <th style="text-align: center;">Mild (1 point)</th> <th></th> </tr> </thead> <tbody> <tr> <td>Type of loading:</td> <td style="text-align: center;">High density of unmaintained septic, some types of industrial sources.</td> <td style="text-align: center;">Moderate density septic, cropland, secondary wastewater treatment plant.</td> <td style="text-align: center;">Livestock, pets, low density residential.</td> <td style="text-align: center;">0</td> </tr> <tr> <td>Frequency &amp; duration of input:</td> <td style="text-align: center;">Frequent and year-round.</td> <td style="text-align: center;">Frequent but mostly seasonal.</td> <td style="text-align: center;">Infrequent &amp; during high runoff events mainly.</td> <td style="text-align: center;">0</td> </tr> <tr> <td>AA proximity to main sources (actual or potential):</td> <td style="text-align: center;">0 - 15 m.</td> <td style="text-align: center;">15-100 m. or in groundwater.</td> <td style="text-align: center;">In more distant part of contributing area.</td> <td style="text-align: center;">0</td> </tr> <tr> <td colspan="4" style="text-align: right;">Sum=</td> <td style="text-align: center;">0</td> </tr> <tr> <td colspan="4" style="text-align: right;">Stressor subscore=</td> <td style="text-align: center;">0.00</td> </tr> </tbody> </table>		Severe (3 points)	Medium (2 points)	Mild (1 point)		Type of loading:	High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	0	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	0	Sum=				0	Stressor subscore=				0.00											
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S4 <b>Excessive Sediment Loading from Contributing Area</b>			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 <b>Soil or Sediment Alteration Within the Assessment Area</b>			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: FC-Trib1-W-02

Date: 14 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.185552, -66.204419

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	5.54	Higher	0.37	Lower	5.99	0.45
Stream Flow Support (SFS)	4.69	Moderate	3.10	Moderate	2.50	1.81
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.37	Lower	8.33	0.22
Phosphorus Retention (PR)	5.71	Higher	0.00	Lower	6.95	0.33
Nitrate Removal & Retention (NR)	1.94	Lower	1.75	Lower	5.03	2.67
Carbon Sequestration (CS)	8.92	Higher			8.41	
Organic Nutrient Export (OE)	5.06	Moderate			5.02	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	4.46	Moderate	0.59	Lower	5.44	1.56
Amphibian & Turtle Habitat (AM)	0.90	Lower	1.01	Lower	3.78	2.70
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.77	Moderate	2.50	Lower	5.61	2.50
Pollinator Habitat (POL)	9.45	Higher	10.00	Higher	7.61	10.00
Native Plant Habitat (PH)	5.94	Moderate	10.00	Higher	5.48	10.00
Public Use & Recognition (PU)			2.33	Lower		1.99
Wetland Sensitivity (Sens)			1.75	Lower		2.73
Wetland Ecological Condition (EC)			8.55	Higher		9.17
Wetland Stressors (STR) (higher score means more stress)			0.39	Lower		2.40
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	4.69	Moderate	0.37	Lower	5.99	0.45
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.32	Higher	1.23	Lower	7.80	1.87
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.30	Moderate	2.17	Moderate	4.34	1.47
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	0.54	Lower	0.61	Lower	2.27	1.62
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.42	Higher	8.75	Higher	6.92	8.75
WETLAND CONDITION (EC)			8.55	Higher		9.17
WETLAND RISK (average of Sensitivity & Stressors)			1.07	Lower		2.57

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - FC-Trib1-W-04
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	14 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.194758
Longitude (decimal degrees):	-66.20425
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	4.8
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	80
What percent (approx.) of the <b>wetland</b> were you able to visit?	80
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 14 October 2019		Site Identifier: FC-Trib1-W-04		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [ <i>This is nearly always the answer in relatively undeveloped landscapes</i> ] >1000 hectares.	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of <b>opened</b> roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [ <i>This is often the answer in relatively undeveloped landscapes</i> ] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.20	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	1 0 0 0 0	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC or agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:		Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
		A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.		
		A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge ( <i>Carex rariflora</i> ). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.	0	
		A2. Not A1. Surface water, if present, has pH typically >4.5 and conductivity is usually >100 µS/cm (>64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (<2 m).	0	
		B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:		
		B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).	1	
		B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.	0	
<b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.				
F2	Wetland Types - Adjoining or Subordinate	If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
		A1.	1	
		A2.	0	
		B1.	0	
		B2.	1	
F3	Woody Height & Form Diversity	Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if <5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.		Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
		coniferous trees (may include lamarack) taller than 3 m.	5	
		deciduous trees taller than 3 m.	2	
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.	1	
		deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	1	
<b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).				
F4	Dominance of Most Abundant Shrub Species	Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:		[PH, POL, SBM, Sens]
		those species together comprise > 50% of such cover.	0	
		those species together do not comprise > 50% of such cover.	1	
F5	Woody Diameter Classes	Mark ALL the types that comprise >5% of the woody canopy cover in the AA or >5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.		Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
		coniferous, 1-9 cm diameter and >1 m tall.	1	
		broad-leaved deciduous 1-9 cm diameter and >1 m tall.	1	
		coniferous, 10-19 cm diameter.	1	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	1	
		broad-leaved deciduous 20-40 cm diameter.	1	
coniferous, >40 cm diameter.	1			
		broad-leaved deciduous >40 cm diameter.	0	
F6	Height Class Interspersion	Follow the key below and mark the ONE row that best describes MOST of the AA:		[AM, INV, NR, PH, SBM, Sens]
		A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.		
		A1. The two height classes are mostly scattered and intermixed throughout the AA.	0	
		A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.	1	
		B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:		
		B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.	0	
		B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.	0	
F7	Large Snags (Dead Standing Trees)	The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:		Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
		None, or fewer than 8/ hectare which exceed this diameter.	0	
		Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.	0	
		Several (>8/hectare) but above not true.	1	
F8	Downed Wood	The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:		Exclude temporary "burn piles." [AM, INV, POL, SBM]
		Few or none that meet these criteria.	0	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	1	

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	1	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	1	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.			
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.			
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.			
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.			
			Sum=	0		
			Stressor subscore=	0.00		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
				Sum=	0	
				Stressor subscore=	0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
			Sum=	0		
			Stressor subscore=	0.00		

S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: FC-Trib1-W-04

Date: 14 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.194758, -66.20425

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	6.76	Higher	0.42	Lower	6.93	0.50
Stream Flow Support (SFS)	2.08	Lower	3.65	Moderate	1.11	2.13
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.37	Lower	8.33	0.22
Phosphorus Retention (PR)	5.71	Higher	0.00	Lower	6.95	0.33
Nitrate Removal & Retention (NR)	3.01	Moderate	1.56	Lower	5.69	2.50
Carbon Sequestration (CS)	8.20	Higher			8.10	
Organic Nutrient Export (OE)	5.58	Higher			5.29	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	8.20	Higher	1.42	Moderate	6.76	2.01
Amphibian & Turtle Habitat (AM)	3.42	Moderate	1.74	Lower	5.11	3.15
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	8.37	Higher	2.50	Lower	6.94	2.50
Pollinator Habitat (POL)	9.50	Higher	10.00	Higher	7.65	10.00
Native Plant Habitat (PH)	9.82	Higher	10.00	Higher	7.04	10.00
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			2.24	Lower		2.87
Wetland Ecological Condition (EC)			8.55	Higher		9.17
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.08	Lower	0.42	Lower	6.93	0.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.50	Higher	1.10	Lower	7.80	1.76
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.09	Higher	2.67	Moderate	5.03	1.75
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	2.05	Lower	1.04	Lower	3.07	1.89
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.52	Higher	8.75	Higher	7.43	8.75
WETLAND CONDITION (EC)			8.55	Higher		9.17
WETLAND RISK (average of Sensitivity & Stressors)			1.23	Lower		2.61

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - FC-Trib2-W-01
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	14 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.193500
Longitude (decimal degrees):	-66.207134
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1.0
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 14 October 2019		Site Identifier: FC-Trib2-W-01		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [ <i>This is nearly always the answer in relatively undeveloped landscapes</i> ] >1000 hectares.	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of <b>opened</b> roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [ <i>This is often the answer in relatively undeveloped landscapes</i> ] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	1	
		50 - 100 m.	0	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
OF18	Relative Elevation in Watershed	Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
		In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.19	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF23	Unvegetated Surface in the Contributing Area	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 1 0 0 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>2</p> <p>2</p> <p>0</p> <p>4</p> <p>0</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>1</p> <p>0</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>1</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>1</p> <p>0</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	1	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	1	
		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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	1	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 1 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 1 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 1	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 1 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 1 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	1 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	1 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	1 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	1	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	1	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRV, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRV, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	1	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, FAV, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[FAv, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				1
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.		
			Sum=	0	
			Stressor subscore=	0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor subscore=	0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor subscore=	0.00

S4 <b>Excessive Sediment Loading from Contributing Area</b>			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 <b>Soil or Sediment Alteration Within the Assessment Area</b>			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: FC-Trib2-W-01

Date: 14 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.193500, -66.207134

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.64	Moderate	0.39	Lower	3.76	0.48
Stream Flow Support (SFS)	2.92	Lower	3.53	Moderate	1.56	2.06
Water Cooling (WC)	8.40	Higher	1.28	Lower	5.60	0.77
Sediment Retention & Stabilisation (SR)	2.00	Moderate	1.56	Lower	4.53	0.94
Phosphorus Retention (PR)	3.76	Moderate	1.09	Lower	5.57	1.32
Nitrate Removal & Retention (NR)	2.30	Moderate	4.56	Moderate	5.25	5.17
Carbon Sequestration (CS)	4.82	Moderate			6.64	
Organic Nutrient Export (OE)	6.31	Higher			5.68	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	7.93	Higher	5.26	Moderate	6.66	4.08
Amphibian & Turtle Habitat (AM)	4.85	Moderate	5.58	Moderate	5.86	5.48
Waterbird Feeding Habitat (WBF)	7.62	Higher	2.50	Moderate	6.07	2.50
Waterbird Nesting Habitat (WBN)	5.49	Higher	2.50	Moderate	4.69	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.48	Higher	2.50	Lower	7.86	2.50
Pollinator Habitat (POL)	10.00	Higher	0.00	Lower	8.35	0.00
Native Plant Habitat (PH)	8.65	Higher	6.23	Moderate	6.57	5.40
Public Use & Recognition (PU)			2.23	Lower		1.92
Wetland Sensitivity (Sens)			0.08	Lower		2.23
Wetland Ecological Condition (EC)			7.59	Higher		8.61
Wetland Stressors (STR) (higher score means more stress)			3.14	Moderate		3.41
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.92	Moderate	0.39	Lower	3.76	0.48
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.23	Moderate	3.48	Lower	6.07	3.82
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.39	Higher	4.31	Moderate	5.77	3.19
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	5.61	Moderate	3.85	Moderate	4.69	3.79
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.69	Higher	4.57	Moderate	7.97	4.02
WETLAND CONDITION (EC)			7.59	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			1.61	Lower		2.82

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MB-Trib2-W-01
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	11 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.172643
Longitude (decimal degrees):	-66.196268
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	9.8
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	40
What percent (approx.) of the <b>wetland</b> were you able to visit?	40
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 11 October 2019		Site Identifier: MB-Trib2-W-01		Investigator: Derrick Mitchell	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one.		This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
		New Brunswick	1		
		Nova Scotia	0		
		Prince Edward Island	0		
		Newfoundland-Labrador	0		
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
		<0.01 hectare (about 10 m x 10 m).	1		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		>100 hectares.	1		
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus all adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is:		See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		100 to 1000 hectares.	1		
		>1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes.]	0		
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is:		To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
		<50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes.]	1		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	0		
		50-500 m, and not separated.	0		
		50-500 m, but separated by those features.	0		
		0.5 - 5 km, and not separated.	0		
		0.5 - 5 km, but separated by those features.	0		
		None of the above (the closest patches or corridors which are that large are >5 km away).	0		
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is:		In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
		<5% of the land.	0		
		5 to 20% of the land.	0		
		20 to 60% of the land.	0		
		60 to 90% of the land.	0		
		>90% of the land. SKIP to OF10.	1		
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly:		[AM, SBM]	
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0		
		Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0		
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is:		"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	
		<100 m.	0		
		100 - 500 m.	0		
		0.5 - 1 km.	0		
		1 - 5 km.	1		
		>5 km.	0		

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler>Line tool. Or use the GeoNB's Draw Line tool. [AM, FAv, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	1	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	1	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are > 1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	1	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP-AC.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.55	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream). This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream). This is the situation for nearly all wetlands in this region.	1	
OF23	Unvegetated Surface in the Contributing Area	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland's area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:		[NRv, PRv, SRv, WSV]
		Mostly true.	0	
		Somewhat true.	0	
		Mostly untrue.	1	
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:		[AM, NR, SFS, WC, WS]
		Northward (N, NE), north-facing contributing area.	0	
		Southward (S, SW), south-facing contributing area.	1	
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).		
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:		Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
		<10 m.	0	
		10 - 50 m.	0	
		50 - 100 m.	0	
		100 - 1000 m.	1	
		1 - 2 km.	0	
>2 km, or wetland lacks an inlet and outlet.	0			
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKenney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [Mark just the first choice that is true.]:		Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a>
		Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatlantic.com/atlanticsalmoncanada-east/index.1.html">http://www.salmonatlantic.com/atlanticsalmoncanada-east/index.1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a>	0	[AM, FA, FR, INV, WBF, WBN]
		Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions.	0	
		Is probably not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally.	0	
		Is known or likely to be fishless (e.g. too small, dry, and/or not accessible even temporarily, and not stocked).	1	
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented. [mark all applicable]:		Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMv, EC, PHv, POLv, SBMv, Sens, WBFv, WBNv]
		Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SupplInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer	0	
		Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file.	0	
		Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file.	0	
		Presence of one or more of the nesting songbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file, during their nesting season (May-July for most species).	0	
None of the above, or no data.	1			
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMv, WBFv, WBNv]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNv]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to Identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8). See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB_Crown lands. Use more recent information if available.		"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]
		New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions.	0	
		Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed.	1	
		Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.	0	
		Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0	



**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>1</p> <p>0</p> <p>0</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	1	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	1	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainsloms), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	1	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	1	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			



F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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.]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
Sum=				0	
Stressor subscore=				0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
	Sum=				0
	Stressor subscore=				0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
Sum=				0	
Stressor subscore=				0.00	

S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: BOR WL 15

Date: 11 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees):

*Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.*

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	9.04	Higher	1.30	Lower	8.68	1.38
Stream Flow Support (SFS)	1.04	Lower	0.00	Lower	0.56	0.00
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	5.13	Moderate	0.37	Lower	6.67	0.22
Phosphorus Retention (PR)	5.32	Higher	0.00	Lower	6.68	0.33
Nitrate Removal & Retention (NR)	10.00	Higher	1.00	Lower	10.00	2.00
Carbon Sequestration (CS)	6.98	Higher			7.57	
Organic Nutrient Export (OE)	6.11	Higher			5.57	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	8.29	Higher	0.99	Moderate	6.79	1.78
Amphibian & Turtle Habitat (AM)	3.09	Lower	1.08	Lower	4.93	2.75
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.93	Moderate	2.50	Lower	5.75	2.50
Pollinator Habitat (POL)	9.96	Higher	0.00	Lower	8.02	0.00
Native Plant Habitat (PH)	6.16	Higher	5.29	Moderate	5.57	4.59
Public Use & Recognition (PU)			2.26	Lower		1.94
Wetland Sensitivity (Sens)			1.94	Lower		2.78
Wetland Ecological Condition (EC)			8.55	Higher		9.17
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.04	Lower	1.30	Lower	8.68	1.38
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	8.41	Higher	0.73	Lower	8.86	1.43
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.08	Higher	0.66	Lower	5.01	1.19
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.85	Lower	0.65	Lower	2.96	1.65
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.82	Higher	3.94	Moderate	7.23	3.48
WETLAND CONDITION (EC)			8.55	Higher		9.17
WETLAND RISK (average of Sensitivity & Stressors)			1.08	Lower		2.56

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MCB-W-01
Investigator Name:	Matt Alexander
Date of Field Assessment:	9 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.162984
Longitude (decimal degrees):	66.195641
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	3.90
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 9 October 2019		Site Identifier: MCB-W-01		Investigator: Matt Alexander	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: Google Earth Pro: <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> GeoNB: <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 1 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. SKIP to OF10.	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria. [FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
0.5 - 1 km, but separated by those features.	1			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.29	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is: Mostly true Somewhat true. Mostly untrue.	0 1 0	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is: Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is: ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i> Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 1 0 0	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i> Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available. New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place. Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]



**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>1</p> <p>0</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>3</p> <p>1</p> <p>2</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>1</p> <p>0</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>1</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
F22	Fringe Wetland	some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is:		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0	
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0	
		25-50% of the AA never contains surface water.	1	
		50-75% of the AA never contains surface water.	0	
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	0	
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0	
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:		If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0	
		1-20% of the AA.	0	
		20-50% of the AA.	1	
		50-95% of the AA.	0	
		>95% of the AA. True for many fringe wetlands.	0	
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:		[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0	
		5-25% of the water is shaded.	1	
		25-50% of the water is shaded.	0	
		50-75% of the water is shaded.	0	
		>75% of the water is shaded.	0	
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:		Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0	
		1-20% of the AA, or <1% but >0.01 ha.	0	
		20-50% of the AA.	1	
		50-95% of the AA.	0	
		>95% of the AA.	0	
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:		Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0	
		10 cm - 50 cm change.	1	
		0.5 - 1 m change.	0	
		1-2 m change.	0	
		>2 m change.	0	
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:		If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	0	
		10 - 50 cm deep.	1	
		0.5 - 1 m deep.	0	
		1 - 2 m deep.	0	
		>2 m deep. True for many fringe wetlands.	0	
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):		Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0	
		One depth class that comprises 50-90% of the AA's inundated area.	0	
		Neither of above. There are 3 or more depth classes and none occupy >50%.	1	
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:		Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	0	
		5-30% of the water.	0	
		30-70% of the water.	1	
		70-95% of the water.	0	
		>95% of the water.	0	
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:		[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		5-30% of the ponded water.	0	
		30-70% of the ponded water.	0	
		70-99% of the ponded water.	0	
		100% of the ponded water.	0	
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:		"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0	
		1 - 9 m.	0	
		10 - 29 m.	0	
		30 - 49 m.	0	
		50 - 100 m.	0	
		> 100 m, or open water is absent at that time.	0	
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:		If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0	
		1-25% of the water edge.	0	
		25-50% of the water edge.	0	
		50-75% of the water edge.	0	
		>75% of the water edge.	0	
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:		Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0	
		1-25% of the emergent vegetation.	0	
		25-75% of the emergent vegetation.	0	
		>75% of the emergent vegetation.	0	

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	1	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	1			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	1	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	0	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			



F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	1	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0"s for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
Sum=				0	
Stressor subscore=				0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0"s for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	0
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	0
	Sum=				0
	Stressor subscore=				0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0"s for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	0
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	0
Sum=				0	
Stressor subscore=				0.00	

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				1
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	3
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	3
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	2
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	1
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum= 9
				Stressor subscore= 0.75
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	0
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	0
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	0
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	0
				Sum= 0
				Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: MCB-W-01

Date: 9 October 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.162984N 66.195641W

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.36	Lower	1.91	Lower	3.54	1.98
Stream Flow Support (SFS)	7.19	Higher	6.47	Higher	3.83	3.77
Water Cooling (WC)	3.29	Moderate	8.76	Higher	2.19	5.27
Sediment Retention & Stabilisation (SR)	2.09	Moderate	7.31	Moderate	4.59	4.44
Phosphorus Retention (PR)	3.02	Moderate	6.08	Higher	5.05	5.83
Nitrate Removal & Retention (NR)	2.23	Lower	10.00	Higher	5.20	10.00
Carbon Sequestration (CS)	5.75	Higher			7.04	
Organic Nutrient Export (OE)	5.03	Moderate			5.00	
Anadromous Fish Habitat (FA)	6.97	Higher	2.65	Moderate	4.27	1.96
Resident Fish Habitat (FR)	6.81	Higher	2.62	Moderate	4.06	1.86
Aquatic Invertebrate Habitat (INV)	4.91	Moderate	7.36	Higher	5.60	5.21
Amphibian & Turtle Habitat (AM)	6.20	Moderate	5.81	Moderate	6.58	5.61
Waterbird Feeding Habitat (WBF)	6.64	Moderate	5.00	Moderate	5.28	5.00
Waterbird Nesting Habitat (WBN)	5.30	Moderate	5.00	Moderate	4.53	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.91	Higher	5.00	Moderate	6.56	5.00
Pollinator Habitat (POL)	10.00	Higher	0.00	Lower	8.18	0.00
Native Plant Habitat (PH)	6.63	Higher	5.66	Moderate	5.76	4.91
Public Use & Recognition (PU)			2.18	Lower		1.88
Wetland Sensitivity (Sens)			0.50	Lower		2.35
Wetland Ecological Condition (EC)			5.66	Moderate		7.50
Wetland Stressors (STR) (higher score means more stress)			2.62	Moderate		3.22
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	7.19	Higher	1.91	Lower	3.54	1.98
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.73	Lower	8.90	Higher	6.26	8.38
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.15	Higher	8.15	Higher	4.88	5.01
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	6.68	Higher	5.01	Moderate	5.76	4.75
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.09	Higher	4.61	Moderate	7.51	4.15
WETLAND CONDITION (EC)			5.66	Moderate		7.50
WETLAND RISK (average of Sensitivity & Stressors)			1.56	Lower		2.79

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MC-Trib1B-W-01
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	11 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.195228
Longitude (decimal degrees):	-66.187355
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.5
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	10
What percent (approx.) of the <b>wetland</b> were you able to visit?	10
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 11 October 2019		Site Identifier: MCB-Trib1B-W-01		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [ <i>This is nearly always the answer in relatively undeveloped landscapes</i> ] ≥1000 hectares.	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of <b>opened</b> roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [ <i>This is often the answer in relatively undeveloped landscapes</i> ] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	1	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	1	
		0.5 - 1 km, and not separated.	0	
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
OF15	Tidal Proximity	<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
		>10 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	1	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP-AC.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.60	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
OF22	Wetland as a % of Its Contributing Area (Catchment)	The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
		From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0			
0.01 to 0.1.	0			
0.1 to 1.	1			
>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0			
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC or agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]



**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:		Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
		A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.		
		A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge ( <i>Carex rariflora</i> ). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.	0	
		A2. Not A1. Surface water, if present, has pH typically >4.5 and conductivity is usually >100 µS/cm (>64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (<2 m).	1	
		B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:		
		B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).	0	
		B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.	0	
<b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.				
F2	Wetland Types - Adjoining or Subordinate	If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
		A1.	0	
		A2.	0	
		B1.	1	
		B2.	0	
F3	Woody Height & Form Diversity	Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if <5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.		Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
		coniferous trees (may include lamarack) taller than 3 m.	3	
		deciduous trees taller than 3 m.	3	
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.	2	
		deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	4	
<b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).				
F4	Dominance of Most Abundant Shrub Species	Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:		[PH, POL, SBM, Sens]
		those species together comprise > 50% of such cover.	0	
		those species together do not comprise > 50% of such cover.	1	
F5	Woody Diameter Classes	Mark ALL the types that comprise >5% of the woody canopy cover in the AA or >5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.		Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
		coniferous, 1-9 cm diameter and >1 m tall.	1	
		broad-leaved deciduous 1-9 cm diameter and >1 m tall.	1	
		coniferous, 10-19 cm diameter.	1	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	1	
		broad-leaved deciduous 20-40 cm diameter.	1	
		coniferous, >40 cm diameter.	0	
		broad-leaved deciduous >40 cm diameter.	0	
F6	Height Class Interspersion	Follow the key below and mark the ONE row that best describes MOST of the AA:		[AM, INV, NR, PH, SBM, Sens]
		A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.		
		A1. The two height classes are mostly scattered and intermixed throughout the AA.	0	
		A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.	0	
		B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:		
B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.	0			
B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.	1			
F7	Large Snags (Dead Standing Trees)	The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:		Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
		None, or fewer than 8/ hectare which exceed this diameter.	0	
		Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.	0	
		Several (>8/hectare) but above not true.	1	
F8	Downed Wood	The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:		Exclude temporary "burn piles." [AM, INV, POL, SBM]
		Few or none that meet these criteria.	0	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	1	

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	1	
		Intermediate.	0	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	1	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	1	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is:		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0	
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0	
		25-50% of the AA never contains surface water.	0	
		50-75% of the AA never contains surface water.	1	
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	0	
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0	
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:		If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0	
		1-20% of the AA.	1	
		20-50% of the AA.	0	
		50-95% of the AA.	0	
		>95% of the AA. True for many fringe wetlands.	0	
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:		[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0	
		5-25% of the water is shaded.	0	
		25-50% of the water is shaded.	0	
		50-75% of the water is shaded.	0	
		>75% of the water is shaded.	1	
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:		Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0	
		1-20% of the AA, or <1% but >0.01 ha.	1	
		20-50% of the AA.	0	
		50-95% of the AA.	0	
		>95% of the AA.	0	
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:		Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0	
		10 cm - 50 cm change.	1	
		0.5 - 1 m change.	0	
		1-2 m change.	0	
		>2 m change.	0	
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:		If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	1	
		10 - 50 cm deep.	0	
		0.5 - 1 m deep.	0	
		1 - 2 m deep.	0	
		>2 m deep. True for many fringe wetlands.	0	
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):		Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	1	
		One depth class that comprises 50-90% of the AA's inundated area.	0	
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0	
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:		Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	1	
		5-30% of the water.	0	
		30-70% of the water.	0	
		70-95% of the water.	0	
		>95% of the water.	0	
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:		[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		5-30% of the ponded water.	0	
		30-70% of the ponded water.	0	
		70-99% of the ponded water.	0	
		100% of the ponded water.	0	
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:		"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0	
		1 - 9 m.	0	
		10 - 29 m.	0	
		30 - 49 m.	0	
		50 - 100 m.	0	
		> 100 m, or open water is absent at that time.	0	
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:		If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0	
		1-25% of the water edge.	0	
		25-50% of the water edge.	0	
		50-75% of the water edge.	0	
		>75% of the water edge.	0	
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:		Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0	
		1-25% of the emergent vegetation.	0	
		25-75% of the emergent vegetation.	0	
		>75% of the emergent vegetation.	0	

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCV, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	1	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRV, PH, PRV, SRV]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	1	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	1	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRV, PH, PRV, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	1	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	0	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRV, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	1	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRV, PH, POL, PRV, SBM, Sens, SRV, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	



F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	1	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
			Sum=	0	
			Stressor subscore=	0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor subscore=	0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor subscore=	0.00

S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: MC-Trib1B-W-01

Date: 11 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.195228, -66.187355

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	1.29	Lower	1.43	Lower	2.72	1.50
Stream Flow Support (SFS)	6.67	Higher	6.94	Higher	3.56	4.04
Water Cooling (WC)	7.80	Higher	5.73	Higher	5.20	3.45
Sediment Retention & Stabilisation (SR)	1.30	Lower	6.16	Moderate	4.05	3.74
Phosphorus Retention (PR)	2.94	Moderate	5.53	Higher	4.98	5.33
Nitrate Removal & Retention (NR)	0.98	Lower	10.00	Higher	4.44	10.00
Carbon Sequestration (CS)	3.31	Moderate			5.99	
Organic Nutrient Export (OE)	8.43	Higher			6.81	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	6.77	Higher	4.63	Moderate	6.26	3.74
Amphibian & Turtle Habitat (AM)	4.89	Moderate	4.74	Moderate	5.88	4.97
Waterbird Feeding Habitat (WBF)	5.81	Moderate	2.50	Moderate	4.62	2.50
Waterbird Nesting Habitat (WBN)	4.86	Moderate	2.50	Moderate	4.15	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.39	Higher	2.50	Lower	7.79	2.50
Pollinator Habitat (POL)	10.00	Higher	0.00	Lower	8.19	0.00
Native Plant Habitat (PH)	8.15	Higher	6.14	Moderate	6.37	5.33
Public Use & Recognition (PU)			2.26	Lower		1.94
Wetland Sensitivity (Sens)			4.00	Moderate		3.40
Wetland Ecological Condition (EC)			7.11	Higher		8.33
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	6.67	Higher	1.43	Lower	2.72	1.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.34	Lower	8.62	Higher	5.43	8.18
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.92	Higher	6.35	Higher	6.13	3.89
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.46	Moderate	3.35	Moderate	4.41	3.48
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.59	Higher	4.51	Moderate	7.82	3.97
WETLAND CONDITION (EC)			7.11	Higher		8.33
WETLAND RISK (average of Sensitivity & Stressors)			2.11	Lower		2.87

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MC-Trib1C-W-03
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	9 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.1904
Longitude (decimal degrees):	-66.184379
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	5
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	5
What percent (approx.) of the <b>wetland</b> were you able to visit?	5
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 9 October 2019		Site Identifier: MC-TribTC-W-03		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
		>500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	1	
		0.5 - 1 km, but separated by those features.	0	
		None of the above (the closest patches or corridors that large are >1 km away).	0	
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
		>10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	1	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.55	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	0	
		10 to 25%.	1	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true. Mostly untrue.	0 1 0	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC at agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]



**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the form of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:		Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
		A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.		
		A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge ( <i>Carex rariflora</i> ). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.	0	
		A2. Not A1. Surface water, if present, has pH typically >4.5 and conductivity is usually >100 µS/cm (>64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (<2 m).	0	
		B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:		
		B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).	1	
		B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.	0	
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
		A1.	0	
		A2.	0	
		B1.	0	
		B2.	1	
F3	Woody Height & Form Diversity	Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if <5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.		Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
		coniferous trees (may include lamarack) taller than 3 m.	5	
		deciduous trees taller than 3 m.	2	
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.	2	
deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	1			
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:		[PH, POL, SBM, Sens]
		those species together comprise > 50% of such cover.	1	
		those species together do not comprise > 50% of such cover.	0	
F5	Woody Diameter Classes	Mark ALL the types that comprise >5% of the woody canopy cover in the AA or >5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.		Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
		coniferous, 1-9 cm diameter and >1 m tall.	1	
		broad-leaved deciduous 1-9 cm diameter and >1 m tall.	1	
		coniferous, 10-19 cm diameter.	1	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	1	
		broad-leaved deciduous 20-40 cm diameter.	1	
		coniferous, >40 cm diameter.	1	
		broad-leaved deciduous >40 cm diameter.	0	
F6	Height Class Interspersion	Follow the key below and mark the ONE row that best describes MOST of the AA:		[AM, INV, NR, PH, SBM, Sens]
		A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.		
		A1. The two height classes are mostly scattered and intermixed throughout the AA.	1	
		A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.	0	
		B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:		
		B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.	0	
		B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.	0	
F7	Large Snags (Dead Standing Trees)	The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:		Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
		None, or fewer than 8/ hectare which exceed this diameter.	0	
		Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.	0	
		Several (>8/hectare) but above not true.	1	
F8	Downed Wood	The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:		Exclude temporary "burn piles." [AM, INV, POL, SBM]
		Few or none that meet these criteria.	0	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	1	

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	1	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	1	
		Intermediate.	0	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	1	
		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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	0	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	1	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
F48	TDS and/or Conductivity	Neither of above. Enter "1".	1	
		The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
Neither of above	1			
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	1	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	1	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			



F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	1	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				1	
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	2		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	1		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.			
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.			
			Sum=	3		
			Stressor sub-score=	0.25		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
				Sum=	0	
				Stressor sub-score=	0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.				1		
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
			Sum=	1		
			Stressor sub-score=	0.11		

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	0
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	0
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	0
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				0.00
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	2
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	1
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	1
				Sum=
				Stressor subscore=
				5
				0.42

## Assessment Area (AA) Results:

Wetland ID: MC-Trib1C-W-03

Date: 9 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees):

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	8.39	Higher	4.45	Moderate	8.18	4.50
Stream Flow Support (SFS)	1.20	Lower	0.00	Lower	0.64	0.00
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	3.32	Moderate	1.83	Lower	5.43	1.11
Phosphorus Retention (PR)	4.41	Higher	1.63	Lower	6.03	1.81
Nitrate Removal & Retention (NR)	10.00	Higher	3.63	Moderate	10.00	4.33
Carbon Sequestration (CS)	4.51	Moderate			6.51	
Organic Nutrient Export (OE)	5.80	Higher			5.41	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	3.16	Moderate	0.91	Moderate	4.99	1.73
Amphibian & Turtle Habitat (AM)	2.81	Lower	2.39	Moderate	4.78	3.54
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.79	Moderate	5.00	Moderate	5.63	5.00
Pollinator Habitat (POL)	9.20	Higher	0.00	Lower	7.41	0.00
Native Plant Habitat (PH)	4.68	Moderate	5.01	Moderate	4.97	4.35
Public Use & Recognition (PU)			2.18	Lower		1.88
Wetland Sensitivity (Sens)			1.83	Lower		2.75
Wetland Ecological Condition (EC)			3.25	Moderate		6.11
Wetland Stressors (STR) (higher score means more stress)			6.76	Higher		4.74
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.20	Lower	4.45	Moderate	8.18	4.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	7.95	Higher	2.99	Lower	8.50	3.38
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.17	Moderate	0.61	Lower	4.08	1.16
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.68	Lower	1.43	Lower	2.87	2.13
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.05	Higher	4.17	Moderate	6.71	4.06
WETLAND CONDITION (EC)			3.25	Moderate		6.11
WETLAND RISK (average of Sensitivity & Stressors)			4.29	Moderate		3.75

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MC-Trib1C-W-04
Investigator Name:	Matt Alexander
Date of Field Assessment:	8 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.189587
Longitude (decimal degrees):	66.183085
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.94
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 8 October 2019		Site Identifier: MC-Trib1C-W-04		Investigator: Matt Alexander	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 1 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	1	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.56	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlantic/salmon/canada-east/index_1.html">http://www.salmonatl.ca/atlantic/salmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC at agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]



**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 0 1 0	<p><b>Ericaceous</b> shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1. A2. B1. B2.</p>	0 0 0 0	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m. deciduous trees taller than 3 m. coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees. deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees. coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation. deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	5 1 3 1 1 1	<p><b>Deciduous</b> shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover. those species together do not comprise &gt; 50% of such cover.</p>	1 0	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall. broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall. coniferous, 10-19 cm diameter. broad-leaved deciduous 10-19 cm diameter. coniferous, 20-40 cm diameter. broad-leaved deciduous 20-40 cm diameter. coniferous, &gt;40 cm diameter. broad-leaved deciduous &gt;40 cm diameter.</p>	1 1 1 1 1 1 1	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA. <b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one. <b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	0 0 1 0	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter. Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km. Several (&gt;8/hectare) but above not true.</p>	0 0 1	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria. Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	0 1	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			



F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):	1	[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	Unknown if new or expanded within 20 years or not.	1	
		More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
F58	Visibility	Burned >30 years ago, or no evidence of a burn and no data.	1	
		The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
F59	Non-consumptive Uses - Actual or Potential	>50%.	0	
		Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
F60	Unvisited Core Area	Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
		The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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.]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
F61	Frequently Visited Area	50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
F62	BMP - Soils	50-95%.	0	
		>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[FAv, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	1	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	0	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				1
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	2	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	1	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
Sum=			3		
Stressor sub-score=			0.25		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	0
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	0
	Sum=			0	
	Stressor sub-score=			0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	0
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	0
Sum=			0		
Stressor sub-score=			0.00		

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	0
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	0
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	0
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	0
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				0.00
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	0
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	0
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	0
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	0
				Sum=
				Stressor subscore=
				0.00

## Assessment Area (AA) Results:

Wetland ID: MC-Trib1C-W-04

Date: 8 October 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.189587N 66.183085W

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	4.57	Moderate	1.33	Lower	5.24	1.40
Stream Flow Support (SFS)	2.66	Lower	6.45	Higher	1.42	3.76
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.37	Lower	8.33	0.22
Phosphorus Retention (PR)	4.77	Higher	0.00	Lower	6.29	0.33
Nitrate Removal & Retention (NR)	2.61	Moderate	0.25	Lower	5.44	1.33
Carbon Sequestration (CS)	8.44	Higher			8.20	
Organic Nutrient Export (OE)	3.36	Moderate			4.11	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.40	Moderate	0.83	Lower	5.77	1.69
Amphibian & Turtle Habitat (AM)	2.81	Lower	0.87	Lower	4.79	2.62
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.46	Moderate	2.50	Lower	5.36	2.50
Pollinator Habitat (POL)	8.64	Higher	0.00	Lower	6.96	0.00
Native Plant Habitat (PH)	4.95	Moderate	4.73	Moderate	5.08	4.11
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			0.00	Lower		1.88
Wetland Ecological Condition (EC)			5.66	Moderate		7.50
Wetland Stressors (STR) (higher score means more stress)			2.54	Moderate		3.19
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.66	Moderate	1.33	Lower	5.24	1.40
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.27	Higher	0.29	Lower	7.70	0.98
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.13	Moderate	4.44	Moderate	4.30	2.79
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.69	Lower	0.52	Lower	2.87	1.57
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.66	Higher	3.57	Moderate	6.38	3.15
WETLAND CONDITION (EC)			5.66	Moderate		7.50
WETLAND RISK (average of Sensitivity & Stressors)			1.27	Lower		2.54

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MC-Trib1D-W-01
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	9 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.192384
Longitude (decimal degrees):	-66.186994
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	5
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	5
What percent (approx.) of the <b>wetland</b> were you able to visit?	5
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the form of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:		Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
		A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.		
		A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge ( <i>Carex rariflora</i> ). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.	0	
		A2. Not A1. Surface water, if present, has pH typically >4.5 and conductivity is usually >100 µS/cm (>64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (<2 m).	0	
		B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:		
		B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).	1	
		B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.	0	
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
		A1.	0	
		A2.	0	
		B1.	0	
		B2.	1	
F3	Woody Height & Form Diversity	Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if <5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.		Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
		coniferous trees (may include lamarack) taller than 3 m.	5	
		deciduous trees taller than 3 m.	1	
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	1	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	1	
		coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.	2	
		deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	2	
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:		[PH, POL, SBM, Sens]
		those species together comprise > 50% of such cover.	1	
		those species together do not comprise > 50% of such cover.	0	
F5	Woody Diameter Classes	Mark ALL the types that comprise >5% of the woody canopy cover in the AA or >5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.		Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
		coniferous, 1-9 cm diameter and >1 m tall.	1	
		broad-leaved deciduous 1-9 cm diameter and >1 m tall.	1	
		coniferous, 10-19 cm diameter.	1	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	1	
		broad-leaved deciduous 20-40 cm diameter.	1	
		coniferous, >40 cm diameter.	1	
		broad-leaved deciduous >40 cm diameter.	0	
F6	Height Class Interspersion	Follow the key below and mark the ONE row that best describes MOST of the AA:		[AM, INV, NR, PH, SBM, Sens]
		A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.		
		A1. The two height classes are mostly scattered and intermixed throughout the AA.	0	
		A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.	1	
		B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:		
		B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.	0	
		B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.	0	
F7	Large Snags (Dead Standing Trees)	The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:		Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
		None, or fewer than 8/ hectare which exceed this diameter.	0	
		Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.	0	
		Several (>8/hectare) but above not true.	1	
F8	Downed Wood	The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:		Exclude temporary "burn piles." [AM, INV, POL, SBM]
		Few or none that meet these criteria.	0	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	1	

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	1	
		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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and <b>SKIP to F20</b> (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainsloms), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]



F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	1	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the form of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:		Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
		A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.		
		A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge ( <i>Carex rariflora</i> ). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.	0	
		A2. Not A1. Surface water, if present, has pH typically >4.5 and conductivity is usually >100 µS/cm (>64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (<2 m).	0	
		B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:		
		B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).	1	
		B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.	0	
<b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.				
F2	Wetland Types - Adjoining or Subordinate	If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
		A1.	0	
		A2.	0	
		B1.	0	
		B2.	1	
F3	Woody Height & Form Diversity	Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if <5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.		Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
		coniferous trees (may include lamarack) taller than 3 m.	5	
		deciduous trees taller than 3 m.	1	
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	1	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	1	
		coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.	2	
		deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	2	
<b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).				
F4	Dominance of Most Abundant Shrub Species	Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:		[PH, POL, SBM, Sens]
		those species together comprise > 50% of such cover.	1	
		those species together do not comprise > 50% of such cover.	0	
F5	Woody Diameter Classes	Mark ALL the types that comprise >5% of the woody canopy cover in the AA or >5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.		Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
		coniferous, 1-9 cm diameter and >1 m tall.	1	
		broad-leaved deciduous 1-9 cm diameter and >1 m tall.	1	
		coniferous, 10-19 cm diameter.	1	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	1	
		broad-leaved deciduous 20-40 cm diameter.	1	
		coniferous, >40 cm diameter.	1	
		broad-leaved deciduous >40 cm diameter.	0	
F6	Height Class Interspersion	Follow the key below and mark the ONE row that best describes MOST of the AA:		[AM, INV, NR, PH, SBM, Sens]
		A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.		
		A1. The two height classes are mostly scattered and intermixed throughout the AA.	0	
		A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.	1	
		B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:		
		B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.	0	
		B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.	0	
F7	Large Snags (Dead Standing Trees)	The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:		Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
		None, or fewer than 8/ hectare which exceed this diameter.	0	
		Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.	0	
		Several (>8/hectare) but above not true.	1	
F8	Downed Wood	The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:		Exclude temporary "burn piles." [AM, INV, POL, SBM]
		Few or none that meet these criteria.	0	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	1	

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	1	
		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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRV, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	1	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRV, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
Sum=				0	
Stressor subscore=				0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
	Sum=				0
	Stressor subscore=				0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
Sum=				0	
Stressor subscore=				0.00	



S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: MC-Trib1D-W-01

Date: 9 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.163275, 66.199397

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	4.35	Moderate	1.63	Lower	5.08	1.70
Stream Flow Support (SFS)	5.63	Moderate	7.40	Higher	3.00	4.32
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.24	Higher	0.69	Lower	8.11	0.42
Phosphorus Retention (PR)	5.07	Higher	0.48	Lower	6.50	0.76
Nitrate Removal & Retention (NR)	3.23	Moderate	1.94	Lower	5.82	2.83
Carbon Sequestration (CS)	7.54	Higher			7.82	
Organic Nutrient Export (OE)	5.01	Moderate			4.99	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	4.61	Moderate	0.83	Lower	5.49	1.69
Amphibian & Turtle Habitat (AM)	3.14	Lower	0.78	Lower	4.96	2.57
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.27	Moderate	2.50	Lower	5.20	2.50
Pollinator Habitat (POL)	9.62	Higher	0.00	Lower	7.75	0.00
Native Plant Habitat (PH)	5.27	Moderate	4.97	Moderate	5.21	4.32
Public Use & Recognition (PU)			2.26	Lower		1.94
Wetland Sensitivity (Sens)			0.00	Lower		2.12
Wetland Ecological Condition (EC)			4.70	Moderate		6.94
Wetland Stressors (STR) (higher score means more stress)			1.92	Lower		2.97
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	5.63	Higher	1.63	Lower	5.08	1.70
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.21	Higher	1.49	Lower	7.59	2.09
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.72	Moderate	5.07	Higher	4.43	3.16
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.88	Lower	0.47	Lower	2.97	1.54
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.33	Higher	3.73	Moderate	6.90	3.29
WETLAND CONDITION (EC)			4.70	Moderate		6.94
WETLAND RISK (average of Sensitivity & Stressors)			0.96	Lower		2.54

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MC-W-01
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	October 9, 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.188198
Longitude (decimal degrees):	-66.187343
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	8.9 ha
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	90
What percent (approx.) of the <b>wetland</b> were you able to visit?	90
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, July 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 9 October 2019		Site Identifier: MC-W-01		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 1 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. ≥1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. SKIP to OF10.	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	1	
0.5 - 1 km, but separated by those features.	0			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.12	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	1	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	0			
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 1 0	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	1 0 0 0 0	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the form of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>1</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>2</p> <p>2</p> <p>1</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>0</p> <p>1</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>1</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	0	
		Several (extensive micro-topography).	1	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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.	1	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	0	
		100-1000 sq. m.	1	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
F22	Fringe Wetland	some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 1 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 1 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 1 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 1 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 1 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 1 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	1 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 1	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	1	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 1 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 1 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 1 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 1 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	1	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	1	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	1	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	1	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	1	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	1	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	0	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	Unknown if new or expanded within 20 years or not.	1	
		More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
F58	Visibility	Burned >30 years ago, or no evidence of a burn and no data.	1	
		The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
F59	Non-consumptive Uses - Actual or Potential	>50%.	0	
		Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
F60	Unvisited Core Area	Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
		The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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.]</i>		[AM, FAv, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
F61	Frequently Visited Area	50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
F62	BMP - Soils	50-95%.	0	
		>95% of the AA.	0	
F63	BMP - Wildlife Protection	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
		Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[FAv, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	0	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				1
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	1	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	2	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	1	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	2	
Sum=				6	
Stressor sub-score=				0.50	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
	Sum=				0
	Stressor sub-score=				0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
Sum=				0	
Stressor sub-score=				0.00	



S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			1
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			1
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			1
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: MC-W-01

Date: 9 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.188198, -66.187343

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.06	Lower	0.22	Lower	3.32	0.30
Stream Flow Support (SFS)	4.48	Moderate	3.28	Moderate	2.39	1.91
Water Cooling (WC)	2.92	Moderate	4.08	Moderate	1.94	2.46
Sediment Retention & Stabilisation (SR)	3.78	Moderate	10.00	Higher	5.74	10.00
Phosphorus Retention (PR)	4.09	Moderate	10.00	Higher	5.81	10.00
Nitrate Removal & Retention (NR)	2.28	Moderate	10.00	Higher	5.24	10.00
Carbon Sequestration (CS)	5.36	Moderate			6.87	
Organic Nutrient Export (OE)	4.43	Moderate			4.68	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	4.40	Moderate	2.84	Moderate	2.62	2.01
Aquatic Invertebrate Habitat (INV)	3.95	Moderate	6.43	Higher	5.26	4.71
Amphibian & Turtle Habitat (AM)	5.89	Moderate	7.08	Higher	6.41	6.39
Waterbird Feeding Habitat (WBF)	7.63	Higher	5.00	Moderate	6.07	5.00
Waterbird Nesting Habitat (WBN)	5.95	Higher	5.00	Moderate	5.08	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.75	Higher	5.00	Moderate	8.08	5.00
Pollinator Habitat (POL)	9.16	Higher	10.00	Higher	7.38	10.00
Native Plant Habitat (PH)	7.05	Higher	10.00	Higher	5.93	10.00
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			0.00	Lower		2.20
Wetland Ecological Condition (EC)			4.94	Moderate		7.08
Wetland Stressors (STR) (higher score means more stress)			4.57	Moderate		3.94
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	4.48	Moderate	0.22	Lower	3.32	0.30
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.74	Moderate	10.00	Higher	6.39	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.21	Moderate	5.52	Higher	4.42	3.87
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	6.21	Moderate	5.53	Moderate	5.23	5.03
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.20	Higher	9.17	Higher	7.61	9.17
WETLAND CONDITION (EC)			4.94	Moderate		7.08
WETLAND RISK (average of Sensitivity & Stressors)			2.28	Lower		3.07

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PH-W-01
Investigator Name:	Matt Alexander
Date of Field Assessment:	20 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.202795
Longitude (decimal degrees):	66.187736
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1.93
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	Catches runoff from Paddy's Hill and Paddy's Hill Road.

Date: 20 September 2019		Site Identifier: PH-W01		Investigator: Matt Alexander	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: Google Earth Pro: <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> GeoNB: <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 0 1 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 0 1 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. ≥1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	3	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. SKIP to OF10.	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	1	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
0.5 - 1 km, but separated by those features.	1			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.68	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about:		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 0 1 0	Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1. A2. B1. B2.</p>	0 0 0 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m. deciduous trees taller than 3 m. coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees. deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees. coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation. deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	2 2 2 3 1 3	Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover. those species together do not comprise &gt; 50% of such cover.</p>	1 0	[PH, POL, SBM, Sens]
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall. broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall. coniferous, 10-19 cm diameter. broad-leaved deciduous 10-19 cm diameter. coniferous, 20-40 cm diameter. broad-leaved deciduous 20-40 cm diameter. coniferous, &gt;40 cm diameter. broad-leaved deciduous &gt;40 cm diameter.</p>	1 1 1 1 1 1 1	Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA. <b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one. <b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	0 1 0 0	[AM, INV, NR, PH, SBM, Sens]
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/hectare which exceed this diameter. Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km. Several (&gt;8/hectare) but above not true.</p>	0 1 0	Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria. Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	0 1	Exclude temporary "burn piles." [AM, INV, POL, SBM]

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	1	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	0	
		Several (extensive micro-topography).	1	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	0	
		100-1000 sq. m.	1	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 1 0 0 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 1 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 1 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 1 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 1 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 1 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 1 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 1	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	1	
		Neither of above. Enter "1".	0	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	1	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	0	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRV, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRV, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	1	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	1	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	0	
		>50%.	1	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	1	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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.]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

<b>Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.</b>	<b>Data</b>
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<b>S1</b>	<b>Aberrant Timing of Water Inputs</b>				
<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
Stormwater from impervious surfaces that drains directly to the wetland.					1
Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
Regular removal of surface or groundwater for irrigation or other consumptive use.					
Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
Artificial drains or ditches in or near the wetland.					0
Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
Logging within the wetland.					
Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
Straightening, ditching, dredging, and/or lining of tributary channels.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.		0
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.		1
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.		1
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.		1
Sum=					3
Stressor sub-score=					0.25
<b>S2</b>	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					1
Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a>					
Road salt.					
Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		0
Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		1
AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		3
Sum=					4
Stressor sub-score=					0.44
<b>S3</b>	<b>Accelerated Inputs of Nutrients</b>				
<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>					
Stormwater or wastewater effluent (including failing septic systems), landfills.					1
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:	High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		0
Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		1
AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		3
Sum=					4
Stressor sub-score=					0.44



S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	0
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	3
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				0.42
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	3
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	2
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	1
				Sum=
				Stressor subscore=
				0.58

## Assessment Area (AA) Results:

Wetland ID: PH-W-01

Date: 20 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.202795, 66.187736

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	3.06	Moderate	1.63	Lower	4.09	1.70
Stream Flow Support (SFS)	2.55	Lower	7.19	Higher	1.36	4.19
Water Cooling (WC)	1.42	Lower	0.00	Lower	0.94	0.00
Sediment Retention & Stabilisation (SR)	2.03	Moderate	1.88	Lower	4.55	1.14
Phosphorus Retention (PR)	3.02	Moderate	4.55	Moderate	5.05	4.44
Nitrate Removal & Retention (NR)	2.21	Lower	7.19	Moderate	5.19	7.50
Carbon Sequestration (CS)	2.73	Lower			5.74	
Organic Nutrient Export (OE)	4.16	Moderate			4.54	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	2.53	Lower	5.04	Moderate	4.76	3.96
Amphibian & Turtle Habitat (AM)	5.80	Moderate	9.62	Higher	6.36	7.93
Waterbird Feeding Habitat (WBF)	7.36	Higher	10.00	Higher	5.86	10.00
Waterbird Nesting Habitat (WBN)	4.25	Moderate	10.00	Higher	3.63	10.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.57	Higher	10.00	Higher	7.93	10.00
Pollinator Habitat (POL)	9.95	Higher	10.00	Higher	8.01	10.00
Native Plant Habitat (PH)	6.23	Higher	9.97	Higher	5.60	8.65
Public Use & Recognition (PU)			4.55	Moderate		3.57
Wetland Sensitivity (Sens)			5.56	Higher		3.87
Wetland Ecological Condition (EC)			4.94	Moderate		7.08
Wetland Stressors (STR) (higher score means more stress)			6.38	Higher		4.60
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.55	Moderate	1.63	Lower	4.09	1.70
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.72	Lower	5.86	Moderate	5.44	5.93
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	3.41	Lower	5.64	Higher	3.83	3.46
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	5.42	Moderate	7.96	Higher	4.77	7.79
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.26	Higher	9.99	Higher	7.59	9.77
WETLAND CONDITION (EC)			4.94	Moderate		7.08
WETLAND RISK (average of Sensitivity & Stressors)			5.97	Higher		4.24

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PH-W-02
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	14 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.202084
Longitude (decimal degrees):	-66.186590
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	8.7
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	75
What percent (approx.) of the <b>wetland</b> were you able to visit?	50
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 14 October 2019		Site Identifier: PH-W-02		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: Google Earth Pro: <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> GeoNB: <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. SKIP to OF10.	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[Fv, FRv, NRV, PH, PU, SBM, WBFv]	



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.70	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlantic/salmon/canada-east/index_1.html">http://www.salmonatl.ca/atlantic/salmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 0	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>1</p> <p>0</p> <p>0</p> <p>1</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>2</p> <p>1</p> <p>2</p> <p>3</p> <p>2</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>0</p> <p>1</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>1</p> <p>0</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>1</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	1	
		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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
F22	Fringe Wetland	some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is:	1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0	
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0	
		25-50% of the AA never contains surface water.	0	
		50-75% of the AA never contains surface water.	0	
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	1	
99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0			
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:		If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0	
		1-20% of the AA.	1	
		20-50% of the AA.	0	
		50-95% of the AA.	0	
		>95% of the AA. True for many fringe wetlands.	0	
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:		[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0	
		5-25% of the water is shaded.	0	
		25-50% of the water is shaded.	0	
		50-75% of the water is shaded.	1	
		>75% of the water is shaded.	0	
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:		Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0	
		1-20% of the AA, or <1% but >0.01 ha.	0	
		20-50% of the AA.	0	
		50-95% of the AA.	0	
		>95% of the AA.	1	
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:		Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0	
		10 cm - 50 cm change.	1	
		0.5 - 1 m change.	0	
		1-2 m change.	0	
		>2 m change.	0	
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:		If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	1	
		10 - 50 cm deep.	0	
		0.5 - 1 m deep.	0	
		1 - 2 m deep.	0	
		>2 m deep. True for many fringe wetlands.	0	
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):		Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0	
		One depth class that comprises 50-90% of the AA's inundated area.	1	
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0	
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:		Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	0	
		5-30% of the water.	1	
		30-70% of the water.	0	
		70-95% of the water.	0	
		>95% of the water.	0	
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	1	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:		[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	1	
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		5-30% of the ponded water.	0	
		30-70% of the ponded water.	0	
		70-99% of the ponded water.	0	
100% of the ponded water.	0			
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:		"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0	
		1 - 9 m.	0	
		10 - 29 m.	0	
		30 - 49 m.	0	
		50 - 100 m.	0	
> 100 m, or open water is absent at that time.	0			
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:		If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0	
		1-25% of the water edge.	0	
		25-50% of the water edge.	0	
		50-75% of the water edge.	0	
		>75% of the water edge.	0	
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:		Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0	
		1-25% of the emergent vegetation.	0	
		25-75% of the emergent vegetation.	0	
		>75% of the emergent vegetation.	0	
			0	

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	1	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	1	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, FAv, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[FAv, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				1
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	2	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	1	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
			Sum=	3	
			Stressor sub-score=	0.25	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor sub-score=	0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor sub-score=	0.00



S4 <b>Excessive Sediment Loading from Contributing Area</b>			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 <b>Soil or Sediment Alteration Within the Assessment Area</b>			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: PH-W-02

Date: 14 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.202084, -66.186590

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.90	Moderate	1.68	Lower	3.96	1.75
Stream Flow Support (SFS)	4.79	Moderate	7.50	Higher	2.56	4.37
Water Cooling (WC)	8.25	Higher	5.29	Higher	5.50	3.18
Sediment Retention & Stabilisation (SR)	3.74	Moderate	1.29	Lower	5.71	0.79
Phosphorus Retention (PR)	3.04	Moderate	0.78	Lower	5.06	1.04
Nitrate Removal & Retention (NR)	2.31	Moderate	3.81	Moderate	5.26	4.50
Carbon Sequestration (CS)	6.54	Higher			7.38	
Organic Nutrient Export (OE)	9.52	Higher			7.38	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	3.84	Moderate	4.16	Moderate	5.22	3.48
Amphibian & Turtle Habitat (AM)	5.60	Moderate	4.45	Moderate	6.26	4.79
Waterbird Feeding Habitat (WBF)	4.99	Moderate	2.50	Moderate	3.97	2.50
Waterbird Nesting Habitat (WBN)	3.25	Moderate	2.50	Moderate	2.77	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.53	Higher	2.50	Lower	7.90	2.50
Pollinator Habitat (POL)	10.00	Higher	0.00	Lower	8.83	0.00
Native Plant Habitat (PH)	7.50	Higher	6.43	Higher	6.11	5.58
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			0.00	Lower		2.11
Wetland Ecological Condition (EC)			6.39	Moderate		7.92
Wetland Stressors (STR) (higher score means more stress)			4.52	Moderate		3.92
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	4.79	Moderate	1.68	Lower	3.96	1.75
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.38	Moderate	2.89	Lower	6.62	3.30
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	8.06	Higher	6.57	Higher	6.27	4.02
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.18	Moderate	3.17	Moderate	4.43	3.38
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.51	Higher	4.70	Moderate	8.22	4.14
WETLAND CONDITION (EC)			6.39	Moderate		7.92
WETLAND RISK (average of Sensitivity & Stressors)			2.26	Lower		3.02

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLE-W-01
Investigator Name:	Matt Alexander
Date of Field Assessment:	19 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.172159
Longitude (decimal degrees):	66.20506
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.61
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	75
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 19 September 2019		Site Identifier: PLE-W-01		Investigator: Matt Alexander	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one.		This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
		New Brunswick	1		
		Nova Scotia	0		
		Prince Edward Island	0		
		Newfoundland-Labrador	0		
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is:		See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		100 to 1000 hectares.	0		
		>1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	1		
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is:		To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
		<50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes]	1		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	0		
		50-500 m, and not separated.	0		
		50-500 m, but separated by those features.	0		
		0.5 - 5 km, and not separated.	0		
		0.5 - 5 km, but separated by those features.	0		
		None of the above (the closest patches or corridors which are that large are >5 km away).	0		
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is:		In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
		<5% of the land.	0		
		5 to 20% of the land.	0		
		20 to 60% of the land.	0		
		60 to 90% of the land.	0		
		>90% of the land. SKIP to OF10.	1		
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly:		[AM, SBM]	
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0		
		Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0		
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is:		"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	
		<100 m.	0		
		100 - 500 m.	0		
		0.5 - 1 km.	0		
		1 - 5 km.	1		
		>5 km.	0		



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	1	
		25 - 50 m.	0	
		50 - 100 m.	0	
100 - 500 m.	0			
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
0.5 - 1 km, but separated by those features.	1			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and islarger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.18	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 1 0 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2314	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>1</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>3</p> <p>1</p> <p>2</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	0	
		Several (extensive micro-topography).	1	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
F22	Fringe Wetland	some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 1 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 1 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 1 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 1	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 1 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 1 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 1	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 1	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	1	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	Unknown if new or expanded within 20 years or not.	1	
		More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
F58	Visibility	Burned >30 years ago, or no evidence of a burn and no data.	1	
		The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	0	
F59	Non-consumptive Uses - Actual or Potential	>50%.	1	
		Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	1	
F60	Unvisited Core Area	Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
		The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	1	
		5-50% and inhabited building is within 100 m of the AA.	0	
F61	Frequently Visited Area	50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	0	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	0	
		5-50%.	1	
F62	BMP - Soils	50-95%.	0	
		>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

<b>Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.</b>	<b>Data</b>
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<b>S1</b>	<b>Aberrant Timing of Water Inputs</b>			
<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.	1		
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.			
	Regular removal of surface or groundwater for irrigation or other consumptive use.			
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.			
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).	1		
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.			
	Artificial drains or ditches in or near the wetland.			
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).			
	Logging within the wetland.			
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.	1		
	Straightening, ditching, dredging, and/or lining of tributary channels.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	1
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	3
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>				
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	1
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	1
	Sum=			6
	Stressor sub-score=			0.50
<b>S2</b>	<b>Accelerated Inputs of Contaminants and/or Salts</b>			
<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.	1		
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1</a> )			
	Road salt.			
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	0
Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3
	Sum=			4
	Stressor sub-score=			0.44
<b>S3</b>	<b>Accelerated Inputs of Nutrients</b>			
<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills.	1		
	Fertilizers applied to lawns, ag lands, or other areas in the CA.			
	Livestock, dogs.			
	Artificial drainage of upslope lands.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:	High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	0
Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3
	Sum=			4
	Stressor sub-score=			0.44



S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	1
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	3
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	3
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	3
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				10
				0.83
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	1
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	3
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	3
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	3
				Sum=
				10
				Stressor subscore=
				0.83

## Assessment Area (AA) Results:

Wetland ID: PLE-W-01

Date: 19 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.172159, 66.20506

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	8.29	Higher	0.37	Lower	8.10	0.45
Stream Flow Support (SFS)	0.00	Lower	0.00	Lower	0.00	0.00
Water Cooling (WC)	2.00	Moderate	0.00	Lower	1.33	0.00
Sediment Retention & Stabilisation (SR)	10.00	Higher	1.74	Lower	10.00	1.06
Phosphorus Retention (PR)	10.00	Higher	4.55	Moderate	10.00	4.44
Nitrate Removal & Retention (NR)	10.00	Higher	3.75	Moderate	10.00	4.44
Carbon Sequestration (CS)	3.57	Moderate			6.10	
Organic Nutrient Export (OE)	1.20	Lower			2.97	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	1.16	Lower	4.16	Moderate	4.28	3.49
Amphibian & Turtle Habitat (AM)	5.24	Moderate	5.77	Moderate	6.07	5.59
Waterbird Feeding Habitat (WBF)	5.23	Moderate	5.00	Moderate	4.16	5.00
Waterbird Nesting Habitat (WBN)	3.61	Moderate	5.00	Moderate	3.09	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.19	Higher	5.00	Moderate	7.62	5.00
Pollinator Habitat (POL)	9.58	Higher	0.00	Lower	7.71	0.00
Native Plant Habitat (PH)	4.97	Moderate	5.89	Moderate	5.09	5.11
Public Use & Recognition (PU)			3.07	Moderate		2.51
Wetland Sensitivity (Sens)			2.21	Lower		2.87
Wetland Ecological Condition (EC)			3.98	Moderate		6.53
Wetland Stressors (STR) (higher score means more stress)			8.23	Higher		5.28
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	0.00	Lower	0.37	Lower	8.10	0.45
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	10.00	Higher	3.95	Lower	9.51	3.88
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	1.55	Lower	2.77	Moderate	3.21	2.33
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.03	Moderate	4.46	Moderate	4.37	4.36
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.74	Higher	4.76	Moderate	7.26	4.24
WETLAND CONDITION (EC)			3.98	Moderate		6.53
WETLAND RISK (average of Sensitivity & Stressors)			5.22	Higher		4.07

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLE-W-03
Investigator Name:	Matt Alexander
Date of Field Assessment:	19 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.163275
Longitude (decimal degrees):	66.199397
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.54
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	90
What percent (approx.) of the <b>wetland</b> were you able to visit?	90
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 19 September 2019		Site Identifier: PLE-W-03		Investigator: Matt Alexander	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 1 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. ≥1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	1 0 0 0 0 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. SKIP to OF10.	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	1	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	1	
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
OF15	Tidal Proximity	<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
OF18	Relative Elevation in Watershed	Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
			0.38	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF23	Unvegetated Surface in the Contributing Area	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about:		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	1	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	0	
		Several (extensive micro-topography).	1	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCV, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRV, PH, PRV, SRV]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRV, PH, PRV, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRV, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRV, PH, POL, PRV, SBM, Sens, SRV, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRV, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRV, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	Unknown if new or expanded within 20 years or not.	1	
		More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
F58	Visibility	Burned >30 years ago, or no evidence of a burn and no data.	1	
		The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	1	
F59	Non-consumptive Uses - Actual or Potential	>50%.	0	
		Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	1	
F60	Unvisited Core Area	Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
		The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
>95% of the AA with or without inhabited building nearby.	1			
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
None of the above.	1			
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

		Data
S1	<p><b>Aberrant Timing of Water Inputs</b></p> <p><i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i></p>	
	Stormwater from impervious surfaces that drains directly to the wetland.	1
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.	
	Regular removal of surface or groundwater for irrigation or other consumptive use.	
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.	
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).	
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.	
	Artificial drains or ditches in or near the wetland.	
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).	
	Logging within the wetland.	
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.	
	Straightening, ditching, dredging, and/or lining of tributary channels.	
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>	
		Severe (3 points)      Medium (2 points)      Mild (1 point)
	Spatial extent of timing shift within the wetland:	>95% of wetland.      5-95% of wetland.      <5% of wetland.
	When most of the timing shift began:	<3 yrs ago.      3-9 yrs ago.      10-100 yrs ago.
	<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>	
	Input timing now vs. previously:	Shift of weeks.      Shift of days.      Shift of hours or minutes.
	Flashiness or muting:	Became very flashy or controlled.      Intermediate.      Became mildly flashy or controlled.
	Sum=	4
	Stressor sub-score=	0.33
S2	<p><b>Accelerated Inputs of Contaminants and/or Salts</b></p> <p><i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i></p>	
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.	1
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1</a> )	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>	
		Severe (3 points)      Medium (2 points)      Mild (1 point)
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.      Cropland, managed landfill, pipeline or transmission rights-of-way.      Low density residential.
	Frequency & duration of input:	Frequent and year-round.      Frequent but mostly seasonal.      Infrequent & during high runoff events mainly.
	AA proximity to main sources (actual or potential):	0 - 15 m.      15-100 m. or in groundwater.      In more distant part of contributing area.
	Sum=	4
	Stressor sub-score=	0.44
S3	<p><b>Accelerated Inputs of Nutrients</b></p> <p><i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i></p>	
	Stormwater or wastewater effluent (including failing septic systems), landfills.	1
	Fertilizers applied to lawns, ag lands, or other areas in the CA.	
	Livestock, dogs.	
	Artificial drainage of upslope lands.	
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>	
		Severe (3 points)      Medium (2 points)      Mild (1 point)
	Type of loading:	High density of unmaintained septic, some types of industrial sources.      Moderate density septic, cropland, secondary wastewater treatment plant.      Livestock, pets, low density residential.
	Frequency & duration of input:	Frequent and year-round.      Frequent but mostly seasonal.      Infrequent & during high runoff events mainly.
	AA proximity to main sources (actual or potential):	0 - 15 m.      15-100 m. or in groundwater.      In more distant part of contributing area.
	Sum=	4
	Stressor sub-score=	0.44



S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	0
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	3
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				0.42
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	
				Sum=
				0
				Stressor subscore=
				0.00

## Assessment Area (AA) Results:

Wetland ID: PLE-W-03

Date: 19 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.163275, 66.199397

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	4.97	Moderate	0.87	Lower	5.56	0.95
Stream Flow Support (SFS)	1.88	Lower	4.86	Moderate	1.00	2.84
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	8.38	Higher	0.82	Lower	8.89	0.50
Phosphorus Retention (PR)	5.03	Higher	4.55	Moderate	6.47	4.44
Nitrate Removal & Retention (NR)	2.77	Moderate	3.75	Moderate	5.54	4.44
Carbon Sequestration (CS)	7.78	Higher			7.92	
Organic Nutrient Export (OE)	3.62	Moderate			4.25	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	4.95	Moderate	0.88	Moderate	5.62	1.72
Amphibian & Turtle Habitat (AM)	2.67	Lower	2.38	Moderate	4.71	3.54
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.77	Moderate	5.00	Moderate	5.61	5.00
Pollinator Habitat (POL)	8.22	Higher	0.00	Lower	6.62	0.00
Native Plant Habitat (PH)	3.32	Lower	4.70	Moderate	4.42	4.08
Public Use & Recognition (PU)			4.33	Moderate		3.41
Wetland Sensitivity (Sens)			0.00	Lower		1.94
Wetland Ecological Condition (EC)			4.94	Moderate		7.08
Wetland Stressors (STR) (higher score means more stress)			4.14	Moderate		3.78
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.88	Lower	0.87	Lower	5.56	0.95
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.89	Higher	3.79	Lower	8.05	3.79
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	3.78	Lower	3.39	Moderate	4.17	2.18
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.60	Lower	1.43	Lower	2.83	2.12
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.16	Moderate	4.12	Moderate	6.09	4.01
WETLAND CONDITION (EC)			4.94	Moderate		7.08
WETLAND RISK (average of Sensitivity & Stressors)			2.07	Lower		2.86

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLW-W-01
Investigator Name:	Matt Alexander
Date of Field Assessment:	19 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.171674
Longitude (decimal degrees):	66.20564
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.37
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	40
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 19 September 2019		Site Identifier: PLW-W-01		Investigator: Matt Alexander	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 1 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	1	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	0	
		>500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	1	
		None of the above (the closest patches or corridors that large are >1 km away).	0	
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
		>10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP-AC.	1	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.16	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about:		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 1 0 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2314	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>1</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>3</p> <p>1</p> <p>2</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unfllooded parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unfllooded parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
F22	Fringe Wetland	some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 1 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 1 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 1 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 1	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 1 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 1 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 1	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 1	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	1	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	Unknown if new or expanded within 20 years or not.	1	
		More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
F58	Visibility	Burned >30 years ago, or no evidence of a burn and no data.	1	
		The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	0	
F59	Non-consumptive Uses - Actual or Potential	>50%.	1	
		Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	1	
F60	Unvisited Core Area	Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
		The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	1	
		5-50% and inhabited building is within 100 m of the AA.	0	
F61	Frequently Visited Area	50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	0	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	0	
		5-50%.	1	
F62	BMP - Soils	50-95%.	0	
		>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.				1	
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				1	
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				1	
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	1		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	3		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	1		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	1		
			Sum=	6		
			Stressor subscore=	0.50		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				1	
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	0	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3	
				Sum=	4	
				Stressor subscore=	0.44	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.					1	
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	0	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3	
			Sum=	4		
			Stressor subscore=	0.44		



S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	1
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	3
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	3
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	3
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				10
				0.83
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	1
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	3
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	3
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	3
				Sum=
				10
				Stressor subscore=
				0.83

## Assessment Area (AA) Results:

Wetland ID: PLW-W-01

Date: 19 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.171674, 66.20564

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	8.33	Higher	0.32	Lower	8.13	0.40
Stream Flow Support (SFS)	0.00	Lower	0.00	Lower	0.00	0.00
Water Cooling (WC)	2.00	Moderate	0.00	Lower	1.33	0.00
Sediment Retention & Stabilisation (SR)	10.00	Higher	1.74	Lower	10.00	1.06
Phosphorus Retention (PR)	10.00	Higher	4.55	Moderate	10.00	4.44
Nitrate Removal & Retention (NR)	10.00	Higher	3.75	Moderate	10.00	4.44
Carbon Sequestration (CS)	3.15	Moderate			5.92	
Organic Nutrient Export (OE)	1.20	Lower			2.97	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	0.69	Lower	4.00	Moderate	4.12	3.40
Amphibian & Turtle Habitat (AM)	5.24	Moderate	5.62	Moderate	6.07	5.50
Waterbird Feeding Habitat (WBF)	5.05	Moderate	5.00	Moderate	4.02	5.00
Waterbird Nesting Habitat (WBN)	3.32	Moderate	5.00	Moderate	2.84	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.03	Higher	5.00	Moderate	7.49	5.00
Pollinator Habitat (POL)	9.37	Higher	0.00	Lower	7.55	0.00
Native Plant Habitat (PH)	4.41	Moderate	5.77	Moderate	4.86	5.01
Public Use & Recognition (PU)			3.07	Moderate		2.51
Wetland Sensitivity (Sens)			2.20	Lower		2.86
Wetland Ecological Condition (EC)			2.53	Lower		5.69
Wetland Stressors (STR) (higher score means more stress)			8.23	Higher		5.28
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	0.00	Lower	0.32	Lower	8.13	0.40
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	10.00	Higher	3.95	Lower	9.49	3.88
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	1.49	Lower	2.67	Moderate	3.11	2.27
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	3.98	Moderate	4.37	Moderate	4.33	4.30
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.49	Higher	4.68	Moderate	7.09	4.17
WETLAND CONDITION (EC)			2.53	Lower		5.69
WETLAND RISK (average of Sensitivity & Stressors)			5.21	Higher		4.07

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLW-W-02
Investigator Name:	Matt Alexander
Date of Field Assessment:	19 September 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.165598
Longitude (decimal degrees):	66.202174
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.51
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	15
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 19 September 2019		Site Identifier: PLW-W-02		Investigator: Matt Alexander	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	1	
		50 - 100 m.	0	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.18	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
OF22	Wetland as a % of Its Contributing Area (Catchment)	The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
		From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
0.01 to 0.1.	1			
0.1 to 1.	0			
>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0			
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2314	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlantic/salmon/canada-east/index_1.html">http://www.salmonatl.ca/atlantic/salmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC or agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field): Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 0 1 0	Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1. A2. B1. B2.</p>	0 0 0 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m. deciduous trees taller than 3 m. coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees. deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees. coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation. deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	3 2 3 2 3 2	Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover. those species together do not comprise &gt; 50% of such cover.</p>	1 0	[PH, POL, SBM, Sens]
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall. broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall. coniferous, 10-19 cm diameter. broad-leaved deciduous 10-19 cm diameter. coniferous, 20-40 cm diameter. broad-leaved deciduous 20-40 cm diameter. coniferous, &gt;40 cm diameter. broad-leaved deciduous &gt;40 cm diameter.</p>	1 1 1 1 1 1 1	Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA. <b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one. <b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	1 0 0 0	[AM, INV, NR, PH, SBM, Sens]
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter. Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km. Several (&gt;8/hectare) but above not true.</p>	0 0 1	Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria. Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	0 1	Exclude temporary "burn piles." [AM, INV, POL, SBM]

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	0	
		Several (extensive micro-topography).	1	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
F22	Fringe Wetland	some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCV, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRV, PH, PRV, SRV]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRV, PH, PRV, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRV, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRV, PH, POL, PRV, SBM, Sens, SRV, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	Unknown if new or expanded within 20 years or not.	1	
		More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
F58	Visibility	Burned >30 years ago, or no evidence of a burn and no data.	1	
		The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	0	
F59	Non-consumptive Uses - Actual or Potential	>50%.	1	
		Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	1	
F60	Unvisited Core Area	Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
		The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
F61	Frequently Visited Area	50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
F62	BMP - Soils	50-95%.	0	
		>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.				1	
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	1		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	1		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	1		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	1		
			Sum=	4		
			Stressor sub-score=	0.33		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				1	
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	0	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3	
				Sum=	4	
				Stressor sub-score=	0.44	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.				1		
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	0	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3	
			Sum=	4		
			Stressor sub-score=	0.44		



S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	0
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	3
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				0.42
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	
				Sum=
				0
				Stressor subscore=
				0.00

## Assessment Area (AA) Results:

Wetland ID: PLW-W-02

Date: 19 September 2019

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.165598, 66.202174

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	4.40	Moderate	0.37	Lower	5.11	0.45
Stream Flow Support (SFS)	2.66	Lower	3.32	Moderate	1.42	1.93
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	6.75	Higher	1.19	Lower	7.78	0.72
Phosphorus Retention (PR)	4.46	Higher	4.55	Moderate	6.06	4.44
Nitrate Removal & Retention (NR)	2.62	Moderate	3.75	Moderate	5.45	4.44
Carbon Sequestration (CS)	7.21	Higher			7.67	
Organic Nutrient Export (OE)	3.44	Moderate			4.16	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	6.61	Higher	1.24	Moderate	6.20	1.91
Amphibian & Turtle Habitat (AM)	3.21	Lower	1.49	Lower	5.00	3.00
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.82	Higher	2.50	Lower	6.49	2.50
Pollinator Habitat (POL)	9.05	Higher	0.00	Lower	7.29	0.00
Native Plant Habitat (PH)	5.64	Moderate	5.29	Moderate	5.36	4.59
Public Use & Recognition (PU)			4.58	Moderate		3.59
Wetland Sensitivity (Sens)			5.64	Higher		3.89
Wetland Ecological Condition (EC)			4.94	Moderate		7.08
Wetland Stressors (STR) (higher score means more stress)			4.18	Moderate		3.80
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.66	Moderate	0.37	Lower	5.11	0.45
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	5.68	Higher	3.85	Lower	7.26	3.82
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.89	Moderate	2.42	Moderate	4.57	1.61
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.93	Lower	0.89	Lower	3.00	1.80
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.28	Higher	3.94	Moderate	6.83	3.48
WETLAND CONDITION (EC)			4.94	Moderate		7.08
WETLAND RISK (average of Sensitivity & Stressors)			4.91	Higher		3.84

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - BB-W-01
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	5 August 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.195989
Longitude (decimal degrees):	-66.201031
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	4.25
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 5 August 2020		Site Identifier: BB-W-01		Investigator: Derrick Mitchell	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one.		This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
		New Brunswick	1		
		Nova Scotia	0		
		Prince Edward Island	0		
		Newfoundland-Labrador	0		
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is:		See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		100 to 1000 hectares.	0		
		>1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	1		
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is:		To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
		<50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes]	1		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	0		
		50-500 m, and not separated.	0		
		50-500 m, but separated by those features.	0		
		0.5 - 5 km, and not separated.	0		
		0.5 - 5 km, but separated by those features.	0		
		None of the above (the closest patches or corridors which are that large are >5 km away).	0		
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	2	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	3	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is:		In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
		<5% of the land.	0		
		5 to 20% of the land.	0		
		20 to 60% of the land.	0		
		60 to 90% of the land.	0		
		>90% of the land. SKIP to OF10.	1		
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly:		[AM, SBM]	
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0		
		Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0		
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is:		"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	
		<100 m.	0		
		100 - 500 m.	0		
		0.5 - 1 km.	0		
		1 - 5 km.	1		
		>5 km.	0		

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	1	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	1	
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
OF15	Tidal Proximity	<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
		>10 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
OF18	Relative Elevation in Watershed	Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
		In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.20	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF23	Unvegetated Surface in the Contributing Area	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place. Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:		Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
		A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.		
		A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge ( <i>Carex rariflora</i> ). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.	0	
		A2. Not A1. Surface water, if present, has pH typically >4.5 and conductivity is usually >100 µS/cm (>64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (<2 m).	0	
		B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:		
		B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).	1	
		B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.	0	
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
		A1.	0	
		A2.	1	
		B1.	0	
		B2.	1	
F3	Woody Height & Form Diversity	Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if <5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.		Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
		coniferous trees (may include lamarack) taller than 3 m.	4	
		deciduous trees taller than 3 m.	2	
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	1	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.	2	
		deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	2	
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:		[PH, POL, SBM, Sens]
		those species together comprise > 50% of such cover.	0	
		those species together do not comprise > 50% of such cover.	1	
F5	Woody Diameter Classes	Mark ALL the types that comprise >5% of the woody canopy cover in the AA or >5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.		Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
		coniferous, 1-9 cm diameter and >1 m tall.	1	
		broad-leaved deciduous 1-9 cm diameter and >1 m tall.	1	
		coniferous, 10-19 cm diameter.	1	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	1	
		broad-leaved deciduous 20-40 cm diameter.	1	
		coniferous, >40 cm diameter.	1	
		broad-leaved deciduous >40 cm diameter.	0	
F6	Height Class Interspersion	Follow the key below and mark the ONE row that best describes MOST of the AA:		[AM, INV, NR, PH, SBM, Sens]
		A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.		
		A1. The two height classes are mostly scattered and intermixed throughout the AA.	0	
		A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.	1	
		B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:		
B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.	0			
		B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.	0	
F7	Large Snags (Dead Standing Trees)	The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:		Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
		None, or fewer than 8/ hectare which exceed this diameter.	0	
		Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.	0	
		Several (>8/hectare) but above not true.	1	
F8	Downed Wood	The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:		Exclude temporary "burn piles." [AM, INV, POL, SBM]
		Few or none that meet these criteria.	0	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	1	

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	1	
		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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	0	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	1	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	1 0 0 0 1 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 1 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	1 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 1 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 1 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 1 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 1 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 1 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	1	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 1 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 1	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 1 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 1 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	1	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	1	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	1	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCV, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	1	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRV, PH, PRV, SRV]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	1	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRV, PH, PRV, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	1	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	0	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRV, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRV, PH, POL, PRV, SBM, Sens, SRV, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			



F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	1	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	1	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	1	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	0	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	1	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				1
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				1
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				1
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	2	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	1	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	3	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	3	
Sum=				9	
Stressor subscore=				0.75	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				1
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrpnri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	2
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	2
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	1
	Sum=				5
	Stressor subscore=				0.56
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.				1	
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	2
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	2
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3
Sum=				7	
Stressor subscore=				0.78	

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum= 0
				Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	2
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	1
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	1
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	1
				Sum= 5
				Stressor subscore= 0.42

## Assessment Area (AA) Results:

Wetland ID: BB-W-01

Date: 5 August 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.195989, -66.201301

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	1.99	Lower	0.42	Lower	3.26	0.50
Stream Flow Support (SFS)	5.83	Moderate	3.33	Moderate	3.11	1.94
Water Cooling (WC)	3.96	Moderate	4.25	Moderate	2.64	2.56
Sediment Retention & Stabilisation (SR)	3.11	Moderate	1.71	Lower	5.29	1.04
Phosphorus Retention (PR)	3.98	Moderate	8.23	Higher	5.73	7.78
Nitrate Removal & Retention (NR)	1.40	Lower	7.50	Higher	4.70	7.78
Carbon Sequestration (CS)	3.83	Moderate			6.21	
Organic Nutrient Export (OE)	6.90	Higher			5.99	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.08	Moderate	6.31	Higher	5.66	4.65
Amphibian & Turtle Habitat (AM)	5.93	Moderate	10.00	Higher	6.43	8.70
Waterbird Feeding Habitat (WBF)	9.61	Higher	6.67	Moderate	7.64	6.67
Waterbird Nesting Habitat (WBN)	6.28	Higher	6.67	Moderate	5.36	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	10.00	Higher	10.00	Higher	8.44	10.00
Pollinator Habitat (POL)	9.68	Higher	10.00	Higher	7.80	10.00
Native Plant Habitat (PH)	9.50	Higher	10.00	Higher	6.92	8.75
Public Use & Recognition (PU)			2.48	Moderate		2.10
Wetland Sensitivity (Sens)			2.19	Lower		2.86
Wetland Ecological Condition (EC)			6.39	Moderate		7.92
Wetland Stressors (STR) (higher score means more stress)			10.00	Higher		6.93
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	5.83	Higher	0.42	Lower	3.26	0.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.41	Moderate	7.02	Moderate	5.85	6.65
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.17	Higher	5.47	Higher	5.17	3.85
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	6.98	Higher	7.33	Higher	5.76	6.55
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.86	Higher	10.00	Higher	8.08	9.79
WETLAND CONDITION (EC)			6.39	Moderate		7.92
WETLAND RISK (average of Sensitivity & Stressors)			6.10	Higher		4.90

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - BOF-W-01
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	10 September 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.157046
Longitude (decimal degrees):	-66.188806
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.58
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	



Date: 10 September 2020		Site Identifier: BOF-W-01		Investigator: Derrick Mitchell	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one.		This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
		New Brunswick	1		
		Nova Scotia	0		
		Prince Edward Island	0		
		Newfoundland-Labrador	0		
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is:		See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		100 to 1000 hectares.	0		
		>1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	1		
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is:		To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
		<50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes]	0		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	0		
		50-500 m, and not separated.	0		
		50-500 m, but separated by those features.	1		
		0.5 - 5 km, and not separated.	0		
		0.5 - 5 km, but separated by those features.	0		
		None of the above (the closest patches or corridors which are that large are >5 km away).	0		
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	1	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	1	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is:		In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
		<5% of the land.	0		
		5 to 20% of the land.	0		
		20 to 60% of the land.	0		
		60 to 90% of the land.	0		
		>90% of the land. SKIP to OF10.	1		
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly:		[AM, SBM]	
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0		
		Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0		
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is:		"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	
		<100 m.	0		
		100 - 500 m.	0		
		0.5 - 1 km.	0		
		1 - 5 km.	1		
		>5 km.	0		

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
0.5 - 1 km, but separated by those features.	1			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	1	
		100 m - 1 km.	0	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.25	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true. Mostly untrue.	0 1 0	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index.1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index.1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC at agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 0 0 0 1	<p><b>Ericaceous</b> shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1. A2. B1. B2.</p>	0 0 0 0	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m. deciduous trees taller than 3 m. coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees. deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees. coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation. deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	0 0 4 0 0	<p><b>Deciduous</b> shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP to F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one: those species together comprise &gt; 50% of such cover. those species together do not comprise &gt; 50% of such cover.</p>	1 0	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall. broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall. coniferous, 10-19 cm diameter. broad-leaved deciduous 10-19 cm diameter. coniferous, 20-40 cm diameter. broad-leaved deciduous 20-40 cm diameter. coniferous, &gt;40 cm diameter. broad-leaved deciduous &gt;40 cm diameter.</p>	0 1 0 0 0 0 0	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA. <b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one. <b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	0 1 0 0	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/hectare which exceed this diameter. Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km. Several (&gt;8/hectare) but above not true.</p>	1 0 0	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria. Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	1 0	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	1	
		Intermediate.	0	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	1	
		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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	1	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCV, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	1	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRV, PH, PRV, SRV]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRV, PH, PRV, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRV, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	1	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRV, PH, POL, PRV, SBM, Sens, SRV, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
F54	Buffer Slope	Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	[NRv, PRv, Sens, SRv]
		The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	1	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	1	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.			
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.			
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.			
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.			
			Sum=	0		
			Stressor subscore=	0.00		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
				Sum=	0	
				Stressor subscore=	0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
			Sum=	0		
			Stressor subscore=	0.00		

S4	<b>Excessive Sediment Loading from Contributing Area</b>				
	<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
	Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.		
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.					
			Sum=	0	
			Stressor subscore=	0.00	
S5	<b>Soil or Sediment Alteration Within the Assessment Area</b>				
	<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.		
			Sum=	0	
			Stressor subscore=	0.00	



## Assessment Area (AA) Results:

Wetland ID: BOF-W-01

Date: 10 September 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.157046, -66.188806

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	8.53	Higher	1.81	Lower	8.29	1.88
Stream Flow Support (SFS)	0.68	Lower	0.00	Lower	0.36	0.00
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	3.99	Moderate	1.60	Lower	5.89	0.97
Phosphorus Retention (PR)	4.41	Higher	1.24	Lower	6.03	1.46
Nitrate Removal & Retention (NR)	10.00	Higher	7.19	Moderate	10.00	7.50
Carbon Sequestration (CS)	3.44	Moderate			6.05	
Organic Nutrient Export (OE)	5.90	Higher			5.47	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	8.41	Higher	0.93	Moderate	6.83	1.74
Amphibian & Turtle Habitat (AM)	4.48	Moderate	1.94	Lower	5.67	3.27
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	5.79	Moderate	5.00	Moderate	4.80	5.00
Pollinator Habitat (POL)	6.57	Moderate	3.33	Moderate	5.29	3.33
Native Plant Habitat (PH)	6.23	Higher	5.15	Moderate	5.60	4.47
Public Use & Recognition (PU)			2.40	Moderate		2.04
Wetland Sensitivity (Sens)			4.62	Moderate		3.59
Wetland Ecological Condition (EC)			3.98	Moderate		6.53
Wetland Stressors (STR) (higher score means more stress)			3.53	Moderate		3.56
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	0.68	Lower	1.81	Lower	8.29	1.88
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	8.07	Higher	5.27	Moderate	8.50	5.41
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.08	Higher	0.62	Lower	5.00	1.16
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	2.69	Moderate	1.16	Lower	3.40	1.96
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	6.38	Moderate	4.83	Moderate	5.41	4.63
WETLAND CONDITION (EC)			3.98	Moderate		6.53
WETLAND RISK (average of Sensitivity & Stressors)			4.07	Moderate		3.57

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - FC-Trib1-W-03
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	5 August 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.190455
Longitude (decimal degrees):	-66.206848
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1.16
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 5 August 2020		Site Identifier: FC-Trib1-W-03		Investigator: Derrick Mitchell	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one.		This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
		New Brunswick	1		
		Nova Scotia	0		
		Prince Edward Island	0		
		Newfoundland-Labrador	0		
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
		<0.01 hectare (about 10 m x 10 m).	1		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		>100 hectares.	1		
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is:		See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		100 to 1000 hectares.	0		
		>1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	1		
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is:		To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
		<50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes]	1		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	0		
		50-500 m, and not separated.	0		
		50-500 m, but separated by those features.	0		
		0.5 - 5 km, and not separated.	0		
		0.5 - 5 km, but separated by those features.	0		
		None of the above (the closest patches or corridors which are that large are >5 km away).	0		
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	2	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is:		In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
		<5% of the land.	0		
		5 to 20% of the land.	0		
		20 to 60% of the land.	0		
		60 to 90% of the land.	0		
		>90% of the land. SKIP to OF10.	1		
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly:		[AM, SBM]	
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0		
		Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0		
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is:		"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	
		<100 m.	0		
		100 - 500 m.	0		
		0.5 - 1 km.	0		
		1 - 5 km.	1		
		>5 km.	0		

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	1	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.20	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatlas.com/atlantic/salmon/canada-east/index_1.html">http://www.salmonatlas.com/atlantic/salmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]



**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 0 1 0	Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	0 0 0 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	5 1 1 1 2 2	Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	1 0	[PH, POL, SBM, Sens]
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	1 1 1 1 1 1 0	Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	0 0 1 0	[AM, INV, NR, PH, SBM, Sens]
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	0 0 1	Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	0 1	Exclude temporary "burn piles." [AM, INV, POL, SBM]

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	1	
		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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0		
			Sum=	0		
			Stressor subscore=	0.00		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
				Sum=	0	
				Stressor subscore=	0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
			Sum=	0		
			Stressor subscore=	0.00		

S4	<b>Excessive Sediment Loading from Contributing Area</b>				
	<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
	Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.		
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.					
			Sum=	0	
			Stressor subscore=	0.00	
S5	<b>Soil or Sediment Alteration Within the Assessment Area</b>				
	<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.		
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.		
			Sum=	0	
			Stressor subscore=	0.00	

## Assessment Area (AA) Results:

Wetland ID: FC-Trib1-W-03

Date: 5 August 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.190455, -66.206848

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	5.43	Higher	0.42	Lower	5.91	0.50
Stream Flow Support (SFS)	2.81	Lower	3.38	Moderate	1.50	1.97
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.37	Lower	8.33	0.22
Phosphorus Retention (PR)	5.24	Higher	0.00	Lower	6.62	0.33
Nitrate Removal & Retention (NR)	2.75	Moderate	0.25	Lower	5.52	1.33
Carbon Sequestration (CS)	8.91	Higher			8.41	
Organic Nutrient Export (OE)	5.71	Higher			5.36	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.56	Moderate	0.76	Lower	5.83	1.66
Amphibian & Turtle Habitat (AM)	2.90	Lower	3.02	Moderate	4.83	3.93
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.16	Moderate	6.67	Moderate	5.11	6.67
Pollinator Habitat (POL)	9.57	Higher	6.67	Moderate	7.71	6.67
Native Plant Habitat (PH)	6.06	Higher	7.48	Higher	5.53	6.49
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			0.00	Lower		1.79
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.81	Moderate	0.42	Lower	5.91	0.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.37	Higher	0.29	Lower	7.81	0.98
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.62	Moderate	2.38	Moderate	4.50	1.59
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.74	Lower	1.81	Lower	2.90	2.36
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.42	Higher	7.21	Higher	6.91	6.64
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			0.11	Lower		2.07

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MCB2-W-03
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	10 September 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.161926
Longitude (decimal degrees):	-66.191334
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.67
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 10 September 2020		Site Identifier: MCB2-W-03		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	0 0 1 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	1	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	1	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	1	
		50 - 100 m.	0	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	1	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.35	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
OF21	Degraded Water Downstream	Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF23	Unvegetated Surface in the Contributing Area	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	0	
		10 to 25%.	1	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 1 0	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 0 0 0 1	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1. A2. B1. B2.</p>	0 0 0 0	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m. deciduous trees taller than 3 m. coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees. deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees. coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation. deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	0 1 0 5 0 0	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP to F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one: those species together comprise &gt; 50% of such cover. those species together do not comprise &gt; 50% of such cover.</p>	1 0	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall. broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall. coniferous, 10-19 cm diameter. broad-leaved deciduous 10-19 cm diameter. coniferous, 20-40 cm diameter. broad-leaved deciduous 20-40 cm diameter. coniferous, &gt;40 cm diameter. broad-leaved deciduous &gt;40 cm diameter.</p>	0 1 0 1 0 0 0 0	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA. <b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one. <b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	0 0 1 0	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter. Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km. Several (&gt;8/hectare) but above not true.</p>	1 0 0	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria. Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	1 0	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	1	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	1	
		Intermediate.	0	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]



F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCV, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	1	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRV, PH, PRV, SRV]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	1	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	1	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRV, PH, PRV, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRV, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRV, PH, POL, PRV, SBM, Sens, SRV, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
F54	Buffer Slope	Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	[NRv, PRv, Sens, SRv]
		The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	1	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	0	
		Yes, and created or expanded 20 - 100 years ago.	1	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
Yes, but time of origin or expansion unknown.	0			
Unknown if new or expanded within 20 years or not.	0			
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	0	
		>50%.	1	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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.]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
None of the above.	1			
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.				1	
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				1	
	Artificial drains or ditches in or near the wetland.				1	
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.				1	
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	2		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	1		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.			
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.			
			Sum=	3		
			Stressor subscore=	0.25		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.				1	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	1	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	1	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	3	
				Sum=	5	
				Stressor subscore=	0.56	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.					1	
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
			Sum=	0		
			Stressor subscore=	0.00		

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	1
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	3
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	2
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.				Sum=
				Stressor subscore=
				0.50
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	
				Sum=
				0
				Stressor subscore=
				0.00

## Assessment Area (AA) Results:

Wetland ID: MCB2-W-03

Date: 10 September 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.161926, -66.191334

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	4.43	Moderate	3.95	Moderate	5.14	4.00
Stream Flow Support (SFS)	1.09	Lower	0.00	Lower	0.58	0.00
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	5.78	Higher	2.01	Lower	7.11	1.22
Phosphorus Retention (PR)	4.16	Moderate	1.11	Lower	5.86	1.33
Nitrate Removal & Retention (NR)	2.88	Moderate	10.00	Higher	5.61	10.00
Carbon Sequestration (CS)	6.49	Higher			7.36	
Organic Nutrient Export (OE)	3.50	Moderate			4.19	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	7.12	Higher	0.94	Moderate	6.38	1.75
Amphibian & Turtle Habitat (AM)	4.64	Moderate	1.01	Lower	5.75	2.70
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	5.76	Moderate	3.33	Moderate	4.77	3.33
Pollinator Habitat (POL)	7.32	Moderate	3.33	Moderate	5.90	3.33
Native Plant Habitat (PH)	5.17	Moderate	5.38	Moderate	5.17	4.67
Public Use & Recognition (PU)			3.02	Moderate		2.48
Wetland Sensitivity (Sens)			2.04	Lower		2.81
Wetland Ecological Condition (EC)			3.01	Lower		5.97
Wetland Stressors (STR) (higher score means more stress)			5.07	Higher		4.12
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.09	Lower	3.95	Moderate	5.14	4.00
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	5.03	Moderate	7.19	Moderate	6.92	7.09
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.03	Moderate	0.63	Lower	4.58	1.17
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	2.78	Moderate	0.60	Lower	3.45	1.62
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	6.70	Moderate	4.70	Moderate	5.59	4.22
WETLAND CONDITION (EC)			3.01	Lower		5.97
WETLAND RISK (average of Sensitivity & Stressors)			3.55	Moderate		3.47

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - MC-W-02
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	5 August 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.181689
Longitude (decimal degrees):	-66.187034
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	2.39
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 5 August 2020		Site Identifier: MC-W-02		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 1 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 0 0 1	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. ≥1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	2	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
		>500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	1	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
		>10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.15	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 0 1	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:		Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
		A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.		
		A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge ( <i>Carex rariflora</i> ). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.	0	
		A2. Not A1. Surface water, if present, has pH typically >4.5 and conductivity is usually >100 µS/cm (>64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (<2 m).	0	
		B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:		
		B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).	1	
		B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.	0	
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
		A1.	0	
		A2.	0	
		B1.	0	
		B2.	0	
F3	Woody Height & Form Diversity	Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if <5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.		Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
		coniferous trees (may include tamarack) taller than 3 m.	5	
		deciduous trees taller than 3 m.	1	
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.	2	
		deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	2	
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:		[PH, POL, SBM, Sens]
		those species together comprise > 50% of such cover.	0	
		those species together do not comprise > 50% of such cover.	1	
F5	Woody Diameter Classes	Mark ALL the types that comprise >5% of the woody canopy cover in the AA or >5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.		Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
		coniferous, 1-9 cm diameter and >1 m tall.	1	
		broad-leaved deciduous 1-9 cm diameter and >1 m tall.	1	
		coniferous, 10-19 cm diameter.	1	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	1	
		broad-leaved deciduous 20-40 cm diameter.	1	
		coniferous, >40 cm diameter.	1	
		broad-leaved deciduous >40 cm diameter.	0	
F6	Height Class Interspersion	Follow the key below and mark the ONE row that best describes MOST of the AA:		[AM, INV, NR, PH, SBM, Sens]
		A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.		
		A1. The two height classes are mostly scattered and intermixed throughout the AA.	1	
		A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.	0	
		B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:		
		B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.	0	
		B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.	0	
F7	Large Snags (Dead Standing Trees)	The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:		Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
		None, or fewer than 8/ hectare which exceed this diameter.	0	
		Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.	1	
		Several (>8/hectare) but above not true.	1	
F8	Downed Wood	The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:		Exclude temporary "burn piles." [AM, INV, POL, SBM]
		Few or none that meet these criteria.	0	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	1	



F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	1	
		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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is:	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0
		25-50% of the AA never contains surface water.	0
		50-75% of the AA never contains surface water.	0
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	0
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	1
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0
		1-20% of the AA.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA. True for many fringe wetlands.	0
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:	[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0
		5-25% of the water is shaded.	0
		25-50% of the water is shaded.	0
		50-75% of the water is shaded.	0
		>75% of the water is shaded.	0
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0
		1-20% of the AA, or <1% but >0.01 ha.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA.	0
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0
		10 cm - 50 cm change.	0
		0.5 - 1 m change.	0
		1-2 m change.	0
		>2 m change.	0
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	0
		10 - 50 cm deep.	0
		0.5 - 1 m deep.	0
		1 - 2 m deep.	0
		>2 m deep. True for many fringe wetlands.	0
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0
		One depth class that comprises 50-90% of the AA's inundated area.	0
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	0
		5-30% of the water.	0
		30-70% of the water.	0
		70-95% of the water.	0
		>95% of the water.	0
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0
		Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.	
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		5-30% of the ponded water.	0
		30-70% of the ponded water.	0
		70-99% of the ponded water.	0
		100% of the ponded water.	0
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0
		1 - 9 m.	0
		10 - 29 m.	0
		30 - 49 m.	0
		50 - 100 m.	0
		> 100 m, or open water is absent at that time.	0
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0
		1-25% of the water edge.	0
		25-50% of the water edge.	0
		50-75% of the water edge.	0
		>75% of the water edge.	0
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0
		1-25% of the emergent vegetation.	0
		25-75% of the emergent vegetation.	0
		>75% of the emergent vegetation.	0

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
F38	Persistent Deepwater Area	Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
		If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
F40	Isolated Island	Extensive.	0	
		The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
		During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
F44	Tributary Channel	Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
		At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
F47	pH Measurement	Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0	
		The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]	0	
F48	TDS and/or Conductivity	Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	1	
		Neither of above. Enter "1".	1	
		The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
F49	Beaver Probability	Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
		Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
F50	Groundwater Strength of Evidence	Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
		Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
F51	Internal Gradient	Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
		The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
F52	Vegetated Buffer as % of Perimeter	6-10%.	0	
		>10%.	0	
		Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.		
		Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
F53	Vegetated Buffer as % of Perimeter	5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0		
			Sum=	0		
			Stressor subscore=	0.00		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
				Sum=	0	
				Stressor subscore=	0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
			Sum=	0		
			Stressor subscore=	0.00		



S4	<b>Excessive Sediment Loading from Contributing Area</b>				
	<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
	Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.		
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.					
			Sum=	0	
			Stressor subscore=	0.00	
S5	<b>Soil or Sediment Alteration Within the Assessment Area</b>				
	<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.		
			Sum=	0	
			Stressor subscore=	0.00	

## Assessment Area (AA) Results:

Wetland ID: MC-W-02

Date: 5 August 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.181689, -66.187034

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	5.30	Higher	0.29	Lower	5.81	0.38
Stream Flow Support (SFS)	3.59	Moderate	3.16	Moderate	1.92	1.84
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.37	Lower	8.33	0.22
Phosphorus Retention (PR)	5.24	Higher	0.00	Lower	6.62	0.33
Nitrate Removal & Retention (NR)	2.77	Moderate	0.25	Lower	5.54	1.33
Carbon Sequestration (CS)	8.91	Higher			8.41	
Organic Nutrient Export (OE)	5.71	Higher			5.36	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	7.66	Higher	1.06	Moderate	6.57	1.82
Amphibian & Turtle Habitat (AM)	2.96	Lower	3.53	Moderate	4.87	4.23
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.27	Higher	6.67	Moderate	6.03	6.67
Pollinator Habitat (POL)	9.80	Higher	6.67	Moderate	7.89	6.67
Native Plant Habitat (PH)	8.26	Higher	7.91	Higher	6.42	6.86
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			0.00	Lower		2.02
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	3.59	Moderate	0.29	Lower	5.81	0.38
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.38	Higher	0.29	Lower	7.82	0.98
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.95	Moderate	2.29	Moderate	5.02	1.53
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.78	Lower	2.12	Lower	2.92	2.54
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.12	Higher	7.50	Higher	7.34	6.80
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			0.11	Lower		2.18

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PH-W-07
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	6 August 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.204537
Longitude (decimal degrees):	-66.188376
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	3.34
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 6 August 2020		Site Identifier: PH-W-07		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 1 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 1 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [ <i>This is nearly always the answer in relatively undeveloped landscapes</i> ] >1000 hectares.	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of <b>opened</b> roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [ <i>This is often the answer in relatively undeveloped landscapes</i> ] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	2	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	1	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
0.5 - 1 km, but separated by those features.	1			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.70	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have <b>other fish</b> at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the <b>amphibian</b> or <b>reptile</b> species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the <b>waterbird</b> species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the <b>nestingsongbird</b> or <b>raptor</b> species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called <b>IBAs_Canada</b> . The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to <b>blank</b> .	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 <b>blank</b> (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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 <b>blank</b> .	0	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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 <b>blank</b> .	0	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to <b>blank</b> .	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	1	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	



F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
			Sum=	0	
			Stressor subscore=	0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor subscore=	0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
			Sum=	0	
			Stressor subscore=	0.00	

S4	<b>Excessive Sediment Loading from Contributing Area</b>				
	<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
	Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.		
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.					
			Sum=	0	
			Stressor subscore=	0.00	
S5	<b>Soil or Sediment Alteration Within the Assessment Area</b>				
	<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.		
			Sum=	0	
			Stressor subscore=	0.00	

## Assessment Area (AA) Results:

Wetland ID: PH-W-07

Date: 6 August 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.204537, -66.188376

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	5.27	Higher	1.68	Lower	5.79	1.75
Stream Flow Support (SFS)	3.13	Moderate	7.65	Higher	1.67	4.46
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	5.94	Higher	0.73	Lower	7.22	0.44
Phosphorus Retention (PR)	5.54	Higher	0.37	Lower	6.83	0.67
Nitrate Removal & Retention (NR)	2.84	Moderate	1.25	Lower	5.58	2.22
Carbon Sequestration (CS)	8.91	Higher			8.41	
Organic Nutrient Export (OE)	5.32	Higher			5.16	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.40	Moderate	0.73	Lower	5.77	1.64
Amphibian & Turtle Habitat (AM)	2.48	Lower	3.07	Moderate	4.61	3.96
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.28	Moderate	6.67	Moderate	5.20	6.67
Pollinator Habitat (POL)	9.57	Higher	6.67	Moderate	7.71	6.67
Native Plant Habitat (PH)	6.76	Higher	7.52	Higher	5.81	6.53
Public Use & Recognition (PU)			2.15	Lower		1.86
Wetland Sensitivity (Sens)			0.95	Lower		2.49
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	3.13	Moderate	1.68	Lower	5.79	1.75
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	5.36	Moderate	1.02	Lower	7.71	1.67
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.43	Moderate	5.22	Higher	4.46	3.25
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.49	Lower	1.84	Lower	2.77	2.37
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.55	Higher	7.24	Higher	6.98	6.64
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			0.58	Lower		2.41

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PH-W-08
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	6 August 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.206996
Longitude (decimal degrees):	
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.89
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	



Date: 6 August 2020		Site Identifier: PH-W-08		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 1 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 0 1 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [ <i>This is nearly always the answer in relatively undeveloped landscapes</i> ] >1000 hectares.	0 0 0 0 0 1 0	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [ <i>This is often the answer in relatively undeveloped landscapes</i> ] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	2	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.65	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlantic/salmon/canada-east/index_1.html">http://www.salmonatl.ca/atlantic/salmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>0</p> <p>0</p> <p>1</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	1	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	1	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is:	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0
		25-50% of the AA never contains surface water.	0
		50-75% of the AA never contains surface water.	0
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	0
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	1
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0
		1-20% of the AA.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA. True for many fringe wetlands.	0
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:	[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0
		5-25% of the water is shaded.	0
		25-50% of the water is shaded.	0
		50-75% of the water is shaded.	0
		>75% of the water is shaded.	0
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0
		1-20% of the AA, or <1% but >0.01 ha.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA.	0
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0
		10 cm - 50 cm change.	0
		0.5 - 1 m change.	0
		1-2 m change.	0
		>2 m change.	0
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	0
		10 - 50 cm deep.	0
		0.5 - 1 m deep.	0
		1 - 2 m deep.	0
		>2 m deep. True for many fringe wetlands.	0
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0
		One depth class that comprises 50-90% of the AA's inundated area.	0
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	0
		5-30% of the water.	0
		30-70% of the water.	0
		70-95% of the water.	0
		>95% of the water.	0
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0
		Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.	
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		5-30% of the ponded water.	0
		30-70% of the ponded water.	0
		70-99% of the ponded water.	0
100% of the ponded water.	0		
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0
		1 - 9 m.	0
		10 - 29 m.	0
		30 - 49 m.	0
		50 - 100 m.	0
> 100 m, or open water is absent at that time.	0		
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0
		1-25% of the water edge.	0
		25-50% of the water edge.	0
		50-75% of the water edge.	0
		>75% of the water edge.	0
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0
		1-25% of the emergent vegetation.	0
		25-75% of the emergent vegetation.	0
		>75% of the emergent vegetation.	0

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0		
			Sum=	0		
			Stressor subscore=	0.00		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
				Sum=	0	
				Stressor subscore=	0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
		Severe (3 points)	Medium (2 points)	Mild (1 point)		
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
			Sum=	0		
			Stressor subscore=	0.00		

S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00



## Assessment Area (AA) Results:

Wetland ID: PH-W-08

Date: 6 August 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.206996, -66.189022

*Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.*

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	5.68	Higher	1.55	Lower	6.10	1.63
Stream Flow Support (SFS)	3.13	Moderate	7.23	Higher	1.67	4.21
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.37	Lower	8.33	0.22
Phosphorus Retention (PR)	5.71	Higher	0.00	Lower	6.95	0.33
Nitrate Removal & Retention (NR)	2.97	Moderate	0.25	Lower	5.66	1.33
Carbon Sequestration (CS)	8.91	Higher			8.41	
Organic Nutrient Export (OE)	5.32	Higher			5.16	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.40	Moderate	0.98	Moderate	5.77	1.78
Amphibian & Turtle Habitat (AM)	3.04	Lower	3.37	Moderate	4.91	4.14
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.93	Moderate	6.67	Moderate	5.75	6.67
Pollinator Habitat (POL)	9.57	Higher	6.67	Moderate	7.71	6.67
Native Plant Habitat (PH)	7.00	Higher	7.73	Higher	5.91	6.71
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			0.50	Lower		2.35
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	3.13	Moderate	1.55	Lower	6.10	1.63
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.49	Higher	0.29	Lower	7.87	0.98
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.43	Moderate	4.98	Moderate	4.46	3.10
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.82	Lower	2.02	Lower	2.94	2.48
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.70	Higher	7.37	Higher	7.08	6.69
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			0.36	Lower		2.35

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLE-W-07
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	7 August 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.172878
Longitude (decimal degrees):	-66.203534
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.69
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 7 August 2020		Site Identifier: PLE-W-07		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 1 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. ≥1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	1	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
0.5 - 1 km, but separated by those features.	1			
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.20	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place. Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]



**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>1</p> <p>0</p> <p>0</p> <p>0</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP to F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>1</p> <p>0</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	1	
		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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	1	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is:	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0
		25-50% of the AA never contains surface water.	0
		50-75% of the AA never contains surface water.	0
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	0
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	1
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0
		1-20% of the AA.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA. True for many fringe wetlands.	0
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:	[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0
		5-25% of the water is shaded.	0
		25-50% of the water is shaded.	0
		50-75% of the water is shaded.	0
		>75% of the water is shaded.	0
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0
		1-20% of the AA, or <1% but >0.01 ha.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA.	0
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0
		10 cm - 50 cm change.	0
		0.5 - 1 m change.	0
		1-2 m change.	0
		>2 m change.	0
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	0
		10 - 50 cm deep.	0
		0.5 - 1 m deep.	0
		1 - 2 m deep.	0
		>2 m deep. True for many fringe wetlands.	0
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0
		One depth class that comprises 50-90% of the AA's inundated area.	0
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	0
		5-30% of the water.	0
		30-70% of the water.	0
		70-95% of the water.	0
		>95% of the water.	0
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0
		Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.	
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		5-30% of the ponded water.	0
		30-70% of the ponded water.	0
		70-99% of the ponded water.	0
100% of the ponded water.	0		
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0
		1 - 9 m.	0
		10 - 29 m.	0
		30 - 49 m.	0
		50 - 100 m.	0
> 100 m, or open water is absent at that time.	0		
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0
		1-25% of the water edge.	0
		25-50% of the water edge.	0
		50-75% of the water edge.	0
		>75% of the water edge.	0
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0
		1-25% of the emergent vegetation.	0
		25-75% of the emergent vegetation.	0
		>75% of the emergent vegetation.	0

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
F38	Persistent Deepwater Area	Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
		If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
F40	Isolated Island	Extensive.	0	
		The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
		During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
F44	Tributary Channel	Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
		At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
F47	pH Measurement	Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
		Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0	
		The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
F48	TDS and/or Conductivity	Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F49	Beaver Probability	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
F50	Groundwater Strength of Evidence	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
F51	Internal Gradient	Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
		Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
F52	Vegetated Buffer as % of Perimeter	Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
		The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	0	
F53	Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.	6-10%.	0	
		>10%.	0	
		Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
F54	Vegetated Buffer as % of Perimeter	30 to 60%.	0	
		60 to 90%.	1	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
Sum=				0	
Stressor subscore=				0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
	Sum=				0
	Stressor subscore=				0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
Sum=				0	
Stressor subscore=				0.00	

S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: PLE-W-07

Date: 7 August 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.172878, -66.203534

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.99	Moderate	0.42	Lower	4.04	0.50
Stream Flow Support (SFS)	2.81	Lower	3.33	Moderate	1.50	1.94
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	2.69	Moderate	0.53	Lower	5.00	0.32
Phosphorus Retention (PR)	3.68	Moderate	0.17	Lower	5.51	0.49
Nitrate Removal & Retention (NR)	0.91	Lower	1.56	Lower	4.39	2.50
Carbon Sequestration (CS)	8.05	Higher			8.03	
Organic Nutrient Export (OE)	5.97	Higher			5.50	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.08	Moderate	0.62	Lower	5.66	1.58
Amphibian & Turtle Habitat (AM)	2.45	Lower	2.90	Moderate	4.60	3.85
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	5.89	Moderate	6.67	Moderate	4.89	6.67
Pollinator Habitat (POL)	7.92	Higher	6.67	Moderate	6.38	6.67
Native Plant Habitat (PH)	7.09	Higher	6.89	Higher	5.95	5.98
Public Use & Recognition (PU)			2.18	Lower		1.88
Wetland Sensitivity (Sens)			1.55	Lower		2.67
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			1.64	Lower		2.86
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.81	Moderate	0.42	Lower	4.04	0.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.05	Lower	1.16	Lower	6.88	1.80
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.72	Moderate	2.33	Moderate	4.41	1.56
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.47	Lower	1.74	Lower	2.76	2.31
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.44	Moderate	6.81	Higher	6.06	6.55
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			1.60	Lower		2.77

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLE-W-08
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	7 August 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.174913
Longitude (decimal degrees):	-66.20149
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	3.19
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 7 August 2020		Site Identifier: PLE-W-08		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus all adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes.]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes.] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	1	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. SKIP to OF10.	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	



OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler>Line tool. Or use the GeoNB's Draw Line tool. [AM, FAv, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are > 1 km away).	1			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	0	
		5-10 km.	1	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. <b>This will be true for most assessments done with WESP-AC.</b>	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.20	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream). This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream). This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland's area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about:		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is: Mostly true. Somewhat true. Mostly untrue.	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is: Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is: ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKenney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA [Mark just the first choice that is true]: Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonidlas.com/atlanticsalmon/canada-east/index.1.html">http://www.salmonidlas.com/atlanticsalmon/canada-east/index.1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g. too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented [mark all applicable]: Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SupplInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file. Presence of one or more of the nesting songbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMv, EC, PHv, POLv, SBMv, Sens, WBFv, WBNv]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMv, WBFv, WBNv]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNv]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to Identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8). See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB_Crown lands. Use more recent information if available. New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place. Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>5</p> <p>1</p> <p>1</p> <p>0</p> <p>0</p> <p>0</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>1</p> <p>0</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	1	
		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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	1	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is:	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0
		25-50% of the AA never contains surface water.	0
		50-75% of the AA never contains surface water.	0
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	0
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	1
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0
		1-20% of the AA.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA. True for many fringe wetlands.	0
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:	[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0
		5-25% of the water is shaded.	0
		25-50% of the water is shaded.	0
		50-75% of the water is shaded.	0
		>75% of the water is shaded.	0
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0
		1-20% of the AA, or <1% but >0.01 ha.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA.	0
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0
		10 cm - 50 cm change.	0
		0.5 - 1 m change.	0
		1-2 m change.	0
		>2 m change.	0
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	0
		10 - 50 cm deep.	0
		0.5 - 1 m deep.	0
		1 - 2 m deep.	0
		>2 m deep. True for many fringe wetlands.	0
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0
		One depth class that comprises 50-90% of the AA's inundated area.	0
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	0
		5-30% of the water.	0
		30-70% of the water.	0
		70-95% of the water.	0
		>95% of the water.	0
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0
		Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.	
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		5-30% of the ponded water.	0
		30-70% of the ponded water.	0
		70-99% of the ponded water.	0
		100% of the ponded water.	0
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0
		1 - 9 m.	0
		10 - 29 m.	0
		30 - 49 m.	0
		50 - 100 m.	0
		> 100 m, or open water is absent at that time.	0
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0
		1-25% of the water edge.	0
		25-50% of the water edge.	0
		50-75% of the water edge.	0
		>75% of the water edge.	0
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0
		1-25% of the emergent vegetation.	0
		25-75% of the emergent vegetation.	0
		>75% of the emergent vegetation.	0



F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
F38	Persistent Deepwater Area	Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
		If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
F40	Isolated Island	Extensive.	0	
		The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
		During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
F44	Tributary Channel	Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
		At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
F47	pH Measurement	Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
		Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0	
		The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
F48	TDS and/or Conductivity	Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F49	Beaver Probability	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
F50	Groundwater Strength of Evidence	Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
		Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
F51	Internal Gradient	Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F52	Vegetated Buffer as % of Perimeter	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
F53	Internal Gradient	Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
		The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	0	
		6-10%.	0	
>10%.	0			
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F54	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	1	
>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0			

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
None of the above.	1			
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
Sum=				0	
Stressor subscore=				0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
	Sum=				0
	Stressor subscore=				0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
Sum=				0	
Stressor subscore=				0.00	

S4 Excessive Sediment Loading from Contributing Area			
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>			
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.			
Erosion from construction, in-channel machinery in the CA.			
Erosion from off-road vehicles in the CA.			
Erosion from livestock or foot traffic in the CA.			
Stormwater or wastewater effluent.			
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.			
Accelerated channel downcutting or headcutting of tributaries due to altered land use.			
Other human-related disturbances within the CA.			
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum= 0
			Stressor subscore= 0.00
S5 Soil or Sediment Alteration Within the Assessment Area			
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>			
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.			
Leveling or other grading not to the natural contour.			
Tillage, plowing (but excluding disking for enhancement of native plants).			
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.			
Excavation.			
Ditch cleaning or dredging in or adjacent to the wetland.			
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.			
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.			
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
	Severe (3 points)	Medium (2 points)	Mild (1 point)
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.
			Sum= 0
			Stressor subscore= 0.00

## Assessment Area (AA) Results:

Wetland ID: PLE-W-08

Date: 7 August 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.174913, -66.20149

*Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.*

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	2.99	Moderate	0.42	Lower	4.04	0.50
Stream Flow Support (SFS)	2.81	Lower	3.33	Moderate	1.50	1.94
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	2.69	Moderate	0.53	Lower	5.00	0.32
Phosphorus Retention (PR)	3.68	Moderate	0.17	Lower	5.51	0.49
Nitrate Removal & Retention (NR)	0.91	Lower	1.56	Lower	4.39	2.50
Carbon Sequestration (CS)	8.05	Higher			8.03	
Organic Nutrient Export (OE)	5.97	Higher			5.50	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.08	Moderate	0.56	Lower	5.66	1.55
Amphibian & Turtle Habitat (AM)	2.09	Lower	4.73	Moderate	4.41	4.96
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	5.89	Moderate	10.00	Higher	4.89	10.00
Pollinator Habitat (POL)	7.92	Higher	6.67	Moderate	6.38	6.67
Native Plant Habitat (PH)	7.03	Higher	6.89	Higher	5.92	5.98
Public Use & Recognition (PU)			2.18	Lower		1.88
Wetland Sensitivity (Sens)			1.87	Lower		2.76
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			1.64	Lower		2.86
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.81	Moderate	0.42	Lower	4.04	0.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.05	Lower	1.16	Lower	6.88	1.80
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.72	Moderate	2.32	Moderate	4.41	1.55
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.26	Lower	2.84	Lower	2.64	2.98
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.43	Moderate	8.93	Higher	6.05	8.77
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			1.76	Lower		2.81

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.



Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLE-W-10
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	31 July 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.176867
Longitude (decimal degrees):	-66.195094
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	3.30
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 31 July 2020		Site Identifier: PLE-W-10		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 1 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. ≥100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. ≥1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	1	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. ≥90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. ≥5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FV, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
		>500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	1			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	1	
		2-5 km.	0	
		5-10 km.	0	
		>10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).		[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0.2	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p><b>A.</b> Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p><b>A2.</b> Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p><b>B.</b> Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p><b>B1.</b> Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p><b>B2.</b> Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>1</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>4</p> <p>2</p> <p>2</p> <p>2</p> <p>1</p> <p>2</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>0</p> <p>1</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p><b>A.</b> Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p><b>A1.</b> The two height classes are mostly scattered and intermixed throughout the AA.</p> <p><b>A2.</b> Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p><b>B.</b> Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p><b>B1.</b> The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p><b>B2.</b> Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>0</p> <p>1</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>1</p> <p>0</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>



F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unwatered parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unwatered parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	1	
		Shallow Peat or organic <40 cm deep.	0	
F15	Shorebird Feeding Habitats	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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
F17	Forb Cover	50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
F18	Sedge Cover	25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
F19	Dominance of Most Abundant Herbaceous Species	50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
F22	Fringe Wetland	some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is:	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0
		25-50% of the AA never contains surface water.	0
		50-75% of the AA never contains surface water.	0
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	0
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	1
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0
		1-20% of the AA.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA. True for many fringe wetlands.	0
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:	[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0
		5-25% of the water is shaded.	0
		25-50% of the water is shaded.	0
		50-75% of the water is shaded.	0
		>75% of the water is shaded.	0
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0
		1-20% of the AA, or <1% but >0.01 ha.	0
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA.	0
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0
		10 cm - 50 cm change.	0
		0.5 - 1 m change.	0
		1-2 m change.	0
		>2 m change.	0
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	0
		10 - 50 cm deep.	0
		0.5 - 1 m deep.	0
		1 - 2 m deep.	0
		>2 m deep. True for many fringe wetlands.	0
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0
		One depth class that comprises 50-90% of the AA's inundated area.	0
		Neither of above. There are 3 or more depth classes and none occupy >50%.	0
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	0
		5-30% of the water.	0
		30-70% of the water.	0
		70-95% of the water.	0
		>95% of the water.	0
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0
		Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.	
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		5-30% of the ponded water.	0
		30-70% of the ponded water.	0
		70-99% of the ponded water.	0
100% of the ponded water.	0		
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0
		1 - 9 m.	0
		10 - 29 m.	0
		30 - 49 m.	0
		50 - 100 m.	0
> 100 m, or open water is absent at that time.	0		
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0
		1-25% of the water edge.	0
		25-50% of the water edge.	0
		50-75% of the water edge.	0
		>75% of the water edge.	0
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is:	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0
		1-25% of the emergent vegetation.	0
		25-75% of the emergent vegetation.	0
		>75% of the emergent vegetation.	0

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
Sum=				0	
Stressor subscore=				0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
	Sum=				0
	Stressor subscore=				0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
Sum=				0	
Stressor subscore=				0.00	



S4	<b>Excessive Sediment Loading from Contributing Area</b>				
	<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
	Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.		
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.					
			Sum=	0	
			Stressor subscore=	0.00	
S5	<b>Soil or Sediment Alteration Within the Assessment Area</b>				
	<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.		
			Sum=	0	
			Stressor subscore=	0.00	

## Assessment Area (AA) Results:

Wetland ID: PLE-W-10

Date: 31 July 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.176867, -66.195094

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	5.68	Higher	0.00	Lower	6.10	0.00
Stream Flow Support (SFS)	3.13	Moderate	1.62	Lower	1.67	0.94
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.37	Lower	8.33	0.22
Phosphorus Retention (PR)	5.71	Higher	0.00	Lower	6.95	0.33
Nitrate Removal & Retention (NR)	2.25	Lower	1.56	Lower	5.22	2.50
Carbon Sequestration (CS)	8.49	Higher			8.22	
Organic Nutrient Export (OE)	5.58	Higher			5.29	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	5.09	Moderate	0.79	Lower	5.66	1.67
Amphibian & Turtle Habitat (AM)	2.12	Lower	5.13	Moderate	4.42	5.20
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.77	Moderate	10.00	Higher	5.61	10.00
Pollinator Habitat (POL)	8.92	Higher	6.67	Moderate	7.19	6.67
Native Plant Habitat (PH)	8.16	Higher	7.48	Higher	6.38	6.49
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			1.54	Lower		2.67
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	3.13	Moderate	0.00	Lower	6.10	0.00
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.37	Higher	1.10	Lower	7.76	1.76
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.52	Moderate	1.21	Lower	4.41	1.27
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.27	Lower	3.08	Lower	2.65	3.12
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.44	Higher	9.02	Higher	6.79	8.86
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			0.88	Lower		2.50

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLE-W-11
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	31 July 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.179169
Longitude (decimal degrees):	-66.197518
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	4.50
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100
What percent (approx.) of the <b>wetland</b> were you able to visit?	100
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 31 July 2020		Site Identifier: PLE-W-11		Investigator: Derrick Mitchell	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one.		This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
		New Brunswick	1		
		Nova Scotia	0		
		Prince Edward Island	0		
		Newfoundland-Labrador	0		
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus all adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is:		See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		100 to 1000 hectares.	0		
		>1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes.]	1		
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is:		To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
		<50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes.]	1		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	0		
		50-500 m, and not separated.	0		
		50-500 m, but separated by those features.	0		
		0.5 - 5 km, and not separated.	0		
		0.5 - 5 km, but separated by those features.	0		
		None of the above (the closest patches or corridors which are that large are >5 km away).	0		
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation".]	1	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is:		In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
		<5% of the land.	0		
		5 to 20% of the land.	0		
		20 to 60% of the land.	0		
		60 to 90% of the land.	0		
		>90% of the land. SKIP to OF10.	1		
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly:		[AM, SBM]	
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0		
		Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0		
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is:		"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	
		<100 m.	0		
		100 - 500 m.	0		
		0.5 - 1 km.	0		
		1 - 5 km.	1		
		>5 km.	0		

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler>Line tool. Or use the GeoNB's Draw Line tool. [AM, FAv, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are > 1 km away).	1			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	1	
		2-5 km.	0	
		5-10 km.	0	
		>10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. <b>This will be true for most assessments done with WESP-AC.</b>	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).		[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0.2	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream). <b>This is the situation for nearly all wetlands in this region.</b>	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream). <b>This is the situation for nearly all wetlands in this region.</b>	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland's area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	



OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:		[NRV, PRV, SRV, WSV]
		Mostly true.	0	
		Somewhat true.	0	
		Mostly untrue.	1	
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:		[AM, NR, SFS, WC, WS]
		Northward (N, NE), north-facing contributing area.	0	
		Southward (S, SW), south-facing contributing area.	1	
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).		
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:		Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
		<10 m.	0	
		10 - 50 m.	0	
		50 - 100 m.	0	
		100 - 1000 m.	1	
		1 - 2 km.	0	
>2 km, or wetland lacks an inlet and outlet.	0			
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKenney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [Mark just the first choice that is true.]:		Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a>
		Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonidlas.com/atlanticsalmon/canada-east/index.1.html">http://www.salmonidlas.com/atlanticsalmon/canada-east/index.1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a>	0	[AM, FA, FR, INV, WBF, WBN]
		Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions.	0	
		Is probably not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally.	0	
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented. [mark all applicable]:		Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
		Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SupplInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer	0	
		Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file.	0	
		Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file.	0	
		Presence of one or more of the nesting songbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file, during their nesting season (May-July for most species).	0	
		None of the above, or no data.	1	
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to Identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8). See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.		"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]
		New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions.	0	
		Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed.	1	
		Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.	0	
		Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0	

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>3</p> <p>2</p> <p>1</p> <p>2</p> <p>0</p> <p>0</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is &lt;25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]</p>
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	<p>1</p> <p>0</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	1	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	1	
		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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	1	
		5-50% of the vegetated area.	0	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	0	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	1	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	



F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0	
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0	
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0	
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0	
Sum=				0	
Stressor subscore=				0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
	Sum=				0
	Stressor subscore=				0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
Sum=				0	
Stressor subscore=				0.00	

S4	<b>Excessive Sediment Loading from Contributing Area</b>				
	<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
	Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.		
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.					
			Sum=	0	
			Stressor subscore=	0.00	
S5	<b>Soil or Sediment Alteration Within the Assessment Area</b>				
	<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.		
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.		
			Sum=	0	
			Stressor subscore=	0.00	

## Assessment Area (AA) Results:

Wetland ID: PLE-W-11

Date: 31 July 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.179169, -66.197518

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	5.43	Higher	0.00	Lower	5.91	0.00
Stream Flow Support (SFS)	2.81	Lower	1.74	Lower	1.50	1.01
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	7.56	Higher	0.37	Lower	8.33	0.22
Phosphorus Retention (PR)	5.24	Higher	0.00	Lower	6.62	0.33
Nitrate Removal & Retention (NR)	2.62	Moderate	7.19	Moderate	5.45	7.50
Carbon Sequestration (CS)	8.49	Higher			8.22	
Organic Nutrient Export (OE)	6.50	Higher			5.78	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	6.27	Higher	0.77	Lower	6.08	1.66
Amphibian & Turtle Habitat (AM)	2.12	Lower	5.09	Moderate	4.42	5.18
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.68	Moderate	10.00	Higher	5.54	10.00
Pollinator Habitat (POL)	8.28	Higher	6.67	Moderate	6.67	6.67
Native Plant Habitat (PH)	7.44	Higher	7.25	Higher	6.09	6.29
Public Use & Recognition (PU)			2.07	Lower		1.80
Wetland Sensitivity (Sens)			5.72	Higher		3.92
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.81	Moderate	0.00	Lower	5.91	0.00
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	6.35	Higher	4.85	Moderate	7.75	5.09
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.20	Moderate	1.29	Lower	4.71	1.28
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.27	Lower	3.05	Lower	2.65	3.11
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.87	Higher	8.99	Higher	6.38	8.83
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			2.97	Moderate		3.13

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLW-W-04
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	10 September 2020
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.166276
Longitude (decimal degrees):	-66.205112
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.66
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	10
What percent (approx.) of the <b>wetland</b> were you able to visit?	10
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	



Date: 10 September 2020		Site Identifier: PLW-W-04		Investigator: Derrick Mitchell	
<b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers: <b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a> <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a> For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of <b>surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of <b>wetlands and surface water</b> ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus <b>adjacent</b> upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: ≤0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. [ <i>This is nearly always the answer in relatively undeveloped landscapes</i> ]	0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the <b>edge</b> of the AA to the edge of the closest <b>vegetated land</b> (but excluding row crops, lawn, conifer plantation) <b>larger than 375 hectares</b> (about 2 km on a side), is: ≤50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [ <i>This is often the answer in relatively undeveloped landscapes</i> ] ≤50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation"]	2	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: ≤5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. <b>SKIP to OF10.</b>	0 0 0 0 1	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured <b>along</b> the maintained road nearest the AA, the distance to the nearest <b>population center</b> is: ≤100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	0 0 0 1 0	"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[Fv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Or use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are >1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closesttidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA.This will be true for most assessments done with WESP-AC.	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.23	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1 = yes, 0 = no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations ofmetals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flowinto the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:  Mostly true Somewhat true Mostly untrue	0 0 1	[NRV, PRV, SRV, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is:  Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:  ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA, and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKeeney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[mark just the first choice that is true.]</i>  Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html">http://www.salmonatl.ca/atlanticsalmon/canada-east/index_1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented: <i>[mark all applicable:]</i>  Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file. Presence of one or more of the nestingsongbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMV, EC, PHV, POLV, SBMV, Sens, WBFV, WBNV]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMV, WBFV, WBNV]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNV]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8) See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands. Use more recent information if available.  New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.  Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]

**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:		Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
		A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.		
		A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge ( <i>Carex rariflora</i> ). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.	0	
		A2. Not A1. Surface water, if present, has pH typically >4.5 and conductivity is usually >100 µS/cm (>64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (<2 m).	0	
		B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:		
		B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).	1	
		B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.	0	
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
		A1.	0	
		A2.	0	
		B1.	0	
		B2.	0	
F3	Woody Height & Form Diversity	Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if <5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.		Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
		coniferous trees (may include lamarack) taller than 3 m.	5	
		deciduous trees taller than 3 m.	1	
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	0	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	2	
		coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.	0	
		deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	0	
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:		[PH, POL, SBM, Sens]
		those species together comprise > 50% of such cover.	1	
		those species together do not comprise > 50% of such cover.	0	
F5	Woody Diameter Classes	Mark ALL the types that comprise >5% of the woody canopy cover in the AA or >5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.		Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
		coniferous, 1-9 cm diameter and >1 m tall.	1	
		broad-leaved deciduous 1-9 cm diameter and >1 m tall.	1	
		coniferous, 10-19 cm diameter.	1	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	1	
		broad-leaved deciduous 20-40 cm diameter.	0	
		coniferous, >40 cm diameter.	1	
broad-leaved deciduous >40 cm diameter.	0			
F6	Height Class Interspersion	Follow the key below and mark the ONE row that best describes MOST of the AA:		[AM, INV, NR, PH, SBM, Sens]
		A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.		
		A1. The two height classes are mostly scattered and intermixed throughout the AA.	0	
		A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.	0	
		B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:		
B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.	1			
B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.	0			
F7	Large Snags (Dead Standing Trees)	The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:		Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
		None, or fewer than 8/ hectare which exceed this diameter.	0	
		Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.	1	
		Several (>8/hectare) but above not true.	0	
F8	Downed Wood	The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:		Exclude temporary "burn piles." [AM, INV, POL, SBM]
		Few or none that meet these criteria.	0	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	1	

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRV, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	1	
		50-95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	0	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	1	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
F12	Ground Irregularity	Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
		Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	0	
		Intermediate.	1	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	0	
		Intermediate (1 - 10% of vegetated part of the AA).	1	
F14	Soil Texture	Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
		In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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.	0	
		Deep Peat, to 40 cm depth or greater.	0	
F15	Shorebird Feeding Habitats	Shallow Peat or organic <40 cm deep.	1	
		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	
		During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
		In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	1	
		5-25% of the vegetated part of the AA.	0	
F17	Forb Cover	25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
		Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
F18	Sedge Cover	5-25% of the herbaceous part of the AA.	1	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
		Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
F19	Dominance of Most Abundant Herbaceous Species	<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
		Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
F20	Invasive Plant Cover	those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	1	
F21	Invasive Cover Along Upland Edge	Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
F22	Fringe Wetland	some (but <5%) of the upland edge.	1	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F23	Lacustrine Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
		The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]



F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 0 0 1	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 0 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 0	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 0 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 0 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	0 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	0 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	0 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	0	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	0	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	0	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	1	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	0	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
F61	Frequently Visited Area	>95% of the AA with or without inhabited building nearby.	1	
		The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
F62	BMP - Soils	>95% of the AA.	0	
		Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
F65	Domestic Wells	None of the above.	1	
		The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
F66	Calcareous Fen	>500 m. away, or no information.	1	
		The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]

**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data	
S1	<b>Aberrant Timing of Water Inputs</b>				
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>				
	Stormwater from impervious surfaces that drains directly to the wetland.				
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.				
	Regular removal of surface or groundwater for irrigation or other consumptive use.				
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.				
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).				
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.				
	Artificial drains or ditches in or near the wetland.				
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).				
	Logging within the wetland.				
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.				
	Straightening, ditching, dredging, and/or lining of tributary channels.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>					
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.		
			Sum=	0	
			Stressor subscore=	0.00	
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>				
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>				
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.				
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )				
	Road salt.				
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.	
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor subscore=	0.00
	S3	<b>Accelerated Inputs of Nutrients</b>			
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
Stormwater or wastewater effluent (including failing septic systems), landfills.					
Fertilizers applied to lawns, ag lands, or other areas in the CA.					
Livestock, dogs.					
Artificial drainage of upslope lands.					
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.	
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.	
				Sum=	0
				Stressor subscore=	0.00

S4	<b>Excessive Sediment Loading from Contributing Area</b>				
	<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]</i>				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
	Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.		
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.					
			Sum=	0	
			Stressor subscore=	0.00	
S5	<b>Soil or Sediment Alteration Within the Assessment Area</b>				
	<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.		
			Sum=	0	
			Stressor subscore=	0.00	



## Assessment Area (AA) Results:

Wetland ID: PLW-W-04

Date: 10 September 2020

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.166276, -66.205112

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	3.37	Moderate	0.50	Lower	4.33	0.58
Stream Flow Support (SFS)	5.63	Moderate	3.58	Moderate	3.00	2.09
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	4.80	Moderate	0.37	Lower	6.44	0.22
Phosphorus Retention (PR)	4.68	Higher	0.00	Lower	6.22	0.33
Nitrate Removal & Retention (NR)	1.36	Lower	1.56	Lower	4.67	2.50
Carbon Sequestration (CS)	6.64	Higher			7.43	
Organic Nutrient Export (OE)	6.85	Higher			5.97	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	4.98	Moderate	0.89	Moderate	5.62	1.73
Amphibian & Turtle Habitat (AM)	3.20	Lower	3.16	Moderate	4.99	4.01
Waterbird Feeding Habitat (WBF)	0.00	Lower	0.00	Lower	0.00	0.00
Waterbird Nesting Habitat (WBN)	0.00	Lower	0.00	Lower	0.00	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	6.47	Moderate	6.67	Moderate	5.36	6.67
Pollinator Habitat (POL)	9.42	Higher	6.67	Moderate	7.58	6.67
Native Plant Habitat (PH)	5.78	Moderate	7.53	Higher	5.42	6.54
Public Use & Recognition (PU)			2.18	Lower		1.88
Wetland Sensitivity (Sens)			0.30	Lower		2.29
Wetland Ecological Condition (EC)			4.22	Moderate		6.67
Wetland Stressors (STR) (higher score means more stress)			2.11	Lower		3.04
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	5.63	Higher	0.50	Lower	4.33	0.58
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	4.21	Moderate	1.10	Lower	6.81	1.76
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.60	Moderate	2.54	Moderate	4.81	1.68
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.92	Lower	1.90	Lower	2.99	2.41
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.32	Higher	7.24	Higher	6.85	6.65
WETLAND CONDITION (EC)			4.22	Moderate		6.67
WETLAND RISK (average of Sensitivity & Stressors)			1.21	Lower		2.66

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Burchill Wind Energy Project - PLW-W-06
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	11 October 2019
Nearest Town:	Lorneville (west Saint John), New Brunswick
Latitude (decimal degrees):	45.166706
Longitude (decimal degrees):	-66.208365
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	0.61
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	10
What percent (approx.) of the <b>wetland</b> were you able to visit?	10
What percent (approx.) of the <b>AA</b> were you able to visit?	100
Were you able to ask the site owner/manager about any of the questions?	No
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals:	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	100+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	

Date: 11 October 2019		Site Identifier: PLW-W-06		Investigator: Derrick Mitchell	
<p><b>Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.</b> DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:</p> <p><b>Google Earth Pro:</b> <a href="https://www.google.com/earth/download/gep/agree.html">https://www.google.com/earth/download/gep/agree.html</a>  <b>GeoNB:</b> <a href="http://www.snb.ca/geonb1/">http://www.snb.ca/geonb1/</a> and <a href="http://www.snb.ca/geonb1/e/apps/apps-E.asp">http://www.snb.ca/geonb1/e/apps/apps-E.asp</a></p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention &amp; Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian &amp; Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, &amp; Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use &amp; Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one.		This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
		New Brunswick	1		
		Nova Scotia	0		
		Prince Edward Island	0		
		Newfoundland-Labrador	0		
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
		<0.01 hectare (about 10 m x 10 m).	1		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is:		See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	1		
		10 to 100 hectares.	0		
		>100 hectares.	0		
OF4	Size of Largest Nearby Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus all adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is:		See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
		<0.01 hectare (about 10 m x 10 m).	0		
		0.01 - 0.1 hectare.	0		
		0.1 - 1 hectare.	0		
		1 to 10 hectares.	0		
		10 to 100 hectares.	0		
		100 to 1000 hectares.	0		
		>1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes.]	1		
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is:		To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
		<50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes.]	1		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	0		
		50-500 m, and not separated.	0		
		50-500 m, but separated by those features.	0		
		0.5 - 5 km, and not separated.	0		
		0.5 - 5 km, but separated by those features.	0		
		None of the above (the closest patches or corridors which are that large are >5 km away).	0		
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grasslike plants in this use of "herbaceous vegetation".]	2	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	2	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is:		In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
		<5% of the land.	0		
		5 to 20% of the land.	0		
		20 to 60% of the land.	0		
		60 to 90% of the land.	0		
		>90% of the land. SKIP to OF10.	1		
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly:		[AM, SBM]	
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0		
		Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	0		
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is:		"Population center" means a settled area with more than about 5 regularly-inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria.[FAv, FRv, NRV, PH, PU, SBM, WBFv]	
		<100 m.	0		
		100 - 500 m.	0		
		0.5 - 1 km.	0		
		1 - 5 km.	1		
		>5 km.	0		

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler>Line tool. Or use the GeoNB's Draw Line tool. [AM, FAv, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	0	
		100 - 500 m.	1	
>500 m.	0			
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	1	
		50-500 m, but separated by those features.	0	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
None of the above (the closest patches or corridors that large are > 1 km away).	0			
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 2 km.	0	
		2-5 km.	1	
		5-10 km.	0	
>10 km.	0			
OF15	Tidal Proximity	The distance from the AA edge to the closest tidal water body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	1	
		1 - 5 km.	0	
		5-10 km.	0	
		10-40 km.	0	
>40 km.	0			
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water.	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. <b>This will be true for most assessments done with WESP-AC.</b>	1			
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.23	[FA, NR, Sens, SFSv, WCV, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream). <b>This is the situation for nearly all wetlands in this region.</b>	1			
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream). <b>This is the situation for nearly all wetlands in this region.</b>	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland's area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): <a href="http://atlas.gc.ca/toporama/en/index.html">http://atlas.gc.ca/toporama/en/index.html</a> [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	0	
		0.1 to 1.	1	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots, other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is: Mostly true. Somewhat true. Mostly untrue.	0 0 1	[NRv, PRv, SRv, WSV]
OF25	Aspect	The overland flow direction of most surface water (in streams, rivers, or runoff) that enters the AA is: Northward (N, NE), north-facing contributing area. Southward (S, SW), south-facing contributing area. Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0 1 0	[AM, NR, SFS, WC, WS]
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is: ≤10 m. 10 - 50 m. 50 - 100 m. 100 - 1000 m. 1 - 2 km. >2 km, or wetland lacks an inlet and outlet.	0 0 0 1 0 0	Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
OF27	Growing Degree Days	In Google Earth, open the KMZ file that accompanies this calculator, called NB-PEI_GrowingDegreeDays. Place your cursor over the AA and left-click. From the pop-up, enter the GRIDCODE in the next column.	2428	This layer was provided by Dr. Dan McKenney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCV, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA [Mark just the first choice that is true]: Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: <a href="http://www.salmonidlas.com/atlanticsalmon/canada-east/index.1.html">http://www.salmonidlas.com/atlanticsalmon/canada-east/index.1.html</a> <a href="http://atlanticsalmonfederation.org/rivers/introduction.html">http://atlanticsalmonfederation.org/rivers/introduction.html</a> Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions. Is probably not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally. Is known or likely to be fishless (e.g. too small, dry, and/or not accessible even temporarily, and not stocked).	0 0 0 1	Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: <a href="http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html">http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html</a> [AM, FA, FR, INV, WBF, WBN]
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented [mark all applicable]: Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SupplInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file. Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file. Presence of one or more of the nesting songbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SupplInfo file, during their nesting season (May-July for most species). None of the above, or no data.	0 0 0 0 1	Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMv, EC, PHv, POLv, SBMv, Sens, WBFv, WBNv]
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: <a href="http://www.ibacanada.com/mapviewer.jsp?lang=EN">http://www.ibacanada.com/mapviewer.jsp?lang=EN</a> [SBMv, WBFv, WBNv]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	0	This was provided by Dr. David Leske. [WBNv]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas. Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to Identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, First Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA 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 (not 0).	0	[PU]
OF35	Mitigation Investment	The AA 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	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA 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	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8). See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at <a href="http://www.snb.ca/geonb1/e/DC/catalogue-E.asp">http://www.snb.ca/geonb1/e/DC/catalogue-E.asp</a> [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB_Crown lands. Use more recent information if available. New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions. Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed. Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place. Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	0 1 0 0	"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]



**Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.** DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

#	Indicators	Condition Choices	Data	Definitions/Explanations
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically &lt;4.5 and conductivity is usually &lt;100 µS/cm (&lt;64 ppm TDS). Trees are absent or nearly so. Sedge cover usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is &lt;4.0.</p> <p>A2. Not A1. Surface water, if present, has pH typically &gt;4.5 and conductivity is usually &gt;100 µS/cm (&gt;64 ppm TDS). Sedge cover is usually extensive, and/or tree and tall shrub cover is extensive. Sometimes at toe of slope or edge of water body. An exit channel is usually present. Wetter than A1 and peat depth may be shallower (&lt;2 m).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree &amp; tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	0 1 0 0	Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale ( <i>Myrica gale</i> ) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]
<p><b>Reminder:</b> For all questions, the AA should include all persistent waters in ponds smaller than 8 hectares (~283 m on a side) that are adjacent to the AA. The AA should also include part of the water area of adjacent ponded water larger than 8 ha and adjacent rivers wider than 20 m. Specifically, the AA should include the open water part adjacent to wetland vegetation and equal in width to the average width of that vegetated zone. Throughout this data form, "adjacent" is used synonymously with abutting, adjoining, bordering, contiguous -- and means no upland (manmade or natural) completely separates the described features along their directly shared edge. Features joined only by a channel are not necessarily considered to be adjacent -- a large portion of their edges must match. The features do not have to be hydrologically connected in order to be considered adjacent.</p>				
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	0 0 1 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if &gt;95%, 5 if 75-95%, 4 if 50-75%, 3 if 25-50%, 2 if 5-25%, 1 if &lt;5%, 0 if none). If the vegetated part of the AA is largely herbaceous (non-woody) vegetation, these percentages should not sum to 100%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs &lt;1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees &lt;1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	3 3 2 2 2 4	Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry ( <i>Morella</i> ), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]
<p><b>Note:</b> If none of top 4 rows in F3 was marked 2 or greater, SKIP TO F9 (N fixers).</p>				
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (&lt;3 m) woody cover. Then choose one:</p> <p>those species together comprise &gt; 50% of such cover.</p> <p>those species together do not comprise &gt; 50% of such cover.</p>	0 1	[PH, POL, SBM, Sens]
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise &gt;5% of the woody canopy cover in the AA or &gt;5% of the wooded areas (if any) along its upland edge (perimeter). The edge should include only the trees whose canopies extend into the AA.</p> <p>coniferous, 1-9 cm diameter and &gt;1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and &gt;1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, &gt;40 cm diameter.</p> <p>broad-leaved deciduous &gt;40 cm diameter.</p>	1 1 1 1 1 1 0 0	Estimate the diameters at chest height. If small-diameter trees are overlapped (shaded) by larger ones, visualise a "subcanopy" at the average height of the smaller-dbh trees, to serve as a basis for the minimum 5% canopy requirement in this question. The trees and shrubs need not be wetland species. [AM, CS, POL, SBM, Sens, WBN]
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise &gt;70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises &gt;70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	0 0 0 1	[AM, INV, NR, PH, SBM, Sens]
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter &gt;20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (&gt;8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (&gt;8/hectare) but above not true.</p>	0 0 1	Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter &gt;10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (&gt;5 if AA is &gt;5 hectares, less for smaller AAs) meet these criteria.</p>	0 1	Exclude temporary "burn piles." [AM, INV, POL, SBM]

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRVr, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of <b>Sphagnum</b> moss (or any moss that forms a dense cushion many centimeters thick), including the moss obscured by taller sedges and other plants rooted in it, is:		Exclude moss growing on trees and rocks. [CS, PH]
		<5% of the vegetated part of the AA.	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F11	% Bare Ground & Thatch	Consider the parts of the AA that lack surface water at the driest time of the growing season. Viewed from directly above the ground layer, the predominant condition in those areas at that time is:		Thatch is dead plant material (stems, leaves) resting on the ground surface. Bare ground that is present under a tree or shrub canopy should be counted. Boulders count as bare ground. Wetlands with mineral soils and that are heavily shaded or are dominated by annual plant species tend to have more extensive areas that are bare during the early growing season. [AM, EC, INV, NR, OE, POL, PR, SBM, Sens]
		Little or no (<5%) <i>bare ground</i> is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unflooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unflooded parts of the AA.	0	
		Other conditions.	0	
		Not applicable. Surface water (either open or obscured by emergent plants) covers all of the AA all the time.	0	
F12	Ground Irregularity	Imagine the AA without any living vegetation. Excluding the portion of the AA that is always under water, the number of hummocks, small pits, raised mounds, animal burrows, ruts, gullies, natural levees, microdepressions, and other areas of peat or mineral soil that are raised or depressed >10 cm compared to most of the area within a few meters surrounding them is:		The depressions may be of human or natural origin. [AM, EC, INV, NR, PH, POL, PR, SBM, SR, WS]
		Few or none (minimal microtopography: <1% of the land has such features, or entire AA is always water-covered).	1	
		Intermediate.	0	
		Several (extensive micro-topography).	0	
F13	Upland Inclusions	Within the AA, inclusions of upland are:		[AM, NR, SBM]
		Few or none.	1	
		Intermediate (1 - 10% of vegetated part of the AA).	0	
		Many (e.g., wetland-upland "mosaic", >10% of the vegetated AA).	0	
F14	Soil Texture	In parts of the AA that lack persistent water, the texture of soil in the uppermost layer is mostly. [To determine this, use a trowel to check in at least 3 widely spaced locations, and use the soil texture key (in Appendix A of the Manual).]		[CS, NR, OE, PH, PR, Sens, SFS, 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	
		Deep Peat, to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	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	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: (Include also any area that is adjacent to the AA)		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	0	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	1	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	0	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	1	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges ( <i>Carex</i> spp.) and cottongrass ( <i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		Invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	1	
		Invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		Invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	1	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	0	
		most (>50%) of the upland edge.	0	
F22	Fringe Wetland	During most of the year, open water within or adjacent to the vegetated part of the wetland is much wider than the maximum width of the vegetated zone within the wetland. Enter "1" if true, "0" if false.	0	[WBF, WBN, WCV]
F23	Lacustrine Wetland	The vegetated part of the AA is within or adjacent to a body of non-tidal standing open water whose size exceeds 8 hectares during most of a normal year.	0	[FR, PR, PU, WBF, WBN]

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainslows), but which is still a wetland, is: <1%. In other words, all or nearly all of the AA is covered by water permanently or at least seasonally. 1-25% of the AA, or <1% but >0.01 ha never contains surface water. 25-50% of the AA never contains surface water. 50-75% of the AA never contains surface water. 75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA. 99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0 0 0 1 0 0	1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is: None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27. 1-20% of the AA. 20-50% of the AA. 50-95% of the AA. >95% of the AA. True for many fringe wetlands.	0 1 0 0 0	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is: <5% of the water is shaded, or no surface water is present then. 5-25% of the water is shaded. 25-50% of the water is shaded. 50-75% of the water is shaded. >75% of the water is shaded.	0 0 0 0 1	[FA, WC]
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is: None, or <0.01 hectare and <1% of the AA. SKIP to F29. 1-20% of the AA, or <1% but >0.01 ha. 20-50% of the AA. 50-95% of the AA. >95% of the AA.	0 1 0 0 0	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is: <10 cm change (stable or nearly so). 10 cm - 50 cm change. 0.5 - 1 m change. 1-2 m change. >2 m change.	0 1 0 0 0	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0	
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is: <10 cm deep (but >0). 10 - 50 cm deep. 0.5 - 1 m deep. 1 - 2 m deep. >2 m deep. True for many fringe wetlands.	1 0 0 0 0	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one): One depth class that comprises >90% of the AA's inundated area (use the classes in the question above). One depth class that comprises 50-90% of the AA's inundated area. Neither of above. There are 3 or more depth classes and none occupy >50%.	1 0 0	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
F31	% of Water That Is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is: <5% of the water, or it occupies <100 sq m cumulatively. Nearly all the surface water is flowing. SKIP to F34. 5-30% of the water. 30-70% of the water. 70-95% of the water. >95% of the water.	1 0 0 0 0	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue. If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is: None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed). 5-30% of the ponded water. 30-70% of the ponded water. 70-99% of the ponded water. 100% of the ponded water.	0 0 0 0 0	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is: <1 m. 1 - 9 m. 10 - 29 m. 30 - 49 m. 50 - 100 m. > 100 m, or open water is absent at that time.	0 0 0 0 0 0	"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is: <1% of the water edge. 1-25% of the water edge. 25-50% of the water edge. 50-75% of the water edge. >75% of the water edge.	0 0 0 0 0	If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail ( <i>Typha</i> spp.), common reed ( <i>Phragmites</i> ), or tall (>1m) bulrush is: <1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38. 1-25% of the emergent vegetation. 25-75% of the emergent vegetation. >75% of the emergent vegetation.	0 0 0 0	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]

F37	Interspersion of Emergents & Open Water	During most of the part of the growing season when water is present, the spatial pattern of emergent vegetation within the water is mostly:		[AM, FA, FR, INV, NR, OE, PH, PR, SR, SBM, SR, WBF, WBN]
		Scattered. More than 30% of such vegetation forms small islands or corridors surrounded by water.	0	
		Intermediate.	0	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42 (Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: [Note: If the AA represents only part of a wetland, answer this according to whichever is the least permanent surface connection: the one between the AA and the rest of the wetland, or the surface connection between the wetland and the downslope stream network.]		Consider the connection regardless of whether the surface water is frozen. The "downslope stream network" could consist of ditches, rivers, ponds, or lakes which eventually connect to the ocean. If this cannot be determined while visiting the AA, consult topographic maps perhaps by viewing these online with Toporama ( <a href="http://atlas.nrcan.gc.ca/toporama/en/index.html">http://atlas.nrcan.gc.ca/toporama/en/index.html</a> ) [CS, FA, FR, NR, OE, PR, Sens, SFS, SR, WCv, WS]
		Persistent (surface water flows out for >9 months/year).	1	
		Seasonal (surface water flows out for 14 days to 9 months/year, not necessarily consecutive).	0	
		Temporary (surface water flows out for <14 days, not necessarily consecutive).	0	
		None - but maps show a stream network downslope from the AA and within a distance that is less than the AA's length. SKIP to F47 (pH Measurement).	0	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland, ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	0	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	1	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	1	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1= yes, 0=no.	1	[WCv]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	1	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	1	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	0	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	0	
		2-5%.	1	
		6-10%.	0	
		>10%.	0	
<b>Note for the next three questions: If the AA lacks an upland edge, evaluate based on the AA's entire perimeter, and moving outward into whatever areas are adjacent. In many situations, these questions are best answered by measuring from aerial images.</b>				
F52	Vegetated Buffer as % of Perimeter	Within a zone extending 30 m laterally from the AA's edge with upland and/or other wetlands, the percentage that contains perennial vegetation cover (except lawns, row crops, heavily grazed land, conifer plantations) is:		[AM, FA, FR, INV, NRv, PH, POL, PRv, SBM, Sens, SRv, STR, WBN]
		<5%.	0	
		5 to 30%.	0	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	1	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	1	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage 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 AA (select one) is:		[PU, STR, WBFv]
		<25%.	1	
		25-50%.	0	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible <u>in</u> (not just near) >5% of the AA during most of the growing season, e.g., free of deep water and dense shrub thickets.	1	
		Maintained roads, parking areas, or foot-trails are within 10 m of the AA, or the AA can be accessed part of the year by boats arriving via contiguous waters.	0	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: <i>[Note: Only include the part actually walked or driven (not simply viewed from) with a vehicle or boat. Do not include visitors on trails outside of the AA 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]</i>		[AM, Fav, FRv, PH, PU, SBM, STR, WBF, WBN]
		<5% and no inhabited building is within 100 m of the AA.	0	
		<5% and inhabited building is within 100 m of the AA.	0	
		5-50% and no inhabited building is within 100 m of the AA.	0	
		5-50% and inhabited building is within 100 m of the AA.	0	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	1	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: <i>[See note above.]</i>		[AM, PH, PU, SBM, STR, WBF, WBN]
		<5%. If F60 was answered ">95%" (mostly never visited), SKIP to F64.	1	
		5-50%.	0	
		50-95%.	0	
		>95% of the AA.	0	
F62	BMP - Soils	Boardwalks, paved trails, fences or other infrastructure and/or well-enforced regulations appear to effectively prevent visitors from walking on soil within nearly all of the AA when the soil is unfrozen. Enter "1" if true.	0	[PH, PU]
F63	BMP - Wildlife Protection	Fences, observation blinds, platforms, paved trails, exclusion periods, and/or well-enforced prohibitions on motorised boats, off-leash pets, and off road vehicles appear to effectively exclude or divert visitors and their pets from the AA at critical times in order to minimize disturbance of wildlife (except during hunting seasons). Enter "1" if true.	0	[AM, PU, WBF, WBN]
F64	Consumptive Uses (Provisioning Services)	Recent evidence was found within the AA of the following potentially-sustainable consumptive uses. Select ALL that apply.		[Fav, FRv, WBFv]
		Low-impact commercial timber harvest (e.g., selective thinning).	0	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	1	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	0	
		100-500 m. away.	0	
		>500 m. away, or no information.	1	
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants, Calcifer worksheet in the accompanying SupplInfo file for list of plant indicators (calciphiles). Enter 1 if more than two Strong or more than five Moderate calciphile species are present; otherwise enter 0, but if not able to identify those and no information, change to blank.	0	[PH, PR]



**Stressor (S) Data Form for Non-Tidal Wetlands. WESP-AC for New Brunswick. Version 2.**

				Data		
S1	<b>Aberrant Timing of Water Inputs</b>					
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>					
	Stormwater from impervious surfaces that drains directly to the wetland.					
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.					
	Regular removal of surface or groundwater for irrigation or other consumptive use.					
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.					
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).					
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.					
	Artificial drains or ditches in or near the wetland.					
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).					
	Logging within the wetland.					
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.					
	Straightening, ditching, dredging, and/or lining of tributary channels.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.	0		
When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.	0		
<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>						
Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.	0		
Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.	0		
Sum=				0		
Stressor subscore=				0.00		
S2	<b>Accelerated Inputs of Contaminants and/or Salts</b>					
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>					
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.					
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. <a href="https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1">https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&amp;n=B85A1846-1</a> )					
	Road salt.					
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.					
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>					
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.		
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
	Sum=				0	
	Stressor subscore=				0.00	
	S3	<b>Accelerated Inputs of Nutrients</b>				
		<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>				
Stormwater or wastewater effluent (including failing septic systems), landfills.						
Fertilizers applied to lawns, ag lands, or other areas in the CA.						
Livestock, dogs.						
Artificial drainage of upslope lands.						
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>						
			Severe (3 points)	Medium (2 points)	Mild (1 point)	
Type of loading:		High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.		
Frequency & duration of input:		Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.		
AA proximity to main sources (actual or potential):		0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.		
Sum=				0		
Stressor subscore=				0.00		

S4	<b>Excessive Sediment Loading from Contributing Area</b>				
	<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	
	Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.		
* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.					
			Sum=	0	
			Stressor subscore=	0.00	
S5	<b>Soil or Sediment Alteration Within the Assessment Area</b>				
	<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	
	Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.		
			Sum=	0	
			Stressor subscore=	0.00	

## Assessment Area (AA) Results:

Wetland ID: PLW-W-06

Date: 11 October 2019

Observer: Derrick Mitchell

Latitude & Longitude (decimal degrees): 45.166706, -66.208365

Scores will appear below after data are entered in worksheets OF, F, and S. See Manual for definitions and descriptions of how scores were computed.

Wetland Functions or Other Attributes:	Function Score (Normalised)	Function Rating	Benefits Score (Normalised)	Benefits Rating	Function Score (raw)	Benefits Score (raw)
Water Storage & Delay (WS)	1.29	Lower	0.50	Lower	2.72	0.58
Stream Flow Support (SFS)	6.67	Higher	3.76	Moderate	3.56	2.19
Water Cooling (WC)	7.80	Higher	5.11	Higher	5.20	3.08
Sediment Retention & Stabilisation (SR)	1.30	Lower	6.16	Moderate	4.05	3.74
Phosphorus Retention (PR)	2.94	Moderate	5.53	Higher	4.98	5.33
Nitrate Removal & Retention (NR)	0.26	Lower	10.00	Higher	3.99	10.00
Carbon Sequestration (CS)	3.31	Moderate			5.99	
Organic Nutrient Export (OE)	8.43	Higher			6.81	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	6.77	Higher	4.77	Moderate	6.26	3.82
Amphibian & Turtle Habitat (AM)	5.13	Moderate	7.16	Higher	6.01	6.43
Waterbird Feeding Habitat (WBF)	5.87	Moderate	6.67	Moderate	4.67	6.67
Waterbird Nesting Habitat (WBN)	4.98	Moderate	6.67	Moderate	4.26	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	9.61	Higher	6.67	Moderate	7.97	6.67
Pollinator Habitat (POL)	10.00	Higher	6.67	Moderate	8.19	6.67
Native Plant Habitat (PH)	8.69	Higher	8.77	Higher	6.59	7.61
Public Use & Recognition (PU)			2.18	Lower		1.88
Wetland Sensitivity (Sens)			4.75	Moderate		3.63
Wetland Ecological Condition (EC)			7.11	Higher		8.33
Wetland Stressors (STR) (higher score means more stress)			0.22	Lower		2.34
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	6.67	Higher	0.50	Lower	2.72	0.58
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.22	Lower	8.62	Higher	5.37	8.18
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.92	Higher	4.83	Moderate	6.13	3.42
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.53	Moderate	5.63	Moderate	4.50	5.31
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.72	Higher	8.07	Higher	7.89	7.29
WETLAND CONDITION (EC)			7.11	Higher		8.33
WETLAND RISK (average of Sensitivity & Stressors)			2.49	Lower		2.98

NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.

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# **Appendix B**

## Updated Archeological Report



**Archaeological Assessment of the Proposed Burchill Wind Farm near Saint  
John, NB**  
Permit #: 2020 NB 35

Prepared for

Natural Forces Developments LP

by

Jason Jeandron, MPhil.  
**Archaeological Prospectors**  
PO Box 393  
Fredericton, NB  
E3B 4Z9  
17/08/20



## **ABSTRACT**

On August 10 & 11<sup>th</sup>, 2020, an archaeological pedestrian survey took place at the location of a proposed wind farm near Lorneville, NB. The pedestrian survey was undertaken to identify any extant heritage/archaeological features of significance, any visible significant artifacts or if any potential exists for the presence of buried archaeological sites.



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- Figure 22:** Turbines and tracklog on a satellite image.
- Figure 23:** The required predictive model purchased from the Province.



## INTRODUCTION

Natural Forces Development LP commissioned the work of an archaeologist to mitigate the potential negative effects of construction activity surrounding the development of a wind farm near Lorneville, New Brunswick (see Figures 1 & 2). In advance of construction activities associated with the wind farm development, the locations of thirteen wind turbines west of Saint John were assessed for the presence of heritage resources and the potential for buried archaeological remains.





## **PREVIOUS RESEARCH**

There are not any previously recorded archaeological sites registered at Archaeological Services New Brunswick within the vicinity of the proposed construction activities in the area surveyed.

The Borden system is a nation-wide, geographically based method for recording sites of archaeological value. In New Brunswick, each Borden block is 10 minutes of latitude by 10 minutes of longitude. Each of these blocks is referred to by a four-letter code, which describes the location of that particular block. Consequently, sites within each Borden block are numbered sequentially in the order in which they are reported. The Borden block that is of concern to this report is BhDm.



## **METHODS**

The information presented in this report was gained through research of relevant documents from Archaeological Services in Fredericton and published materials, including topographic and surficial geology maps & reports, aerial photographs, LiDAR data, and the New Brunswick Register of Historic Places. The field component was conducted using intensive visual inspection through pedestrian surveying. Each turbine area was assessed (see Figure 22).



## RESULTS

A review of early and modern aerial photographs (1935 5093/048 & 059) failed to indicate any extant cultural features of interest. The air photos and topographical mapping indicate that the assessed area of the proposed wind farm is sited across an area that has previously been forested with occasional wood lots and rests at an elevation of ~57-73 m asl. As can also be seen from the remotely sensed data (see Figure 3), the project area is comprised of flat areas with several increases in elevation, which are usually bedrock outcrops. The flat areas are often at the lower local elevations and were sometimes wet and classified as a wetland. While bedrock can clearly be seen at the surface in places, there is also a good chance that much of the wet surface can be attributed to the near-surface presence of marine clay. The maximum elevation of the marine transgression is reported to be ~61 m asl (Lohse, 1977), which places much of the project area below or near this level (see Figure 5).

The bedrock geology of the area, the outcrops on which some of the turbines are proposed, is comprised of four different formations – Taylor Island, Saint John Group, Ashburn and the Spruce Lake Tonalite (Barr and White, 2005). Of potential interest is the middle to late Neoproterozoic Ashburn Formation which is reported to contain white to grey fine-grained quartzite. This quartzite may have been used in the production of stone tools. Turbines 6e & 7e are sited in the area resting on the Ashburn Formation deposits.

The notable surficial geology of the project area consists of ice contact and marine shallow water deposits (see Figure 4). In the north of the project area, an elongated ice contact deposit was mapped with at least three recorded gravel pits. Below the topsoil, this deposit is described as fine to coarse-grained sand with fine to coarse gravel to several metres in depth. Turbine 10e is sited near the northern edge of this deposit. In the south of the map area, a couple of marine shallow water deposits were mapped, just south and immediately west of Turbine 2e and north of Turbine 11e. These deposits are also described as fine to coarse-grained sand with fine to coarse gravel to several metres in depth.

With the maximum marine limit at ~61 m asl, it is assumed that early habitation sites may be found in close proximity to this migrating shoreline. Turbines 2e, 5e, 6e, 7e, 8e, 9e, 11e, 12e & 13e are at elevations at or below the 61 m asl level and consequently are considered as holding high potential for the presence of Indigenous archaeological remains.



A few streams were noted within the project area, along with many mapped wetlands, which are known to be great sources of food & resources as well as being ideal locations for human habitation for thousands of years after the last glaciation. Each of these modern and ancient geographical features should be considered as holding high potential for the presence of Indigenous archaeological remains.

No evidence of significant extant structures was visible during the desktop survey or in the field. In the near vicinity of Turbine 1e (~45 m south-east), a garbage dump was noted along an overgrown dirt road. Much of the forest floor is covered in a thick layer of moss, likely obscuring most of the smaller discarded items, but a few abandoned cars were clearly visible. Only one had enough markings visible to be identified as an early 1960s Pontiac Laurentian (see Figure 7). At Turbine 9e, a couple of particularly flat & level areas between bedrock outcrops that would be ideal locations for habitation, providing protection from some of the elements (see Figure 16). Also at Turbine 9e (~45 m north-west), a gap in the bedrock stood out (see Figure 17). While it is possible that this is natural, it also holds the potential to be an Indigenous quarry site. In a couple of other areas at Turbine 9e, veins of quartz were exposed at the surface. Some turbine locations (including Turbine 5e (see Figure 11)), are placed near areas of bedrock outcropping that could be used as rock shelters; ideal areas for habitation during the late Pleistocene and early Holocene. Consequently, these turbine locations meet the criteria for holding high potential for the presence of significant archaeological resources.

Throughout the course of the pedestrian survey, there were not any culturally significant extant or exposed features/artifacts identified. If any change to the proposed footprint of this project is anticipated, then consultation with a permitted archaeologist should occur to ensure a minimal amount of damage to any buried heritage that may be present.



## CONCLUSIONS & RECOMMENDATIONS

On August 10<sup>th</sup> & 11<sup>th</sup>, 2020, an archaeological pedestrian survey took place at a proposed wind farm west of Lorneville, NB. The assessment of this area resulted in the failure to identify any evidence of significant past human use at the locations of the proposed 13 turbine locations. However, nine turbine locations (Turbines 2e, 5e, 6e, 7e, 8e, 9e, 11e, 12e & 13e) rest in areas that are considered to hold high potential for significant archaeological remains. The age of the Pontiac Laurentian near Turbine 1e falls outside of the range considered significant enough to record as an archaeological site (75+ years), the other two or more vehicles may reach that threshold, but more work to uncover and identify those will be needed.

Due to their proximity to the former marine shoreline, Turbines 2e, 5e, 6e, 7e, 8e, 9e, 11e, 12e & 13e should be considered as holding high potential for the presence of early postglacial archaeology. Following the *Guidelines* (2012), archaeological test pits should be excavated on a 5 m grid anywhere ground-disturbing activities (removing tree stumps, use of heavy equipment etc) will occur as follows: *(c) extends within 50 metres of the banks or shores of a current or former body of water (i.e., river, lake, bay, etc.) – for areas between 50-80 metres from current or former body of water see: Medium Potential (a 10 m grid).* Initially, it might be suitable to excavate test pits along a transect (in a N/S direction) at each of these locations, to better understand the surficial geology and the potential for early human habitation and to narrow focus. Additionally, minimising the amount of ground disturbing activity will limit the amount of effort required to identify the presence/absence of archaeology (i.e. only clear area for turbine pad, leave stumps beyond).





## REFERENCES

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**2005** *Bedrock Geology of the Musquash Area (NTS 21 G/01), Saint John, Charlotte and Kings Counties, New Brunswick.* New Brunswick Dept. of Natural Resources. Plate 2005-26 (Revised 2015).

### **Lohse, H.**

**1975** *Granular Aggregate Resources of Musquash 21G/1.* Province of New Brunswick, Mineral Resources Branch. Plate 76-16.

**1977** *Granular Aggregate Resources of Musquash Map Area 21 G/1, New Brunswick.* Province of New Brunswick, Mineral Resources Branch. Topical Report 77-2.

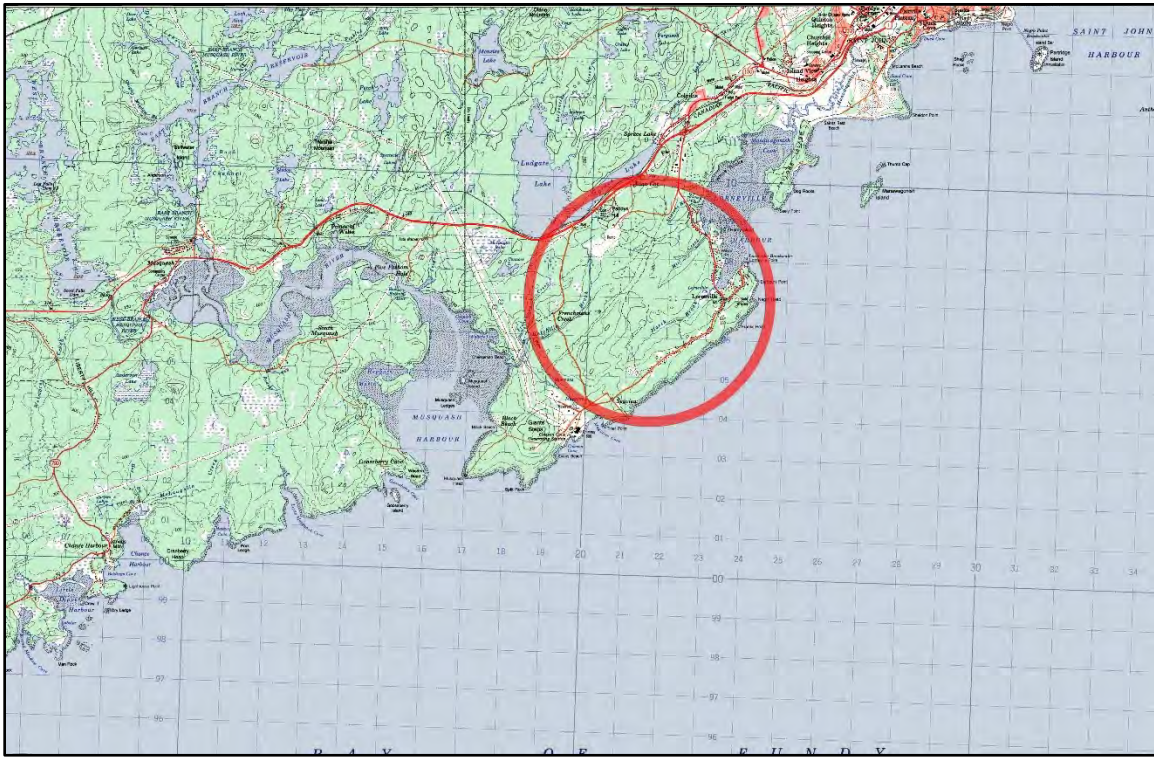
### **NB Archaeological Services Unit**

**2012** *Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick.* Archaeological Services Unit, Fredericton.



## APPENDIX





**Figure 1:** Approximate location of the proposed wind farm. (21 G/01)





**Figure 2:** Project area with locations of turbines.









**Figure 4:** Project area on a satellite image with turbine locations & geology. The southern deposits are 'marine shallow water deposits', and the northern deposit is a 'ice contact stratified drift'.



**Figure 5:** Project area on a satellite image with turbine locations and 60 m+ elevations.





**Figure 6:** Proposed placement for Turbine 1e.



**Figure 7:** An early 1960's Pontiac Laurentian in a dump ~45 m south-east of T1e.





**Figure 8:** Proposed placement for Turbine 2e.



**Figure 9:** Proposed placement for Turbine 3e.







**Figure 10:** Proposed placement for Turbine 4e.



**Figure 11:** Proposed placement for Turbine 5e.







**Figure 12:** Proposed placement for Turbine 6e.



**Figure 13:** Proposed placement for Turbine 7e.





**Figure 14:** Proposed placement for Turbine 8e.



**Figure 15:** Proposed placement for Turbine 9e.





**Figure 16:** A flat, level area between bedrock outcrops near Turbine 9e.



**Figure 17:** An opening in the bedrock near Turbine 9e.





**Figure 18:** Proposed placement for Turbine 10e.



**Figure 19:** Proposed placement for Turbine 11e.





**Figure 20:** Proposed placement for Turbine 12e.



**Figure 21:** Proposed placement for Turbine 13e.







Figure 22: Turbines and tracklog on a satellite image.

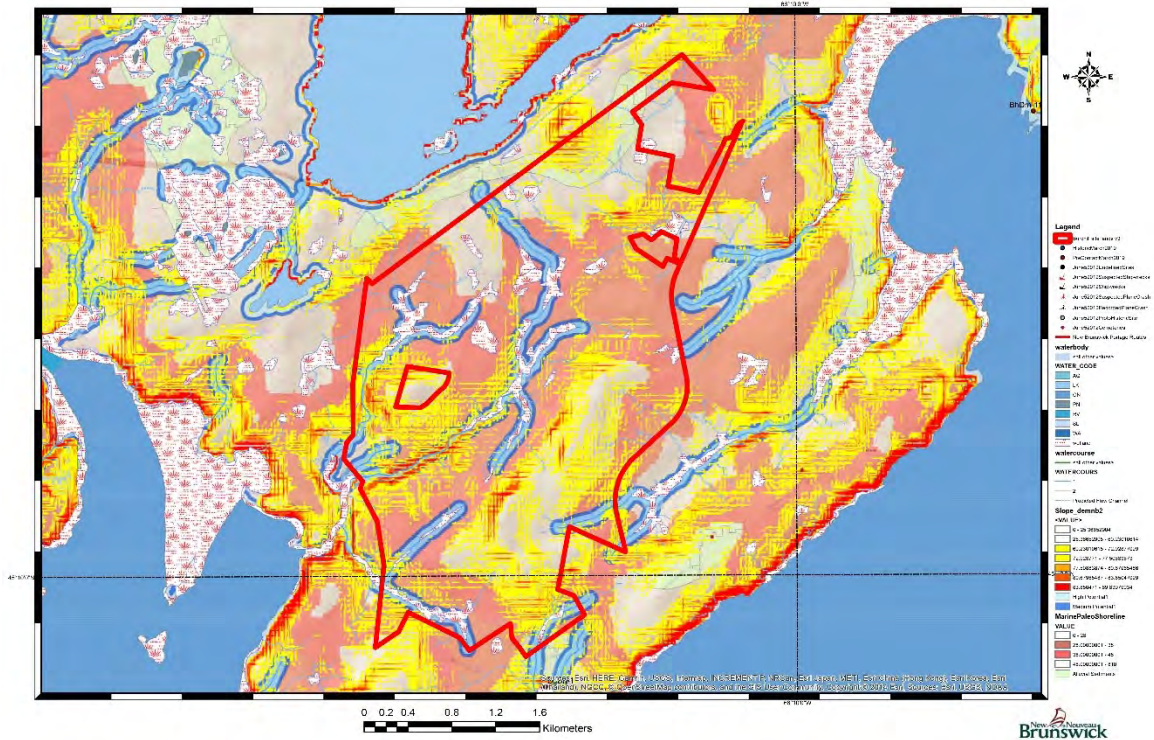


Figure 23: The required predictive model purchased from the Province.

