CHALEUR VENTUS WIND ENERGY PROJECT

APPENDIX K - VEGETATION AND WETLANDS REPORT

CHALEUR VENTUS LIMITED PARTNERSHIP

November 2019

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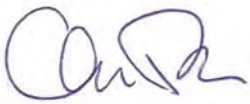

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1 INTRODUCTION

This report provides a summary of the Vegetation and Wetland Studies completed in support of the Chaleur Ventus Wind Energy Project (Project) Registration Document that was submitted to the Sustainable Development, Planning and Impact Evaluation Branch, Department of Environment and Local Government in September of 2019.

The purpose of this report is to present the methods and results of the vegetation and wetland surveys completed in support of this Project.

1.1 PROJECT OVERVIEW

Chaleur Ventus Limited Partnership (CVLP) is proposing the development of the Project. The Project is located on privately owned land south of route 303 in Gloucester County, New Brunswick, and will have an aggregate electrical capacity of 20 megawatts (MW). The Project will consist of five wind energy converters (WECs), access roads, collection system, substation, and associated temporary laydown areas required for construction. An approximate 9 kilometre (km) transmission line is proposed that runs south and southwest from the Project area to a proposed substation that will be located on Crown land approximately 2.8 km southeast of Saint-Leolin.

The Project is expected to consist of Enercon E-126 WECs with a nominal power of 4 MW. Each assembly will consist of the tower, hub, nacelle, rotor blades, and controller, with a total height of 179.5 to 194.5 metres (m) and is dependent on WEC availability from Enercon. The total WEC rotor diameter will be 127 m. It is anticipated that each WEC will be erected on a concrete foundation. The dimensions, depth, and type of foundation will depend on an evaluation of the local soil, surficial geology characteristics, wind forces at the location, and site-specific details of each location.

2 METHODS

2.1 STUDY AREAS

Two study areas were selected for the vegetation and wetlands field programs and are defined as follows:

- **WEC Site Study Area:** Includes the five WEC locations selected for the Project and one alternative location. The WEC Site Study Area is bordered by Route 320, Chemin Downing, Route 303 and Rue Acadie.
- **Tapline Study Area:** A 30 m right of way on an approximately 9 km long tapline that runs south and southwest from the Project area to a proposed substation that will be located on Crown land.

2.2 BACKGROUND REVIEW

For the purposes of this report, species of conservation concern (SOCC) are identified as floral or faunal species that are ranked by the Atlantic Canada Conservation Data Centre (ACCDC), protected by the New Brunswick *Species at Risk Act* (*NB SARA*), designated by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as threatened, endangered, or special concern or protected by the federal *Species at Risk Act* (*SARA*). Although many SOCC ranked by the ACCDC are considered rare in New Brunswick, those protected or listed by federal and provincial legislation are of particular concern.

Prior to completing field surveys, the following sources were reviewed to evaluate the potential for SOCC within the general area of the proposed Project and within the study areas:

- ACCDC
- The federal Species at Risk Registry
- COSEWIC
- GeoNB
- High resolution aerial photography
- Environmentally Significant Areas database
- Ecological Reserves in the Maritimes

In addition, a desktop review of provincial databases, topographic mapping, and available satellite imagery was conducted to assist in the identification of wetland areas within the study areas. Provincially mapped wetlands were identified using Geo NB.

2.3 VEGETATION

Field surveys were conducted within the WEC Site Study Area from August 21 to 22, 2018 in representative habitats within the WEC Site Study Area. Additional vegetation surveys were conducted as part of wetland delineation and functional assessment within the WEC Site Study Area and along the Tapline Study Area during the dates presented in Section 2.4. Observations were recorded for vegetation species and for areas of potential unique or pristine vegetation communities. Vegetation was identified using the Flora of New Brunswick (Hinds et al., 2000).

2.4 WETLAND DELINEATION AND FUNCTIONAL ASSESSMENT

2.4.1 *WETLAND IDENTIFICATION AND DELINEATION*

Targeted surveys to confirm and delineate wetland habitat were conducted in the areas identified in the background review and site reconnaissance completed between spring and summer of 2018. Field surveys were conducted within the WEC Site Study Area June 12 and 13, July 1 to 5, and July 11, 2018. Field surveys were conducted along the Tapline Study Area July 23 and 24 and September 5, 2019. Figures showing the sample locations within the WEC Site Study Area and the Tapline Study Area are presented in Appendix A, Figures A-1 and A-2, respectively. Selected locations were established in representative areas within each wetland type so they did not straddle two or more types of vegetation.

Wetland type was determined using the Canadian Wetland Classification System (NWWG, 1998). Wetlands were evaluated in accordance with the U.S. Army Corps of Engineers Wetlands Delineation Manual (Corps Manual) and the Northcentral and Northeastern Interim Regional Supplement (U.S. Army Corps of Engineers, 2012). The targeted surveys consisted of traversing the landscape using a set of evenly spaced transects (approximately 50 to 100 m apart) in search of areas showing typical wetland characteristics. For an area to be identified as wetland, it must contain indicators of hydrophytic vegetation, hydric soils, and wetland hydrology as described in the following subsections.

HYDROPHYTIC VEGETATION

As defined in the Corps Manual, hydrophytic vegetation is the community of macrophytes that occur in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence the plant species present. Hydrophytic indicators are plant species that require or can tolerate either continuous or seasonal periods of saturated soil conditions. Indicator status varies from obligate (> 99% of occurrences are in a wetland) to upland (< 1% of occurrences are in a wetland). Information on hydrophytic vegetation was collected and recorded by stratum (i.e., tree, shrub, and herb) as defined in the Corps Manual. Vegetation was identified using the Flora of New Brunswick (Hinds et al., 2000).

HYDRIC SOILS

Hydric soils are soils that formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper soil layers. Hydric soil indicators are formed predominantly by the accumulations of organic matter, and/or reduction, translocation, or accumulation of iron or other reducible elements in a saturated and anaerobic environment. Examples of hydric indicators include the presence of an organic soil (or Histosol) and mineral soils with gleyed (reduced) or mottled (oxidized) matrices.

Soil test pits were advanced in suspected wetland areas using a shovel and handheld auger. Hydric soil indicators were recorded. The Munsell Soil Color Charts (Munsell Color [Firm]) and the Northeastern U.S. Hydric Soil Indicators with Probable Application in Nova Scotia (Adapted from: Regional Supplement to the Corps of Engineers Wetland Delineation Manual Northcentral and Northeast Region. Version 2.0, 2012) were used.

WETLAND HYDROLOGY

Wetland hydrology indicators are used in combination with hydrophytic vegetation and hydric soil indicators. Wetland hydrology indicators provide evidence that a location has a continuing wetland hydrological regime and that the hydrophytic vegetation and hydric soil indicators are not only present because of a past hydrologic regime. A site is considered to show a positive indicator for wetland hydrology when either one primary indicator or two secondary indicators are observed. Common primary and secondary indicators are listed below:

Primary Indicators

- Surface water, high water table, saturation
- Water marks on trees
- Sediment deposits
- Water-stained leaves
- Drift deposits

Secondary Indicators

- Drainage patterns
- Stunted or stressed plants
- Dry-season water table

WETLAND DELINEATION

Once a wetland was identified, a soil test pit was advanced at an adjacent upland location (i.e., paired pit) and evaluated for the same criteria to help determine the location of the wetland boundary. Once the wetland boundary was determined, the wetland area was delineated by walking the boundary of the wetland. Wetland data and boundary points were recorded using a Differential GPS system, which has an accuracy of 1 to 2 m depending on tree cover. When necessary, additional soil pits were advanced to confirm the boundary.

2.4.2 *FUNCTIONAL ASSESSMENT*

Wetland functional assessments were completed within the WEC Site Study Area September 5, 2019, and along the Tapline Study Area July 23 to 25, 2019. A functional assessment for each wetland was completed using the Wetland Ecosystem Services Protocol for Atlantic Canada (NBDELG, 2018; WESP-AC Version 1.2.1, October 2017), which is a standardized desktop and field evaluation method designed to assess the condition and function of New Brunswick's wetlands. WESP-AC generates scores (0 to 10) and ratings (Lower, Moderate, and Higher) for each of the following attributes:

- Water Storage and Delay
- Stream Flow Support
- Water Cooling
- Sediment Retention and Stabilisation
- Phosphorus Retention
- Nitrate Removal and Retention
- Amphibian and Turtle Habitat
- Waterbird Feeding Habitat
- Waterbird Nesting Habitat
- Songbird, Raptor, and Mammal Habitat
- Pollinator Habitat
- Native Plant Habitat

- Carbon Sequestration
- Organic Nutrient Export
- Anadromous Fish Habitat
- Resident Fish Habitat
- Aquatic Invertebrate Habitat
- Public Use and Recognition
- Wetland Sensitivity
- Wetland Ecological Condition (higher score means more stress)
- Wetland Stressors

This is done in a consistent and transparent manner so that the scores and ratings can be used to make informed decisions about wetland avoidance, minimization, and replacement. It can also help to support wetland restoration balances unavoidable loss of specific functions and benefits (NBDELG, 2018). Table 1 describes the wetland functions and their benefits that are measured by the WESP-AC.

Table 1 Benefits of Wetland Functions Scored by the WESP-AC

FUNCTION	DEFINITION	POTENTIAL BENEFITS
Hydrologic Functions		
Water Storage and Delay	The effectiveness for storing runoff or delaying the downslope movement of surface water for long or short periods.	Flood control, 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.
Water Quality Maintenance Functions		
Water Cooling	The effectiveness for maintaining or reducing temperature of downslope waters.	Support cold water fish and other aquatic life.
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 stabilising underlying sediments or soil.	Maintain quality of receiving waters. 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.
Carbon Sequestration	The effectiveness of a wetland both for retaining incoming particulate and dissolved carbon, and through the photosynthetic process, converting carbon dioxide gas to organic matter (particulate or dissolved). And to then retain that organic matter on a net annual basis for long periods while emitting little or no methane (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. Includes dragonflies, midges, clams, snails, water beetles, shrimp, aquatic worms, and others.	Support salmon and other aquatic life. 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.

FUNCTION	DEFINITION	POTENTIAL BENEFITS
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.	The capacity to support or contribute to an abundance or diversity of waterbirds that migrate or winter but do not breed in the region.
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 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[a]	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. Protection of prior public investments.

Notes: extracted from NBDELG (2018)
(a) a benefit rather than a function of wetlands

3 RESULTS

3.1 BACKGROUND REVIEW

According to the ACCDC records review, there are six records of four species of vegetation SOCC that have been historically observed within 5 km of the Project's study areas (ACCDC, 2018; Table 2). No records of nonvascular plant SOCC have been documented within 5 km. Based on GeoNB mapping, no provincially significant wetlands are present within the Project's study areas.

Table 2 Plant SOCC Identified within 5 km of the Project

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[(A)]	PROVINCIAL GENERAL STATUS RANK	NUMBER OF RECORDS	HABITAT PREFERENCE; LOCATION SIGHTING
Twisted Whitlow-grass	*Draba incana*	S1	May be at Risk	2	Rocky seashore, dry sloping juniper forests, riverside meadows. Found 2.8 km northwest of the Project
Northern Comandra	*Geocaulon lividum*	S3S4	Secure	1	Moist, boreal type forest. Found 3.7 km east of the Project
Dwarf Alkali Grass	*Puccinella ambigua*	S1	Undetermined	1	Wetland areas. Found 3.3 km northwest of the Project
Cloudberry	*Rubus chamaemorus*	S3S4	Secure	2	Swamps, bogs, peaty moors, wet areas. Found 3.3 km east of the Project

Note: None of these species are designated by COSEWIC, or protected by *SARA* or *NB SARA*
(a) Provincial Rarity Rank, where:
S1 - Extremely rare in province
S3S4 - A numeric range rank is used to indicate any range of uncertainty about the status of the species or community. S3 Uncommon in province. S4 Widespread, common and apparently secure in province

3.2 VEGETATION

The Project area is found in the Atlantic Maritime Ecozone. This Ecozone encompasses Quebec's Gaspe peninsula, as well as the entirety of Nova Scotia, Prince Edward Island, and New Brunswick. The ecozone is heavily influenced by the Atlantic Ocean, which provides cooler summers and warmer winters than many areas found inland. Agriculture and forestry are popular in this ecozone, contributing to the lack of old growth forest.

The ecoregion inside the Atlantic Maritime ecozone is called the Eastern Lowlands. This Ecoregion is a broad wedge of flat to gently rolling terrain. The region extends from Bathurst in the north, to Sackville in the south. The coastal area has a fringe of sand dunes, salt marshes, and lagoons which provide habitat for a distinct mix of flora and fauna. Further inland, peatlands are considered extensive, and host both common and rare plant species. Forests in this area are conifer-dominant, and resemble a boreal-type forest, which is a stark contrast from the deciduous-dominated valley lowlands found adjacent to this ecoregion. Due to the low local relief of the area, extensive peatlands and wet areas are found throughout, with discontinuous stands of black spruce and tamarack. Ericaceous shrubs are common in this low-lying area, and this ecoregion contains more wetland area than any other ecoregion in New Brunswick.

The local plant communities found in the Project area include wetland habitats, along with some areas of shrub, softwood, and to a lesser extent, hardwood, thinned areas with hardwood regeneration, clear-cut areas, and anthropogenic areas dominated by bare sand and soil. A total of 169 vegetation species were observed within the WEC Site Study Area and 229 species along the Tapline Study Area (Appendix B, Tables B-1 and B-2). The majority of species observed were native to New Brunswick, however 34 non-native or exotic species were observed within the WEC Site Study Area and 30 along the Tapline Study Area. Species commonly identified in the area include eastern white cedar (*Thuja occidentalis*), black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), and tamarack (*Larix laricina*) in the tree stratum, however red maple (*Acer rubrum*), and trembling aspen (*Populus tremuloides*) may occur. Shrub species included speckled alder (*Alnus incana*), sheep laurel (*Kalmia angustifolia*), choke cherry (*Prunus virginiana*), mountain holly (*Nemopanthus mucronatus*), blueberry (*Vaccinium* spp.), wild raisin *(Viburnum nudum*), and rhodora (*Rhododendron canadense*). Herbaceous vegetation identified include cottongrass (*Eriophorum* spp.), three seeded sedge (*Carex trisperma*), cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), yellow bluebead lily (*Clintonia borealis*), starflower (*Trientalis borealis*), and twinflower (*Linnaea borealis*).

3.2.1 *PLANT SPECIES OF CONSERVATION CONCERN*

Five plant SOCCs were observed within the WEC Site Study Area and three along the Tapline Study Area during the 2018 and 2019 field surveys (Table 3). None of the species identified during the background review (Section 3.1) were identified during field surveys. Although no other plant SOCC were observed during the site visit or historically observed, it does not preclude the possibility for other plant SOCC to be present. Occurrences can be missed due to timing of the field surveys, because species presence can vary annually and locally. In addition, climatic fluctuations might not allow adequate time for plants to mature and produce flowers, making the species more difficult to spot and identify. Available microhabitats can also vary over time and space. The plant surveys cannot confirm the absence of listed plant species or communities; it can only confirm their presence at the time of observation.

Table 3 Plant SOCC Identified during the 2018 and 2019 Field Surveys

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK(A)	PROVINCIAL GENERAL STATUS RANK	HABITAT PREFERENCE; LOCATION SIGHTING
Field Wormwood	*Artemesia campestris*	S3	Secure	Open woods, grasslands, and disturbed areas; WEC Site Study Area
Wiegand's Sedge	*Carex wiegandii*	S3	Secure	Bogs, openings in acidic conifer, mixed, or alder swamps, wet acidic sandy or peaty meadows; WEC Site Study Area
Spotted Coralroot	*Corallorhiza maculata*	S3S4	Sensitive	Shady woodlands; Tapline Study Area
Marsh Horsetail	*Equisetum palustre*	S3	Secure	Marshes and swamps; WEC Site Study Area
White Fringed Orchid	*Platanthera blephariglottis*	S3	Secure	Open sphagnum bogs and moist sandy and peaty meadows; WEC Site Study Area
Lesser Pyrola	*Pyrola minor*	S3	Secure	Moist, often mossy sites in coniferous and boreal forests, thickets, stream banks; Tapline Study Area
Gmelin's Water Buttercup	*Ranunculus gmeilinii*	S3	Secure	Water or drying mud, wet meadows, swamps, marshes, ponds, shores of rivers; Tapline Study Area
River Bulrush	*Schoenoplectus fluviatilis*	S3	Sensitive	Fresh shores, inland marshes, coastal estuaries; WEC Site Study Area

Note: None of these species are designated by COSEWIC, or protected by *SARA* or *NB SARA*
(a) Provincial Rarity Rank, where:
S3 - Uncommon in province
S3S4 - A numeric range rank is used to indicate any range of uncertainty about the status of the species or community. S3 Uncommon in province. S4 Widespread, common and apparently secure in province

3.3 WETLAND DELINEATION AND FUNCTIONAL ASSESSMENT

3.3.1 *WEC SITE STUDY AREA*

The wetland delineation data sheets, photographic log, and functional assessment spreadsheets for the wetlands associated with the WEC Site Study Area are available in Appendices C, D and E, respectively. Parcel Identification Numbers for WEC Site Study Area wetlands are in Appendix F, Table F-1. Summaries of the functional assessment results are presented in Tables 4 and 5. The subsections following Tables 4 and 5 describe the characteristics of each of the five wetlands that were delineated within the WEC Site Study Area (see Appendix A; Figure A-1). A sixth previously mapped wetland is present within the southeastern section of the WEC Site Study Area, but wetland delineation and functional assessments were not completed for this wetland because of it's distance from the proposed footprint.

All the wetlands observed within the WEC Site Study Area were classified as swamps. Swamps are treed or tall shrub dominated wetlands occurring on either mineral or organic soils (NWWG, 1998). The typical features of a swamp are the dominance of tall woody vegetation and a wood-rich organic layer laid down by this vegetation. The total wetland area delineated within the WEC Site Study Area is approximately 375 hectares (ha).

Table 4 Non-tidal WESP-AC Function Scores for the WEC Site Study Area

Wetland Functions or Other Attributes	WL-A		WL-B+C		WL-D		WL-E	
	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating
Water Storage and Delay	**Higher**	Moderate	Moderate	Moderate	Moderate	Lower	**Higher**	Lower
Stream Flow Support	Lower	**Higher**	Moderate	**Higher**	Lower	Moderate	Lower	**Higher**
Water Cooling	Moderate	Lower	Lower	Lower	Moderate	Lower	Moderate	Lower
Sediment Retention and Stabilisation	Moderate	Lower	Lower	Lower	Moderate	Lower	Moderate	Lower
Phosphorus Retention	Moderate	Lower	Moderate	Lower	Lower	Lower	Lower	Moderate
Nitrate Removal and Retention	Lower	Moderate	Lower	Moderate	Moderate	Lower	Moderate	Moderate
Carbon Sequestration	Moderate	-	Moderate	-	Moderate	-	Moderate	-
Organic Nutrient Export	Moderate	-	Moderate	-	Moderate	-	**Higher**	-
Anadromous Fish Habitat	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower
Resident Fish Habitat	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower
Aquatic Invertebrate Habitat	Lower	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Amphibian and Turtle Habitat	**Higher**	**Higher**	Moderate	Moderate	**Higher**	Moderate	**Higher**	Moderate
Waterbird Feeding Habitat	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Waterbird Nesting Habitat	Moderate	Moderate	Moderate	Moderate	Moderate	Lower	Moderate	Moderate
Songbird, Raptor, and Mammal Habitat	**Higher**	Moderate	**Higher**	**Higher**	**Higher**	Lower	**Higher**	Lower
Pollinator Habitat	**Higher**	Moderate	**Higher**	Moderate	**Higher**	Lower	**Higher**	Lower
Native Plant Habitat	Lower	**Higher**	**Higher**	**Higher**	Moderate	Moderate	Moderate	Moderate
Public Use and Recognition	-	Moderate	-	Lower	-	Lower	-	Moderate
Wetland Sensitivity	-	Moderate	-	**Higher**	-	Lower	-	Moderate
Wetland Ecological Condition	-	Moderate	-	Moderate	-	**Higher**	-	**Higher**
Wetland Stressors	-	Lower	-	**Higher**	-	Lower	-	Lower

Table 5 Non-tidal WESP-AC Summary Ratings for Grouped Functions for the WEC Site Study Area

Summary Ratings for Grouped Functions	WL-A		WL-B+C		WL-D		WL-E	
	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating
Hydrologic Group	Moderate	Moderate	Moderate	Moderate	Lower	Lower	Lower	Lower
Water Quality Support Group	Moderate	Lower	Lower	Lower	Lower	Lower	Moderate	Lower
Aquatic Support Group	Moderate	**Higher**	Lower	**Higher**	Moderate	Moderate	Moderate	**Higher**
Aquatic Habitat Group	Moderate	Moderate	Moderate	Moderate	Moderate	Lower	Moderate	Moderate
Transition Habitat Group	**Higher**	**Higher**	**Higher**	**Higher**	**Higher**	Moderate	**Higher**	Moderate
Wetland Condition	-	Moderate	-	Moderate	-	**Higher**	-	**Higher**
Wetland Risk[(a)]	-	Moderate	-	**Higher**	-	Lower	-	Moderate

(a) Average of sensitivity and stressors.

WETLAND A (WL-A) – FORESTED SWAMP COMPLEX

WL-A is the most northwestern wetland within the WEC Site Study Area and is characterized as a 121 ha natural origin, terrene, flat, and isolated wetland that is seasonally flooded and permanently saturated.

Pre-existing anthropogenic effects include adjacent clear/partial cutting, clear/partial cutting within the wetland, road development and ATV trails. The wetlands primary and secondary indicators and attributes are described as follows:

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-A is red maple, with speckled alder dominating the shrub stratum, and common lady fern (*Athyrium filix-femina*) and sensitive fern dominating the herbaceous layer. The vegetation community identified in WL-A is considered a hydrophytic vegetation community.

Soil profile:

- 0-3 centimetres (cm) organic
- 3-21 cm sandy with depleted redox features in matrix
- 21-32 cm clay; Gley-1 with depleted redox features in matrix
- 32 cm restrictive clay layer

Hydric soil indicator:

Depleted matrix

Primary wetland hydrology indicators present:

Primary indicators of wetland hydrology observed were high water table, saturation, and water stained leaves.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-A functions highest at storing water or delaying the downslope movement of surface water, amphibian, turtle, songbird, raptor, mammal and pollinator habitat.

WETLAND B (WL-B) - MIXED WOOD SWAMP

WL-B is the largest of the five wetlands identified within the WEC Site Study Area, with an approximate area of 201 ha. This wetland is characterized as a natural origin, terrene, flat, and isolated wetland that is seasonally flooded and permanently saturated.

Pre-existing anthropogenic effects include adjacent clear/partial cutting, clear/partial cutting within the wetland, road development and ATV trails. The wetlands primary and secondary indicators and attributes are described as follows:

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-B are red maple and balsam fir, with speckled alder and balsam fir dominating the shrub stratum, and bluejoint reed grass (*Calamagrostis canadensis*) dominating the herbaceous layer.

Soil profile:

- 0-22 cm organic
- 22-65 cm sandy with depleted redox features in matrix

Hydric soil indicator:

Histic Epipedon

Primary wetland hydrology indicators present:

Primary indicators of wetland hydrology observed were high water table, saturation and water stained leaves.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-B functions highest as songbird, raptor, mammal, pollinator and native plant habitat.

WETLAND C (WL-C) - FORESTED WETLAND COMPLEX

WL-C is separated by a road from WL-B; it has an approximate area of 46 ha. This wetland is characterized as a natural origin, terrene, flat, and isolated wetland that is seasonally flooded and permanently saturated.

Pre-existing anthropogenic effects include adjacent clear/partial cutting, clear/partial cutting within the wetland, road development and ATV trails. The wetlands primary and secondary indicators and attributes are described as follows:

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-C is black spruce, with black spruce and mountain holly dominating the shrub stratum, and three-leaved false Solomon's seal (*Maianthemum trifolium*) and three-seeded sedge dominating the herbaceous layer.

Soil profile:

- 0-36 cm organic
- 36 cm dark wet sandy soil

Hydric soil indicator:

Histic Epipedon

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology observed were high water table and saturation.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-C functions highest as songbird, raptor, mammal, pollinator and native plant habitat.

WETLAND D (WL-D) - CONIFEROUS SWAMP

WL-D and is found in the northern section of the WEC Site Study Area, with an approximate area of 3 ha. This wetland is characterized as a natural origin, terrene, flat, and isolated wetland that is seasonally flooded and permanently saturated.

Pre-existing anthropogenic effects include a road/trail through the northern section of the wetland. The wetlands primary and secondary indicators and attributes are described as follows:

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-D is black spruce, with black spruce and wild raisin dominating the shrub layer, and cinnamon fern and three-seeded sedge dominating the herbaceous layer.

Soil profile:

- 0-40 cm organic

Hydric soil indicator:

Histosol

Primary wetland hydrology indicators present:

The primary hydrological indicator of wetland hydrology observed was saturation.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-D functions highest as amphibian, turtle, songbird, raptor, mammal and pollinator habitat.

WETLAND E (WL_E) - DECIDUOUS SWAMP

WL-E is found north of WL-D, with an approximate area of 3 ha. This wetland is characterized as a natural origin, terrene, flat, and isolated wetland that is seasonally flooded and permanently saturated.

Pre-existing anthropogenic effects include a road running north-south through the centre of the wetland, adjacent clear-cut, and partial cut through most of the wetland (according to available land cover mapping. The wetlands primary and secondary indicators and attributes are described as follows:

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-E are red maple and balsam fir, with speckled alder and wild raisin dominating the shrub stratum, and whorled wood aster (*Oclemena acuminata*) and cinnamon fern dominating the herbaceous layer.

Soil profile:

- 0-8 cm organic
- 8-40 cm sandy with depleted redox features in matrix

Hydric soil indicator:

Sandy redox

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology observed were saturation and water stained leaves.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-D functions highest at water storage and delay, organic nutrient export, and as amphibian, turtle, songbird, raptor, mammal and pollinator habitat.

3.3.2 *TAPLINE STUDY AREA*

The wetland delineation data sheets, photographic logs, and functional assessment spreadsheets of the wetlands along the Tapline Study Area are available in Appendices C, D and E, respectively. Parcel Identification Numbers for Tapline Study Area wetlands are in Appendix F, Table F-2. Summaries of the functional assessment results are presented in Tables 6 and 7. The subsections following Tables 6 and 7 describe the characteristics of each of the seven wetlands that were delineated within the Tapline Study Area (see Appendix A; Figure A-2). All of the wetlands observed along the Tapline Study Area were classified as swamps. Wetlands were only delineated to the edge of the Tapline Study Area; therefore, the total area of wetland habitat is not available. The delineated wetland area that could be potentially disturbed by the Project is approximately 7.82 ha.

Table 6 Non-tidal WESP-AC Function Scores along the Tapline Study Area

Wetland Functions or Other Attributes	WL-1		WL-2		WL-3		WL-4	
	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating
Water Storage and Delay	Lower	**Higher**	Lower	Lower	Moderate	**Higher**	**Higher**	Moderate
Stream Flow Support	Moderate	**Higher**	**Higher**	Moderate	Lower	**Higher**	Lower	Lower
Water Cooling	**Higher**	**Higher**	**Higher**	**Higher**	**Higher**	**Higher**	**Higher**	Lower
Sediment Retention and Stabilisation	**Moderate**	Moderate	Moderate	Moderate	Moderate	Lower	**Higher**	Lower
Phosphorus Retention	Moderate	**Higher**	Lower	**Higher**	Lower	Lower	**Higher**	Lower
Nitrate Removal and Retention	Moderate	**Higher**	Lower	**Higher**	Moderate	Moderate	**Higher**	Moderate
Carbon Sequestration	Moderate	-	Moderate	-	Lower	-	**Higher**	-
Organic Nutrient Export	**Higher**	-	Lower	-	**Higher**	-	**Higher**	-
Anadromous Fish Habitat	Lower	Lower	**Higher**	**Higher**	Lower	Lower	Lower	Lower
Resident Fish Habitat	Lower	Lower	Moderate	**Higher**	Lower	Lower	Lower	Lower
Aquatic Invertebrate Habitat	**Higher**	Moderate	Moderate	**Higher**	Moderate	Moderate	Moderate	Moderate
Amphibian and Turtle Habitat	Moderate	**Higher**	Moderate	**Higher**	Moderate	Moderate	Moderate	**Higher**
Waterbird Feeding Habitat	Moderate	**Higher**	Moderate	Moderate	Moderate	Moderate	Moderate	**Higher**
Waterbird Nesting Habitat	Moderate	Lower	Moderate	Moderate	Moderate	Moderate	Moderate	Lower
Songbird, Raptor, and Mammal Habitat	**Higher**	**Higher**	**Higher**	Moderate	**Higher**	Moderate	**Higher**	**Higher**
Pollinator Habitat	**Higher**	Lower	**Higher**	Lower	**Higher**	Lower	**Higher**	Lower
Native Plant Habitat	**Higher**	Moderate	**Higher**	Moderate	Moderate	Moderate	**Higher**	Moderate
Public Use and Recognition	-	Lower	-	Lower	-	Lower	-	Lower
Wetland Sensitivity	-	**Higher**	-	Higher	-	**Higher**	-	**Higher**
Wetland Ecological Condition	-	Moderate	-	Moderate	-	Lower	-	Moderate
Wetland Stressors	-	Moderate	-	Lower	-	**Higher**	-	Lower

Table 6 Non-tidal WESP-AC Function Scores along the Tapline Study Area - Continued

Wetland functions or other attributes	WL-5		WL-6		WL-7	
	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating
Water Storage and Delay	**Higher**	**Higher**	Moderate	Lower	Lower	**Higher**
Stream Flow Support	Lower	Lower	Lower	**Higher**	**Higher**	**Higher**
Water Cooling	**Higher**	Lower	Lower	Lower	Moderate	Moderate
Sediment Retention and Stabilisation	**Higher**	Lower	Moderate	Lower	Lower	Lower
Phosphorus Retention	**Higher**	Lower	Lower	Lower	Moderate	Moderate
Nitrate Removal and Retention	**Higher**	Moderate	Moderate	Lower	Lower	Moderate
Carbon Sequestration	Moderate	-	**Higher**	-	**Higher**	-
Organic Nutrient Export	**Higher**	-	**Higher**	-	**Higher**	-
Anadromous Fish Habitat	Lower	Lower	Lower	Lower	Lower	Lower
Resident Fish Habitat	Lower	Lower	Lower	Lower	Lower	Lower
Aquatic Invertebrate Habitat	Lower	Moderate	**Higher**	Lower	Lower	Moderate
Amphibian and Turtle Habitat	Moderate	Moderate	Lower	Lower	Moderate	Moderate
Waterbird Feeding Habitat	Moderate	Moderate	Lower	Lower	Moderate	Moderate
Waterbird Nesting Habitat	Moderate	Moderate	Lower	Lower	Moderate	Moderate
Songbird, Raptor, and Mammal Habitat	**Higher**	Moderate	Moderate	**Higher**	**Higher**	**Higher**
Pollinator Habitat	**Higher**	Moderate	Moderate	Lower	**Higher**	Lower
Native Plant Habitat	**Higher**	**Higher**	Moderate	Moderate	Moderate	Moderate
Public Use and Recognition	-	Lower	-	Lower	-	Lower
Wetland Sensitivity	-	**Higher**	-	**Higher**	-	**Higher**
Wetland Ecological Condition	-	Moderate	-	**Higher**	-	**Higher**
Wetland Stressors	-	**Higher**	-	Lower	-	Moderate

Table 7 Non-tidal WESP-AC Summary Ratings for Grouped Functions along the Tapline Study Area

Wetland Functions or Other Attributes	WL-1		WL-2		WL-3		WL-4	
	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating
Hydrologic Group	Moderate	**Higher**	**Higher**	Lower	Moderate	**Higher**	**Higher**	Moderate
Water Quality Support Group	Lower	**Higher**	Lower	**Higher**	Moderate	Moderate	**Higher**	Moderate
Aquatic Support Group	**Higher**	**Higher**	Moderate	**Higher**	**Higher**	**Higher**	Moderate	Moderate
Aquatic Habitat Group	Moderate	**Higher**	**Higher**	Moderate	Moderate	Moderate	Moderate	**Higher**
Transition Habitat Group	**Higher**	**Higher**	**Higher**	Moderate	**Higher**	Moderate	**Higher**	**Higher**
Wetland Condition	-	Moderate	-	Moderate	-	Lower	-	Moderate
Wetland Risk[(a)]	-	**Higher**	-	Moderate	-	**Higher**	-	**Higher**

(a) Average of sensitivity and stressors.

Table 7 Non-tidal WESP-AC Summary Ratings for Grouped Functions along the Tapline Study Area - Continued

Wetland functions or other attributes	WL-5		WL-6		WL-7	
	Function Rating	Benefits Rating	Function Rating	Benefits Rating	Function Rating	Benefits Rating
Hydrologic Group	**Higher**	**Higher**	Moderate	Lower	**Higher**	**Higher**
Water Quality Support Group	**Higher**	Lower	Moderate	Lower	Lower	Moderate
Aquatic Support Group	Moderate	Moderate	Moderate	**Higher**	**Higher**	**Higher**
Aquatic Habitat Group	Moderate	Moderate	Lower	Lower	Moderate	Moderate
Transition Habitat Group	**Higher**	**Higher**	Moderate	**Higher**	Higher	**Higher**
Wetland Condition	-	Moderate	-	**Higher**	-	**Higher**
Wetland Risk[(a)]	-	**Higher**	-	**Higher**	-	Moderate

(a) Average of sensitivity and stressors.

WETLAND 1 (WL-1) – MATURE CONIFEROUS SWAMP

WL-1 is characterized as a lotic stream fringe wetland. Trees and tall shrubs taller than 1 m comprise more than 25% of the vegetated cover, and surface water is mostly absent or inundates the vegetation only seasonally.

Pre-existing anthropogenic effects include excavation within the wetland, artificial drains or ditches in or near the wetland, trails through the wetland and Chemin des Boudreau goes through it.

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-1 is eastern white cedar, with eastern white cedar dominating the shrub stratum, and cinnamon fern and dwarf red raspberry (*Rubus pubescens*) dominating the herbaceous layer.

Soil profile:

- 0-5 cm organic
- 5-13 cm silty organic
- 13-28 cm sandy
- 28-38 cm sandy clay with depleted redox features in matrix

Hydric soil indicator:

Depleted matrix

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology include high water table and saturation.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-1 functions highest at water cooling, and organic nutrient export, aquatic invertebrate, songbird, raptor, mammal, pollinator and native plant habitat.

WETLAND 2 (WL-2) – MATURE HARDWOOD SWAMP

WL-2 is characterized as a lotic stream fringe wetland. Trees and tall shrubs taller than 1 m comprise more than 25% of the vegetated cover, and surface water is mostly absent or inundates the vegetation only seasonally.

No pre-existing anthropogenic effects were observed.

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-2 are red maple and yellow birch (*Betula alleghaniensis*), with mountain maple (*Acer spicatum*) dominating the shrub stratum, and sensitive fern dominating the herbaceous layer.

Soil profile:

- 0-2 cm organic
- 2-48 cm sandy with depleted redox features in matrix

Hydric soil indicator:

Depleted matrix

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology observed were high water table and saturation.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-2 functions highest at stream flow support, water cooling, anadromous fish habitat, songbird, raptor, mammal, pollinator and native plant habitat.

WETLAND 3 (WL-3) – IMMATURE DECIDUOUS SWAMP

WL-3 is characterised as a terrene wetland.

Pre-existing anthropogenic effects include a logging road on one side of the wetland and there is water impounded on the eastern side of the wetland.

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-3 is red maple, with speckled alder dominating the shrub stratum, and sensitive fern dominating the herbaceous later.

Soil profile:

- 0-5 cm organic
- 5-24 cm sandy with depleted redox features in matrix
- 24-36 cm sandy with depleted redox features in matrix, over roots/rock

Hydric soil indicator:

Depleted matrix

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology observed were high water table and saturation.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-3 functions highest at water cooling, organic nutrient transport, as well as songbird, raptor, mammal, and pollinator habitat.

WETLAND 4 (WL-4) - MIXEDWOOD BASIN SWAMP

WL-4 is characterised as a terrene wetland.

Pre-existing anthropogenic effects include a small portion of the wetland that was logged approximately 10 years ago.

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-4 are red maple and white cedar, with wild raisin and red maple dominating the shrub stratum, and three-seeded sedge dominating the herbaceous layer.

Soil profile:

- 0-10 cm organic
- 10-22 cm sandy with depleted redox features in matrix
- 22-47 cm sandy with depleted redox features in matrix

Hydric soil indicator:

Depleted matrix

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology observed were saturation and water stained leaves.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-4 functions highest at water storage and delay, water cooling, sediment retention and stabilisation, phosphorous retention, nitrate removal and retention, carbon sequestration, organic nutrient export, as well as songbird, raptor, mammal, pollinator and native plant habitat.

WETLAND 5 (WL-5) - CONIFEROUS SWAMP

WL-5 is characterised as a terrene wetland.

Pre-existing anthropogenic effects include ditching and forest clearing.

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-5 is black spruce, with sheep laurel, black spruce, mountain holly and wild raisin dominating the shrub stratum, and three-seeded sedge dominating the herbaceous layer.

Soil profile:

- 0-32 cm organic over rock

Hydric soil indicator:

Histosol

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology observed were high water table and saturation.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-5 functions highest at water storage and delay, water cooling, sediment retention and stabilisation, phosphorous retention, nitrate removal and retention, organic nutrient export, songbird, raptor, mammal, pollinator, and native plant habitat.

WETLAND 6 (WL-6) – MATURE CONIFEROUS SWAMP

WL-6 is characterised as a terrene wetland.

Pre-existing anthropogenic effects include a nearby unnamed road that travels south from Chemin des Boudreau, though there are not currently an observable impact from the road on the wetland.

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-6 is black spruce, with mountain holly dominating the shrub stratum, and bunchberry (*Cornus canadensis*) and three-leaved false Solomon's seal dominating the herbaceous layer.

Soil profile:

- 0-40 cm organic

Hydric soil indicator:

Histosol

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology observed were high water table, saturation and water stained leaves.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-6 functions highest at carbon sequestration, organic nutrient export, and as aquatic invertebrate habitat.

WETLAND 7 (WL-7) - CONIFEROUS SWAMP/BOG COMPLEX

WL-7 is characterised as a terrene wetland.

Pre-existing anthropogenic effects include an adjacent blueberry field.

Dominant wetland (hydrophytic) vegetation:

The dominant species in the tree stratum within WL-7 is Black spruce, with sheep laurel and rhodora dominating the shrub stratum, and three-leaved false Solomon's seal and three-seeded sedge dominating the herbaceous layer.

Soil profile:

- 0-16 cm organic
- 16-34 cm sandy with depleted redox features in matrix, over roots

Hydric soil indicator:

Depleted matrix

Primary wetland hydrology indicators present:

Primary hydrological indicators of wetland hydrology observed were high water table, saturation and water stained leaves.

Functional Assessment:

Overall, based on the results of the WESP-AC functional assessment, WL-7 functions highest at stream flow support, carbon sequestration, organic nutrient export, as well as songbird, raptor, mammal, and pollinator habitat.

3.3.3 *WETLANDS IDENTIFIED TO SUPPORT AVIAN SPECIES OF CONSERVATION CONCERN*

Important wetland habitat was identified in the Project's study areas (Table 8). Canada Warbler (*Cardellina canadensis*) was recorded in one of the wetlands delineated in the WEC Site Study Area, and Canada Warbler, Common Nighthawk (*Chordeiles minor*), and Olive-sided Flycatcher (*Contopus cooperi*) were recorded in three wetlands along the Tapline Study Area. For more information see Section 3 of Appendix G - Avian Survey Report, Residual Environmental Effects and Determination of Significance.

Table 8 Wetlands within the WEC Site and Tapline Study Areas that support Avian Species at Risk

Wetland ID	Wetland Type	Species	*SARA*	*NB SARA*	WEC Site	Tapline
WL-C	Forested wetland complex	Canada Warbler	Threatened (Schedule 1)	Threatened	✓	-
WL-1	Mature coniferous swamp	Canada Warbler	Threatened (Schedule 1)	Threatened	-	✓
WL-6	Mature coniferous swamp	Common Nighthawk	Threatened (Schedule 1)	Threatened	-	✓
WL-6	Mature coniferous swamp/bog complex	Olive-sided Flycatcher	Threatened (Schedule 1)	Threatened	-	✓
WL-7	Mature coniferous swamp/bog complex	Common Nighthawk	Threatened (Schedule 1)	Threatened	-	✓

3.4 LOSS OF WETLAND AREA OR FUNCTION

WEC T6 is in proximity to a wetland area that is currently delineated on the GeoNB Wetlands Map Viewer and wetland B delineated for this Project (Appendix A, Figure A-1). WEC T6 is outside of the 30-m buffer zone and is sited within a disturbed area. The access road to WEC T6 crosses approximately 660 m of delineated wetland B which includes 48 m of GeoNB wetland. WEC T5 is about 5 m inside of the 30-m buffer of delineated wetland B. Although the tapline crosses wetlands, the majority of the tapline route follows an existing road (Appendix A, Figure A-2). There is approximately 845 m of GeoNB and delineated wetlands that will be crossed by the tapline.

There is also a wetland where the tapline crosses Rivière du Nord and it is expected that the power poles will be located at roughly 15 to 25 m from the stream. No provincially significant wetlands will be affected by the Project.

4 ADDITIONAL RECOMMENDED MITIGATIONS

As outlined in the Registration Document, the Project has been sited to avoid disturbances to wetland and drainage edges to the extent possible. If alteration is required for any wetlands inside of the planned Project footprint, then a Watercourse and Wetland Alteration (WAWA) Permit application will be submitted. Access roads that cannot avoid wetlands and will cross watercourses and wetlands will follow the guidelines from the Watercourse and Wetland Alteration Technical Guidelines and the conditions as listed on the WAWA.

The following mitigations have been identified, in addition to those in the Registration Document:

- The conditions listed on the WAWA may include requirements for wetland compensation if determined to be required for the Project. If compensation is determined to be required, then it will be completed as per the WAWA permit conditions
- Machinery will be operated on land above the high-water-mark or in another manner that minimizes disturbance to the banks and beds of any watercourse
- Appropriate equipment and work access routes will be selected to reduce damage to riparian vegetation and watercourse banks
- Effective sediment and erosion control measures will be installed and maintained prior to any work in and around watercourses and wetlands
- Wetland disturbances shall be minimized to the extent possible to complete the work
- Temporary lay down areas, temporary work areas, and temporary materials storage shall not be completed within wetland areas

5 BIBLIOGRAPHY

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A FIGURES

KEY MAP:

LEGEND:

- TURBINE LAYOUT
- ALTERNATE TURBINE LAYOUT
- OVERHEAD LINE
- TAPLINE STUDY AREA
- UNDERGROUND LINE
- ACCESS ROADS
- CONSTRUCTION LIMITS
- WEC SITE STUDY AREA

N W E S

PROJECT:

PROJECT:
CHALEUR VENTUS WIND ENERGY PROJECT

PROJECT NO.: **181-07802**

CLIENT:
CHALEUR VENTUS LIMITED PARTNERSHIP

FIGURE:

TITLE:
WETLANDS WITHIN THE WEC SITE STUDY AREA

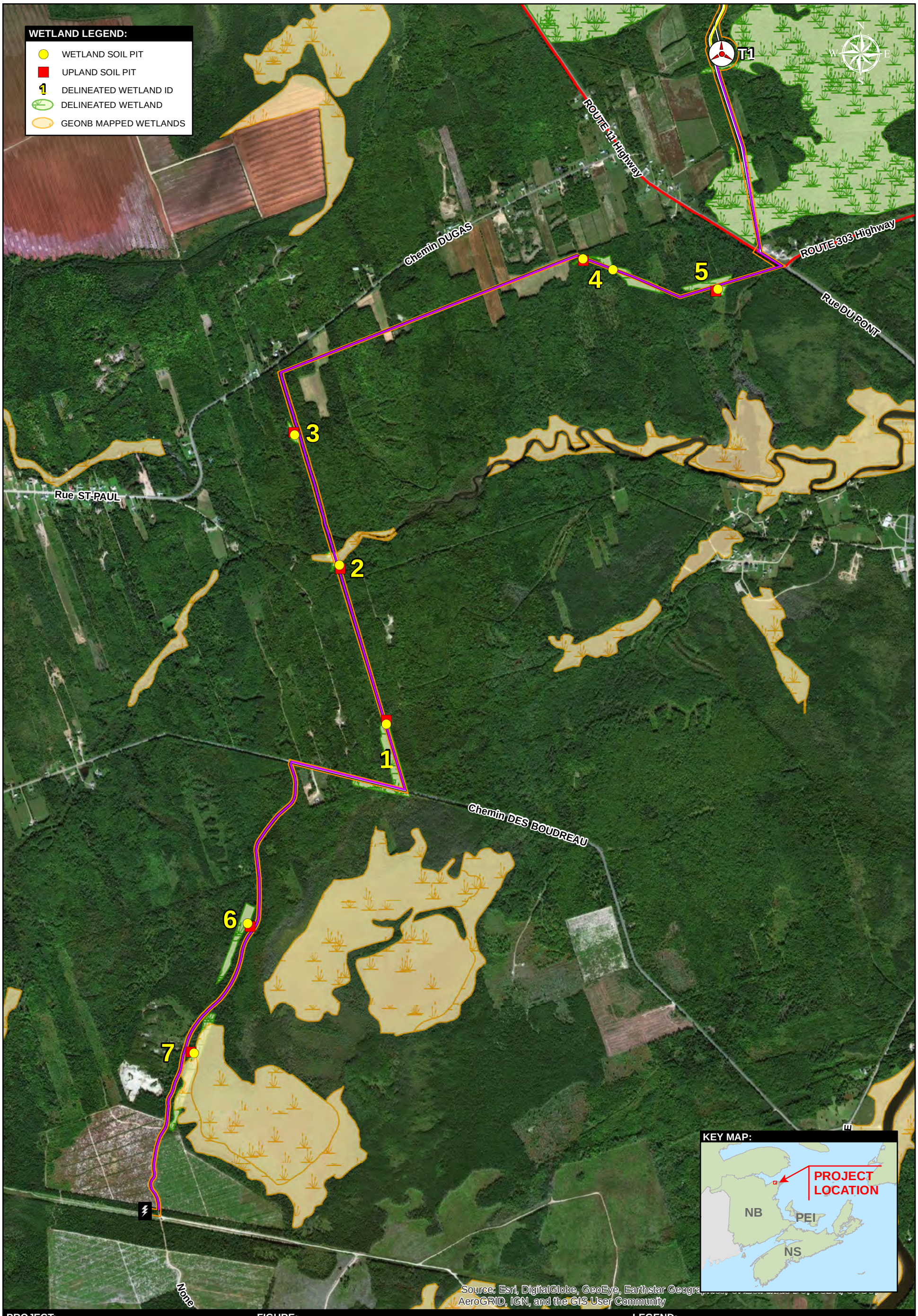
FIGURE NO.:	REVISION NO.:
A-1	0

SCALE: 0 100 200 400 600 800 Metres

DATUM:	PROJECTION:
NAD 83 CSRS	NB Stereographic
DRAWN BY:	CHECKED BY:
T. MOREHOUSE	T. MacAULAY
CREATED DATE: (YYYY-MM-DD) 2019-09-24	REVISION DATE: (YYYY-MM-DD) 2019-11-03

WSP Canada Inc.
1 Spectacle Lake Drive,
Dartmouth, Nova Scotia
www.wsp.com

Document Path: S:\GIS\2_PROJECTS\2018\181_07802_Naveco_WindEnergy_AnseBlue_NB\8_MXD\20191102_181_07802_FIGA1_TurbineArea_Wetlands.mxd



PROJECT:

PROJECT:
CHALEUR VENTUS WIND ENERGY PROJECT

PROJECT NO.: **181-07802**

CLIENT:
CHALEUR VENTUS LIMITED PARTNERSHIP

FIGURE:

TITLE:
WETLANDS ALONG THE TAPLINE STUDY AREA

FIGURE NO.: **A-2**

REVISION NO.: **0**

WSP Canada Inc.
1 Spectacle Lake Drive,
Dartmouth, Nova Scotia
www.wsp.com

DATUM: NAD 83 CSRS

PROJECTION: UTM ZONE 20 NORTH

DRAWN BY: T. MOREHOUSE

CHECKED BY: T. MacAULAY

CREATED DATE: (YYYY-MM-DD) 2019-09-24

REVISION DATE: (YYYY-MM-DD) 2019-11-03

LEGEND:

TURBINE LAYOUT
ALTERNATE TURBINE LAYOUT
SUBSTATION
OVERHEAD LINE
TAPLINE STUDY AREA
UNDERGROUND LINE
ACCESS ROADS
CONSTRUCTION LIMITS
WEC SITE STUDY AREA

SCALE: 1:17,500
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B VEGETATION MASTER SPECIES LISTS

Table B-1 Master Plant List for the WEC Site Study Area

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[(a)]	PROVINCIAL GENERAL STATUS RANK
Balsam Fir	*Abies balsamea*	S5	Secure
Striped Maple	*Acer pensylvanicum*	S5	Secure
Red Maple	*Acer rubrum*	S5	Secure
Sugar Maple	*Acer saccharum*	S5	Secure
Red Baneberry	*Actaea rubra*	S5	Secure
Northern Water Plantian	*Alisma triviale*	S5	Secure
Speckled Alder	*Alnus Incana*	S5	Secure
Pearly Everlasting	*Anaphalis margaritacea*	S5	Secure
Field Chamomile	*Anthemis arvensis*	SNA	Exotic
Dogbane	*Apocynum androsaemifolium*	S5	Secure
Wild Sarsaparilla	*Aralia nudicaulis*	S5	Secure
Bristly Sarsaparilla	*Aralia hispida*	S5	Secure
Common Burdock	*Arctium minus*	SNA	Exotic
Field Wormwood	***Artemisia campestris***	**S3**	**Secure**
Common Wormwood	*Artemisia vulgaris*	SNA	Exotic
Common Lady Fern	*Athyrium filix-femina*	S5	Secure
Thin-leaved Orache	*Atriplex prostrata*	S5	Secure
Yellow Birch	*Betula alleghaniensis*	S5	Secure
Paper Birch	*Betula papyrifera*	S5	Secure
Gray birch	*Betula populifolia*	S5	Secure
Nodding Beggartick	*Bidens cernua*	S5	Secure
Bluejoint Reed Grass	*Calamagrostis canadensis*	S5	Secure
Silvery Sedge	*Carex canescens*	S5	Secure
Crawford's Sedge	*Carex crawfordii*	S5	Secure
Fringed Sedge	*Carex crinita*	S5	Secure
White-edged Sedge	*Carex debilis*	S5	Secure
Graceful Sedge	*Carex gracillima*	S5	Secure
Bristly-stalked Sedge	*Carex leptalea*	S5	Secure
Broom Sedge	*Carex scoparia*	S5	Secure
Three-seeded Sedge	*Carex trisperma*	S5	Secure
Wiegand's Sedge	***Carex wiegandii***	**S3**	**Secure**
Fireweed	*Chamerion angustifolium*	S5	Secure
Common Lamb's Quarters	*Chenopodium album*	SNA	Exotic
Prince's Pine	*Chimaphila umbellata*	S5	Secure
Spotted Water-Hemlock	*Cicuta maculata*	S5	Secure
Small Enchanter's Nightshade	*Circaea alpina*	S5	Secure
Canada Thistle	*Cirsium arvense*	SNA	Exotic
Yellow Bluebead Lily	*Clintonia borealis*	S5	Secure
Sweetfern	*Comptonia peregrina*	S5	Secure
Goldthread	*Coptis trifolia*	S5	Secure
Bunchberry	*Cornus canadensis*	S5	Secure
Red Osier Dogwood	*Cornus sericea*	S5	Secure
Beaked Hazelnut	*Corylus cornuta*	S5	Secure
Pink Lady's Slipper	*Cypripedium acaule*	S5	Secure
Poverty Oat Grass	*Danthonia spicata*	S5	Secure
Smooth Crab Grass	*Digitaria ischaemum*	SNA	Exotic
Hairy Flat-top White Aster	*Doellingeria umbellata*	S5	Secure
Spinulose Wood Fern	*Dryopteris carthusiana*	S5	Secure
Crested Wood Fern	*Dryopteris cristata*	S5	Secure
Evergreen Wood Fern	*Dryopteris intermedia*	S5	Secure

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[a]	PROVINCIAL GENERAL STATUS RANK
Marginal Wood Fern	*Dryopteris marginalis*	S5	Secure
Large Barnyard Grass	*Echinochloa crus-galli*	SNA	Exotic
Blunt Spikerush	*Eleocharis obtusa*	S5	Secure
Quack Grass	*Elymus repens*	SNA	Exotic
willowherb	*Epilobium ciliatum*	S5	Secure
Marsh Willowherb	*Epilobium palustre*	S5	Secure
Broad-leaved Helleborine	*Epipactis helleborine*	SNA	Exotic
Water Horsetail	*Equisetum fluviatile*	S5	Secure
Marsh Horsetail	***Equisetum palustre***	**S3**	**Secure**
Woodland Horsetail	*Equisetum Sylvaticum*	S5	Secure
Variegated Horsetail	*Equisetum variegatum*	S4	Secure
Annual Fleabane	*Erigeron annuus*	S4S5	Secure
Sweet Joe-Pye Weed	*Eupatorium purpureum*	S5	Secure
Common Eyebright	*Euphrasia nemorosa*	SNA	Exotic
Grass-leaved Goldenrod	*Euthamia graminifolia*	S5	Secure
Wild Strawberry	*Fragaria virginiana*	S5	Secure
Black Ash	*Fraxinus nigra*	S4S5	Secure
Common Hemp-nettle	*Galeopsis tetrahit*	SNA	Exotic
Common Marsh Bedstraw	*Galium palustre*	S5	Secure
Three-flowered Bedstraw	*Galium triflorum*	S5	Secure
Black Huckleberry	*Gaylussacia baccata*	S5	Secure
Rattlesnake Mannagrass	*Glyceria canadensis*	S5	Secure
Fowl Manna Grass	*Glyceria striata*	S5	Secure
Common Oak Fern	*Gymnocarpium dryopteris*	S5	Secure
Common Hawkweed	*Hieracium lachenalii*	SNA	Exotic
Northern St John's-Wort	*Hypericum boreale*	S5	Secure
Harlequin Blue Flag	*Iris versicolor*	S5	Secure
Jointed Rush	*Juncus articulatus*	S5	Secure
Narrow-Panicled Rush	*Juncus brevicaudatus*	S5	Secure
Soft Rush	*Juncus effusus*	S5	Secure
Sheep Laurel	*Kalmia angustifolia*	S5	Secure
Tamarack	*Larix laricina*	S5	Secure
Lesser Duckweed	*Lemna minor*	SNA	Exotic
Oxeye Daisy	*Leucanthemum vulgare*	SNA	Exotic
Butter and Eggs	*Linaria vulgaris*	SNA	Exotic
Twinflower	*Linnaea borealis*	S5	Secure
Canada Fly Honeysuckle	*Lonicera canadensis*	S5	Secure
Garden Bird's-foot Trefoil	*Lotus corniculatus*	SNA	Exotic
American Water Horehound	*Lycopus americanus*	S5	Secure
Northern Water Horehound	*Lycopus uniflorus*	S5	Secure
Northern Starflower	*Lysimachia borealis*	S5	Secure
Swamp Candles	*Lysimachia terrestris*	S5	Secure
Canada Mayflower	*Maianthemum canadense*	S5	Secure
Starry False Solomon's Seal	*Maianthemum stellatum*	S4S5	Secure
Three-leaved False Soloman's Seal	*Maianthemum trifolium*	S5	Secure
Pineapple Weed	*Matricaria discoidea*	SNA	Exotic
Indian Cucumber Root	*Medeola virginiana*	S5	Secure
Yellow Sweet Clover	*Melilotus officinalis*	SNA	Exotic
Naked Bishop's-Cap	*Mitella nuda*	S5	Secure
Indian Pipe	*Monotropa uniflora*	S5	Secure
forget me not	*Myosotis arvensis*	SNA	Exotic
Mountian Holly	*Nemopanthus mucronatus*	S5	Secure

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[(a)]	PROVINCIAL GENERAL STATUS RANK
Whorled Wood Aster	*Oclemena acuminata*	S5	Secure
Red Bartsia	*Odontites vulgaris*	SNA	Exotic
Common Evening Primrose	*Oenothera biennis*	S5	Secure
Sensitive Fern	*Onoclea sensibilis*	S5	Secure
One-sided wintergreen	*Orthilia secunda*	S5	Secure
Cinnamon Fern	*Osmunda cinnamomea*	S5	Secure
Inturrupted Fern	*Osmunda claytoniana*	S5	Secure
Common Wood Sorrel	*Oxalis montana*	S5	Secure
Common Witch Grass	*Panicum capillare*	S5	Secure
Northern Beech Fern	*Phegopteris connectilis*	S5	Secure
Common Timothy	*Phleum pratense*	SNA	Exotic
Black Spruce	*Picea mariana*	S5	Secure
Club Spur Orchid	*Platanthera clavellata*	S4S5	Secure
White Fringed Orchid	***Platanthera blephariglottis***	**S3**	**Secure**
Eurasian Black Bindweed	*Polygonum convolvulus*	SNA	Exotic
False Waterpepper	*Polygonum hydropiperoides*	S4	Secure
Spotted Lady's-thumb	*Polygonum persicaria*	SNA	Exotic
Balsam Poplar	*Populus balsamifera*	S5	Secure
Trembling Aspen	*Populus tremuloides*	S5	Secure
Rough Cinquefoil	*Potentilla norvegica*	S5	Secure
Field Ciniquifoil	*Potentilla simplex*	S5	Secure
Self-heal	*Prunella vulgaris*	S5	Secure
Pin Cherry	*Prunus pensylvanica*	S5	Secure
Bracken Fern	*Pteridium aquilinum*	S5	Secure
Round-leaf Pyrola	*Pyrola americana*	S4S5	Secure
Common Buttercup	*Ranunculus acris*	SNA	Exotic
Rhodora	*Rhododendron canadense*	S5	Secure
Skunk Currant	*Ribes glandulosum*	S5	Secure
Shining Rose	*Rosa nitida*	S5	Secure
Alleghaney Blackberry	*Rubus allegheniensis*	S5	Secure
Red raspberry	*Rubus idaeus*	S5	Secure
Dwarf Red Raspberry	*Rubus pubescens*	S5	Secure
Long-leaved Dock	*Rumex longifolius*	SNA	Exotic
Bebb's Willow	*Salix Bebbiana*	S5	Secure
Pussy Willow	*Salix discolor*	S5	Secure
Shining willow	*Salix lucida*	S5	Secure
Black Elderberry	*Sambucus nigra*	S5	Secure
River Bulrush	***Schoenoplectus fluviatilis***	**S3**	**Sensitive**
Black-girdled Bulrush	*Scirpus atrocinctus*	S5	Secure
Woolgrass	*Scirpus cyperinus*	S5	Secure
Tansy Ragwort	*Senecio jacobaea*	SNA	Exotic
Sticky Ragwort	*Senecio viscosus*	SNA	Exotic
Three-Toothed Cinquefoil	*Sibbaldiopsis tridentata*	S5	Secure
Canada Goldenrod	*Solidago canadensis*	S5	Secure
Zigzag Goldenrod	*Solidago flexicaulis*	S5	Secure
Rough-stemmed Goldenrod	*Solidago rugosa*	S5	Secure
Sow Thistle	*Sonchus arvensis*	SNA	Exotic
American Mountian Ash	*Sorbus americana*	S5	Secure
White Meadowsweet	*Spiraea alba*	S5	Secure
Steeplebush	*Spiraea tomentosa*	S5	Secure
Purple Stemmed Aster	*Symphyotrichum puniceum*	S5	Secure
Common dandelion	*Taraxacum officinale*	SNA	Exotic

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[(a)]	PROVINCIAL GENERAL STATUS RANK
Canada Yew	*Taxus canadensis*	S5	Secure
Tall Meadow-rue	*Thalictrum pubescens*	S5	Secure
Eastern White Cedar	*Thuja occidentalis*	S5	Secure
Marsh St Johns Wort	*Triadenum fraseri*	S5	Secure
Yellow Clover	*Trifolium aureum*	SNA	Exotic
Rabbits foot clover	*Trifolium arvense*	SNA	Exotic
Red Clover	*Trifolium pratense*	SNA	Exotic
Painted Trillium	*Trillium undulatum*	S5	Secure
Coltsfoot	*Tussilago farfara*	SNA	Exotic
Narrow-leaved Cattail	*Typha angustifolia*	S5	Secure
Lowbush Blueberry	*Vaccinium angustifolium*	S5	Secure
Velvet-leaved Blueberry	*Vaccinium myrtilloides*	S5	Secure
Small Cranberry	*Vaccinium oxycoccos*	S5	Secure
Northern Wild Raisin	*Viburnum nudum*	S5	Secure
Cow Vetch	*Vicia cracca*	SNA	Exotic
Marsh Blue Violet	*Viola cucullata*	S5	Secure

Notes: Species of Conservation Concern are highlighted in **bold**.
None of these species are designated by COSEWIC, or protected by SARA or NB SARA

(a) Provincial Rarity Rank, where:
S3 - Uncommon in province
S4 - Widespread, common and apparently secure in province
S5 - Widespread, abundant and demonstrably secure in province
S#S# - A numeric range rank is used to indicate any range of uncertainty about the status of the species or community.
SNA - Ranking not applicable in province

Table B-2 Master Plant List for the Tapline Study Area

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[(a)]	PROVINCIAL GENERAL STATUS RANK
Balsam Fir	*Abies balsamea*	S5	Secure
Striped Maple	*Acer pensylvanicum*	S5	Secure
Red Maple	*Acer rubrum*	S5	Secure
Silver Maple	*Acer saccharinum*	S4	Secure
Mountain Maple	*Acer spicatum*	S5	Secure
Northern Yarrow	*Achillea borealis*	S5	Secure
Red Baneberry	*Actaea rubra*	S5	Secure
Upland Bent Grass	*Agrostis perennans*	S5	Secure
Speckled Alder	*Alnus incana*	S5	Secure
Short-awned Foxtail	*Alopecurus aequalis*	S4S5	Secure
Common Ragweed	*Ambrosia artemisiifolia*	S5	Secure
Bartram's Serviceberry	*Amelanchier bartramiana*	S5	Secure
Pearly Everlasting	*Anaphalis margaritacea*	S5	Secure
Canada Anemone	*Anemonastrum canadense*	S5	Secure
Spreading Dogbane	*Apocynum androsaemifolium*	S5	Secure
Wild Sarsaparilla	*Aralia nudicaulis*	S5	Secure
Jack-in-the-pulpit	*Arisaema triphyllum*	S5	Secure
Common Lady Fern	*Athyrium felix-femina*	S5	Secure
Yellow Birch	*Betula alleghaniensis*	S5	Secure
Heart-leaved Birch	*Betula cordifolia*	S5	Secure
Devil's Beggarticks	*Bidens frondosa*	S5	Secure
Bearded Short-husk	*Brachyelytrum erectum*	SH	Undetermined
Bluejoint Reed Grass	*Calamagrostis canadensis*	S5	Secure
Yellow Marsh Marigold	*Caltha palustris*	S4S5	Secure
Black Sedge	*Carex arctata*	S5	Secure
Brownish Sedge	*Carex brunnescens*	S5	Secure
Silvery Sedge	*Carex canescens*	S5	Secure

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[a]	PROVINCIAL GENERAL STATUS RANK
Fibrous-Root Sedge	*Carex communis*	S5	Secure
White-edged Sedge	*Carex debilis*	S5	Secure
Dewey's Sedge	*Carex deweyana*	S5	Secure
Two-seeded Sedge	*Carex disperma*	S5	Secure
Star Sedge	*Carex echinata*	S5	Secure
Nodding Sedge	*Carex gynandra*	S5	Secure
Bladder Sedge	*Carex intumescens*	S5	Secure
Bristly-stalked Sedge	*Carex leptalea*	S5	Secure
Sallow Sedge	*Carex lurida*	S5	Secure
Boreal Bog Sedge	*Carex magellanica*	S5	Secure
New England Sedge	*Carex novae-angliae*	S5	Secure
Cyperuslike Sedge	*Carex pseudocyperus*	S5	Secure
Broom Sedge	*Carex scoparia*	S5	Secure
Awl-fruited Sedge	*Carex stipata*	S5	Secure
Blunt Broom Sedge	*Carex tribuloides*	S4S5	Secure
Three-seeded Sedge	*Carex trisperma*	S5	Secure
Black Knapweed	*Centaurea nigra*	SNA	Exotic
Leatherleaf	*Chamaedaphne calyculata*	S5	Secure
Fireweed	*Chamaenerion angustifolium*	S5	Secure
White Turtlehead	*Chelone glabra*	S5	Secure
Common Lamb's Quarters	*Chenopodium album*	SNA	Exotic
Common Pipsissewa	*Chimaphila umbellata*	S5	Secure
Spotted Water-Hemlock	*Cicuta maculata*	S5	Secure
Small Enchanter's Nightshade	*Circaea alpina*	S5	Secure
Virginia Clematis	*Clematis virginiana*	S5	Secure
Yellow Bluebead Lily	*Clintonia borealis*	S5	Secure
Goldthread	*Coptis trifolia*	S5	Secure
Spotted Coralroot	***Corallorhiza maculata***	**S3S4**	**Sensitive**
Alternate-leaved Dogwood	*Cornus alternifolia*	S5	Secure
Bunchberry	*Cornus canadensis*	S5	Secure
Red Osier Dogwood	*Cornus sericea*	S5	Secure
Beaked Hazel	*Corylus cornuta*	S5	Secure
a Hawthorn	*Crataegus spp.*	-	-
Pink Lady's-Slipper	*Cypripedium acaule*	S5	Secure
Poverty Oat Grass	*Danthonia spicata*	S5	Secure
Round-branched Tree-clubmoss	*Dendrolycopodium dendroideum*	S5	Secure
Woolly Panic Grass	*Dichanthelium acuminatum*	SNA	Exotic
Northern Panic Grass	*Dichanthelium boreale*	S5	Secure
Northern Bush Honeysuckle	*Diervilla lonicera*	S5	Secure
Hairy Flat-top White Aster	*Doellingeria umbellata*	S5	Secure
Spinulose Wood Fern	*Dryopteris carthusiana*	S5	Secure
Crested Wood Fern	*Dryopteris cristata*	S5	Secure
Evergreen Wood Fern	*Dryopteris intermedia*	S5	Secure
Trailing Arbutus	*Epigaea repens*	S5	Secure
Helleborine	*Epipactis helleborine*	SNA	Exotic
Field Horsetail	*Equisetum arvense*	S5	Secure
Woodland Horsetail	*Equisetum sylvaticum*	S5	Secure
Spotted Spurge	*Euphorbia maculata*	SNA	Exotic
Low Rough Aster	*Eurybia radula*	S5	Secure
Grass-leaved Goldenrod	*Euthamia graminifolia*	S5	Secure
American Beech	*Fagus grandifolia*	S4	Secure
Fringed Black Bindweed	*Fallopia cilinodis*	S5	Secure

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[a]	PROVINCIAL GENERAL STATUS RANK
Red Fescue	*Festuca rubra*	S5	Secure
Wild Strawberry	*Fragaria virginiana*	S5	Secure
White Ash	*Fraxinus americana*	S4S5	Secure
Common Hemp-nettle	*Galeopsis tetrahit*	SNA	Exotic
Rough Bedstraw	*Galium asprellum*	S5	Secure
Three-petaled Bedstraw	*Galium trifidum*	S5	Secure
Creeping Snowberry	*Gaultheria hispidula*	S5	Secure
Eastern Teaberry	*Gaultheria procumbens*	S5	Secure
Black Huckleberry	*Gaylussacia baccata*	S5	Secure
Water Avens	*Geum rivale*	S5	Secure
Canada Manna Grass	*Glyceria canadensis*	S5	Secure
Rough Manna Grass	*Glyceria maxima*	SNA	Exotic
Slender Manna Grass	*Glyceria melicaria*	S5	Secure
Fowl Manna Grass	*Glyceria striata*	S5	Secure
Common Oak Fern	*Gymnocarpium dryopteris*	S5	Secure
Common Hawkweed	*Hieracium lachenalii*	SNA	Exotic
a hop plant	*Humulus spp.*	-	-
Fraser's St. John's-wort	*Hypericum fraseri*	S5	Secure
Common St. John's-wort	*Hypericum perforatum*	SNA	Exotic
Pinesap	*Hypopitys monotropa*	S4	Secure
Mountain Holly	*Ilex mucronata*	S5	Secure
Common Winterberry	*Ilex verticillata*	S5	Secure
Spotted Jewelweed	*Impatiens capensis*	S5	Secure
Harlequin Blue Flag	*Iris versicolor*	S5	Secure
Soft Rush	*Juncus effusus*	S5	Secure
Knotted Rush	*Juncus nodosus*	S4S5	Secure
Slender Rush	*Juncus tenuis*	S5	Secure
Sheep Laurel	*Kalmia angustifolia*	S5	Secure
Tall Blue Lettuce	*Lactuca biennis*	S5	Secure
Canada Nettle	*Laportea canadensis*	S5	Secure
Tamarack	*Larix laricina*	S5	Secure
Rice Cut Grass	*Leersia oryzoides*	S5	Secure
Oxeye Daisy	*Leucanthemum vulgare*	SNA	Exotic
Twinflower	*Linnaea borealis*	S5	Secure
Tall Fescue	*Lolium arundinaceum*	SNA	Exotic
Canada Fly Honeysuckle	*Lonicera canadensis*	S5	Secure
Mountain Fly Honeysuckle	*Lonicera villosa*	S5	Secure
Garden Bird's-foot Trefoil	*Lotus corniculatus*	SNA	Exotic
Common Woodrush	*Luzula multiflora*	S5	Secure
Stiff Clubmoss	*Lycopodium annotinum*	S5	Secure
Northern Water Horehound	*Lycopus uniflorus*	S5	Secure
Northern Starflower	*Lysimachia borealis*	S5	Secure
Swamp Yellow Loosestrife	*Lysimachia terrestris*	S5	Secure
Wild Lily-of-The-Valley	*Maianthemum canadense*	S5	Secure
Starry False Solomon's Seal	*Maianthemum stellatum*	S4S5	Secure
Three-leaved False Soloman's Seal	*Maianthemum trifolium*	S5	Secure
Pineapple Weed	*Matricaria matricariodes*	SNA	Exotic
Ostrich Fern	*Matteuccia struthiopteris*	S5	Secure
American Cow Wheat	*Melampyrum lineare*	S5	Secure
Yellow Sweet-clover	*Melilotus officinalis*	SNA	Exotic
Partridgeberry	*Mitchella repens*	S5	Secure
Naked Bishop's-Cap	*Mitella nuda*	S5	Secure

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[(a)]	PROVINCIAL GENERAL STATUS RANK
Convulsion-Root	*Monotropa uniflora*	S5	Secure
Three-leaved Rattlesnakeroot	*Nabalus trifoliolatus*	S5	Secure
Broad-Lip Twayblade	*Neottia convallarioides*	S4	Secure
Common Evening Primrose	*Oenothera biennis*	S5	Secure
Sensitive Fern	*Onoclea sensibilis*	S5	Secure
One-sided Wintergreen	*Orthilia secunda*	S5	Secure
Cinnamon Fern	*Osmunda cinnamomea*	S5	Secure
Interrupted Fern	*Osmunda claytoniana*	S5	Secure
Common Wood Sorrel	*Oxalis montana*	S5	Secure
False Waterpepper	*Persicaria hydropiperoides*	S4	Secure
Northern Beech Fern	*Phegopteris connectilis*	S5	Secure
Common Timothy	*Phleum pratense*	SNA	Exotic
White Spruce	*Picea glauca*	S5	Secure
Black Spruce	*Picea mariana*	S5	Secure
Red Spruce	*Picea rubens*	S5	Secure
Meadow Hawkweed	*Pilosella caespitosa*	SNA	Exotic
Jack Pine	*Pinus banksiana*	S5	Secure
Eastern White Pine	*Pinus strobus*	S5	Secure
Common Plantain	*Plantago major*	SNA	Exotic
Small Purple Fringed Orchid	*Platanthera psycodes*	S4	Secure
Canada Blue Grass	*Poa compressa*	SNA	Exotic
Fowl Blue Grass	*Poa palustris*	S5	Secure
Kentucky Blue Grass	*Poa pratensis*	S5	Secure
Mild Water-pepper	*Polygonum hydropiperoides*	S5	Secure
Balsam Poplar	*Populus balsamifera*	S5	Secure
Large-toothed Aspen	*Populus grandidentata*	S5	Secure
Trembling Aspen	*Populus tremuloides*	S5	Secure
Old Field Cinquefoil	*Potentilla simplex*	S5	Secure
Common Self-heal	*Prunella vulgaris*	S5	Secure
Black Cherry	*Prunus serotina*	S5	Secure
Bracken Fern	*Pteridium aquilinum*	S5	Secure
Pink Pyrola	*Pyrola asarifolia*	S5	Secure
Shinleaf	*Pyrola elliptica*	S5	Secure
Lesser Pyrola	*Pyrola minor*	S3	Secure
Northern Red Oak	*Quercus rubra*	S5	Secure
Kidney-Leaved Buttercup	*Ranunculus abortivus*	S5	Secure
Common Buttercup	*Ranunculus acris*	SNA	Exotic
Gmelin's Water Buttercup	***Ranunculus gmelinii***	**S3**	**Secure**
Creeping Buttercup	*Ranunculus repens*	SNA	Exotic
Little Yellow Rattle	*Rhinanthus minor*	SNA	Secure
Rhodora	*Rhododendron canadense*	S5	Secure
Common Labrador Tea	*Rhododendron groenlandicum*	S5	Secure
Skunk Currant	*Ribes glandulosum*	S5	Secure
Smooth Gooseberry	*Ribes hirtellum*	S5	Secure
Bristly Black Currant	*Ribes lacustre*	S5	Secure
Swamp Red Currant	*Ribes triste*	S5	Secure
Bog Yellowcress	*Rorippa palustris*	S5	Secure
Carolina Rose	*Rosa carolina*	S4S5	Secure
Alleghaney Blackberry	*Rubus allegheniensis*	S5	Secure
Red Raspberry	*Rubus idaeus*	S5	Secure
Dwarf Red Raspberry	*Rubus pubescens*	S5	Secure
Dewdrop	*Rubus repens*	S5	Secure

COMMON NAME	SCIENTIFIC NAME	PROVINCIAL RARITY RANK[(a)]	PROVINCIAL GENERAL STATUS RANK
Black-Eyed Susan	*Rudbeckia hirta*	SNA	Exotic
Sheep Sorrel	*Rumex acetosella*	SNA	Exotic
Bebb's Willow	*Salix bebbiana*	S5	Secure
Pussy Willow	*Salix discolor*	S5	Secure
Red Elderberry	*Sambucus racemosa*	S5	Secure
Black-girdled Bulrush	*Scirpus atrocinctus*	S5	Secure
Common Woolly Bulrush	*Scirpus cyperinus*	S5	Secure
Mosquito Bulrush	*Scirpus hattorianus*	S5	Secure
Small-fruited Bulrush	*Scirpus microcarpus*	S5	Secure
Marsh Skullcap	*Scutellaria galericulata*	S5	Secure
Mad-dog Skullcap	*Scutellaria lateriflora*	S5	Secure
Common Water Parsnip	*Sium suave*	S5	Secure
Canada Goldenrod	*Solidago canadensis*	S5	Secure
Zigzag Goldenrod	*Solidago flexicaulis*	S5	Secure
Downy Goldenrod	*Solidago puberula*	S5	Secure
Rough-stemmed Goldenrod	*Solidago rugosa*	S5	Secure
Field Sow Thistle	*Sonchus arvensis*	SNA	Exotic
American Mountain Ash	*Sorbus americana*	S5	Secure
Ruby Sandspurrey	*Spergularia rubra*	SNA	Exotic
White Meadowsweet	*Spiraea alba*	S5	Secure
Clasping-leaved Twisted-stalk	*Streptopus amplexifolius*	S5	Secure
Purple-stemmed Aster	*Symphyotrichum puniceum*	S5	Secure
Common Tansy	*Tanacetum vulgare*	SNA	Exotic
Canada Yew	*Taxus canadensis*	S5	Secure
Tall Meadow-Rue	*Thalictrum pubescens*	S5	Secure
New York Fern	*Thelypteris noveboracensis*	S5	Secure
Eastern Marsh Fern	*Thelypteris palustris*	S5	Secure
Eastern White Cedar	*Thuja occidentalis*	S5	Secure
Heart-leaved Foamflower	*Tiarella cordifolia*	S4	Secure
Alsike Clover	*Trifolium hybridum*	SNA	Exotic
Red Clover	*Trifolium pratense*	SNA	Exotic
Nodding Trillium	*Trillium cernuum*	S5	Secure
Painted Trillium	*Trillium undulatum*	S5	Secure
Coltsfoot	*Tussilago farfara*	SNA	Exotic
Narrow-Leaved Cattail	*Typha angustifolia*	S5	Secure
Broad-leaved Cattail	*Typha latifolia*	S5	Secure
Late Lowbush Blueberry	*Vaccinium angustifolium*	S5	Secure
Velvet-leaved Blueberry	*Vaccinium myrtilloides*	S5	Secure
Common Mullein	*Verbascum thapsus*	SNA	Exotic
Marsh Speedwell	*Veronica scutellata*	S5	Secure
Thyme-Leaved Speedwell	*Veronica serpyllifolia*	SNA	Secure
Hobblebush	*Viburnum lantanoides*	S5	Secure
Northern Wild Raisin	*Viburnum nudum*	S5	Secure
Highbush Cranberry	*Viburnum opulus*	S4	Secure
Tufted Vetch	*Vicia cracca*	SNA	Exotic
Marsh Blue Violet	*Viola cucullata*	S5	Secure

Notes: Species of Conservation Concern are highlighted in bold.
None of these species are designated by COSEWIC, or protected by SARA or NB SARA

(a) Provincial Rarity Rank, where:
S3 - Uncommon in province
S4 - Widespread, common and apparently secure in province
S5 - Widespread, abundant and demonstrably secure in province
S#S# - A numeric range rank is used to indicate any range of uncertainty about the status of the species or community.
SH - Historically occurring but currently undetected in province
SNA - Ranking not applicable in province

C WETLAND DELINEATION DATA SHEETS

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 5, 2018 | Sample Point: W2-A wet

Applicant/Owner: Naveo | Field Investigator(s): Derrick Mitchell / Christina Lafkamme

County: Gloucester | Coordinates: 20T 341926.88 mE 5298618.89 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Type: Forested Swamp Complex

Rational for Determination: Canadian Wetland Classification System (CWCS)

Wetland Determination

YES ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	70	✓	fac
2.			
3.			
4.			
5.			
	70 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Alnus incana	50	✓	facw
2.			
3.			
4.			
5.			
	50 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Athyrium filix-femina	30	✓	fac
2. Onoclea sensibilis	20	✓	facw
3. Rubus pubescens	10		fac
4. Thalictrum pubescens	5		facw
5. Glyceria striata	3		facw
	81 = Total Cover		
Doellingeria umbellata	2		fac
Phegopteris connectilis	5		fac
Oclemena acuminata	3		facu
Carex leptalea	3		facw

Comments: N/A

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 4 (A)

Total # of Dominant Species across all strata: 4 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	81	x2 =	162
FAC Species	117	x3 =	351
FACU Specie	3	x4 =	12
UPL Species	0	x5 =	0
Column Totals:	201	x1 =	525

Prevalence Index = B/A = 2.61

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- ✓ Water Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron reduction in tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes ✓ No___ Depth 5cm

Saturation Present? Yes ✓ No___ Depth 0cm

Wetland Hydrology Present? Yes ✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3		100					organic	
3-21	7.5yr 5/2	95	7.5yr 6/4	5	D	M	sandy	
21-32	Gley1	75	7.5yr 6/4	25	D	M	clay	
32-	clay						clay	restrictive layer

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Suflide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ 5cm Mucky Peat or Peat (S3)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surfaces (S7)
- __ Polyvalue Below Surface (S8)
- __ Thin Dark Surface (S9)
- __ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Restrictive Layer (if observed): Type Clay Depth: 32cm

Hydric Soil Present? Yes ✓ No___

Comments: Confining layer of clay

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 5, 2018 | Sample Point: WL-A up
Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell / Christina LaFlamme
County: Gloucester | Coordinates: 20T 341916.03 mE 5298613.77 mN
PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐
if no explain:
Atypical Situation? Yes ☐ No ☑ Explain
Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) — Yes ☑ No ☐
Wetland Hydrology — Yes ☐ No ☑
Hydric Soils — Yes ☐ No ☑
Wetland Type:
Rational for Determination:

Wetland Determination
YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Betula papyrifera	35	✓	facu
2. Acer rubrum	25	✓	fac
3. Abies balsamea	5		fac
4.			
5.			
	65 = Total Cover		

Shrub Stratum: (Plot size: 5 m²)			
1. Abies balsamea	25	✓	fac
2. Viburnum nudum	5		fac
3.			
4.			
5.			
	30 = Total Cover		

Herb Stratum: (Plot size: 1 m²)			
1. Aralia nudicaulis	25	✓	fac
2. Maianthemum canadense	25	✓	fac
3. Cornus canadensis	20	✓	fac
4. Coptis trifolia	5		fac
5. Trientalis borealis	2		fac
	79 = Total Cover		
Oclemena acuminata	2		facu

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 6 (B)

% of Dominant Species that are OBL,FACW,FAC: 83 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	0	x2 =	0
FAC Species	137	x3 =	411
FACU Specie	37	x4 =	148
UPL Species	0	x5 =	0
Column Totals:	174	x1 =	559

Prevalence Index = B/A = 3.21

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (explain)
__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Hydrophytic Vegetation Present? Yes ✓ No

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes___ No ✓ Depth___

Saturation Present? Yes___ No ✓ Depth___

Wetland Hydrology Present? Yes___ No ✓

Comments:_____

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5		100					organic	
5-43	7.5yr 5/1	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes___ No ✓

Comments: Low chroma soil, but no redoximorphic features present

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 4, 2018 | Sample Point: WL-B wet

Applicant/Owner: Pavesa | Field Investigator(s): Derrick Mitchell / Christina LaFlamme

County: Gloucester | Coordinates: 20T 343192.38mE 5296717.47mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Type: Forested Swamp Complex

Rational for Determination: CWCS

Wetland Determination

YES ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	35	✓	fac
2. Abies balsamea	15	✓	fac
3. Larix laricina	10		fac
4.			
5.			
	60 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Alnus incana	20	✓	facw
2. Abies balsamea	10	✓	fac
3. Betula papyrifera	5		facu
4. Acer rubrum	5		fac
5.			
	40 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Calamagrostis canadensis	20	✓	facw
2. Doellingeria umbellata	15		fac
3. Equisetum sylvaticum	5		fac
4. Carex trisperma	15		obl
5. Viola cucullata	10		fac
	80 = Total Cover		
Trientalis borealis	10		fac
Carex canescens	5		obl

Comments: N/A

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 5 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x1 =	20
FACW Species	40	x2 =	80
FAC Species	115	x3 =	345
FACU Specie	5	x4 =	20
UPL Species	0	x5 =	0
Column Totals:	180	x1 =	465

Prevalence Index = B/A = 2.58

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- ✓ Water Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron reduction in tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes ✓ No___ Depth 25cm

Saturation Present? Yes ✓ No___ Depth 0cm

Wetland Hydrology Present? Yes ✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-22		100					organic	
22-65	7.5yr 4/1	95	7.5yr 6/3	5	RM	M	sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- __ Histosol (A1)
- ✓ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Suflide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ 5cm Mucky Peat or Peat (S3)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surfaces (S7)
- __ Polyvalue Below Surface (S8)
- __ Thin Dark Surface (S9)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes ✓ No___

Comments: No restrictive layer

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 4, 2018 | Sample Point: WL-B up

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell / Christina LaFlamme

County: Gloucester | Coordinates: 20T 343211.59mE 5296723.98 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☐ No ☑

Hydric Soils Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	35	✓	fac
2. Abies balsamea	10		fac
3. Betula papyrifera	20	✓	facu
4.			
5.			
	65 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Viburnum nudum	5	✓	fac
2. Acer rubrum	5	✓	fac
3.			
4.			
5.			
	10 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Dryopteris intermedia	20	✓	fac
2. Aralia nudicaulis	20	✓	fac
3. Clintonia borealis	15	✓	fac
4. Pteridium aquilinum	10		facu
5. Ribes glandulosum	5		fac
	73 = Total Cover		
Oclemena acuminata	3		facu

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 6 (A)

Total # of Dominant Species across all strata: 7 (B)

% of Dominant Species that are OBL,FACW,FAC: 85.7 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	0	x2 =	0
FAC Species	115	x3 =	345
FACU Specie	33	x4 =	132
UPL Species	0	x5 =	0
Column Totals:	148	x1 =	477

Prevalence Index = B/A = 3.22

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes___ No ✓ Depth___

Saturation Present? Yes___ No ✓ Depth___

Wetland Hydrology Present? Yes___ No ✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8		100					organic	
8-28	7.5yr 4/1	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type Rock Depth: 28cm

Hydric Soil Present? Yes___ No ✓

Comments: low chroma soil, but no redoximorphic features present

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 6, 2018 | Sample Point: W2-C wet

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell / Christina LaFlamme

County: Gloucester | Coordinates: 20T 343586.05mE 5298770.07mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Type: Forested Wetland Complex

Rational for Determination: CWCS

Wetland Determination

YES ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Picea mariana	80	✓	facw
2.			
3.			
4.			
5.			
	80 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Picea mariana	10	✓	facw
2. Nemopanthus mucronatus	20	✓	fac
3. Kalmia angustifolia	5		fac
4. Vaccinium myrtilloides	1		fac
5.			
	36 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Maianthemum trifolium	25	✓	obl
2. Carex trisperma	30	✓	obl
3. Osmunda cinnamomea	5		fac
4.			
5.			
	60 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 5 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	55	x1 =	55
FACW Species	90	x2 =	180
FAC Species	31	x3 =	93
FACU Specie	0	x4 =	0
UPL Species	0	x5 =	0
Column Totals:	176	x1 =	328

Prevalence Index = B/A = 1.86

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: N/A

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- ✓ Water Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron reduction in tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes ✓ No___ Depth___

Saturation Present? Yes ✓ No___ Depth 0cm

Wetland Hydrology Present? Yes ✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-36		100					organic	
36-							sandy	too wet to colour

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- __ Histosol (A1)
- ✓ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Suflide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ 5cm Mucky Peat or Peat (S3)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surfaces (S7)
- __ Polyvalue Below Surface (S8)
- __ Thin Dark Surface (S9)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes ✓ No___

Comments: Soil too wet to colour (really dark and mucky).

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 6, 2018 | Sample Point: WL-6 up

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell / Christina LaFlamme

County: Gloucester | Coordinates: 20T 343600.74 mE 5298777.27 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☐ No ☑

Hydric Soils Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	30	✓	fac
2. Abies balsamea	20	✓	fac
3. Betula papyrifera	20	✓	facu
4.			
5.			
	70 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Picea mariana	5	✓	facw
2. Acer rubrum	2		fac
3. Abies balsamea	5	✓	fac
4.			
5.			
	12 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Pteridium aquilinum	20	✓	facu
2. Clintonia borealis	3		fac
3. Halanthemum canadense	5		fac
4.			
5.			
	28 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 6 (B)

% of Dominant Species that are OBL,FACW,FAC: 83 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	5	x2 =	10
FAC Species	65	x3 =	195
FACU Specie	40	x4 =	160
UPL Species	0	x5 =	0
Column Totals:	110	x1 =	365

Prevalence Index = B/A = 3.32

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes___ No✓ Depth___

Saturation Present? Yes___ No✓ Depth___

Wetland Hydrology Present? Yes___ No✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6		100					organic	
6-16	7.5yr 5/1	100					sandy	
16-28	7.5yr 6/4	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type Rock Depth: 28cm

Hydric Soil Present? Yes___ No✓

Comments: layer from 6-16cm has a low chroma, but no redoximorphic features

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 11, 2018 | Sample Point: WL-D wet

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell / Christina Laflamme

County: Gloucester | Coordinates: 20T 343129.33mE 5298609.10 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Type: Coniferous Swamp

Rational for Determination: CWCS

Wetland Determination

YES ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Picea mariana	65	✓	facw
2. Acer rubrum	5		fac
3. Larix laricina	5		fac
4.			
5.			
	75 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Picea mariana	5	✓	facw
2. Viburnum nudum	5	✓	fac
3. Nemopanthus mucronatus	2		fac
4.			
5.			
	12 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Osmunda cinnamomea	25	✓	fac
2. Carex trisperma	60	✓	obl
3. Maianthemum trifolium	10		obl
4.			
5.			
	95 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 5 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	70	x1 =	70
FACW Species	70	x2 =	140
FAC Species	42	x3 =	126
FACU Specie	0	x4 =	0
UPL Species	0	x5 =	0
Column Totals:	182	x1 =	336

Prevalence Index = B/A = 1.85

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: N/A

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
✓ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes___ No✓ Depth___

Saturation Present? Yes✓ No___ Depth 0cm

Wetland Hydrology Present? Yes✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-40		100					organic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

✓ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes✓ No___

Comments: No restrictive layer within 40 cm of surface

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 11, 2018 | Sample Point: WL-D up

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell / Christina LaFlamme

County: Gloucester | Coordinates: 20T 343140.48 mE 5298619.85 mN

PID: | Do normal environmental conditions exist on-site? Yes ☐ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☐ No ☑

Hydric Soils Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Abies balsamea	25	✓	fac
2. Acer rubrum	15	✓	fac
3. Betula papyrifera	20	✓	facu
4. Picea mariana	10		facw
5.			
	70 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Abies balsamea	35	✓	fac
2. Betula papyrifera	10	✓	facu
3. Picea mariana	5		facw
4.			
5.			
	50 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Maianthemum canadense	25	✓	fac
2. Aralia nudicaulis	15	✓	fac
3. Cornus canadensis	5		fac
4. Pteridium aquilinum	5		facu
5. Linnaea borealis	10		fac
	60 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 7 (B)

% of Dominant Species that are OBL,FACW,FAC: 71.4 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	15	x2 =	30
FAC Species	130	x3 =	390
FACU Specie	35	x4 =	140
UPL Species	0	x5 =	0
Column Totals:	180	x1 =	560

Prevalence Index = B/A = 3.11

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes___ No✓ Depth___

Saturation Present? Yes___ No✓ Depth___

Wetland Hydrology Present? Yes___ No✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5		100					organic	
5-10	7.5yr 5/1	100					sandy	
10-42	7.5yr 4/6	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes___ No✓

Comments: No restrictive layer within 40cm of the surface.
Layer from 5-10cm is depleted, but no redoximorphic features present

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- ✓ Water Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron reduction in tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes___ No ✓ Depth___

Saturation Present? Yes ✓ No___ Depth 10cm

Wetland Hydrology Present? Yes ✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8		100					organic	
8-40	7.5yr 5/1	90	7.5yr 6/4	10	RM	M	sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Suflide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ 5cm Mucky Peat or Peat (S3)
- __ Sandy Gleyed Matrix (S4)
- ✓ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surfaces (S7)
- __ Polyvalue Below Surface (S8)
- __ Thin Dark Surface (S9)
- __ Loamy Gleyed Matrix (F2)
- __ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Restrictive Layer (if observed): Type Rock Depth: 32cm

Hydric Soil Present? Yes ✓ No___

Comments:

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 11, 2018 | Sample Point: WL-E wet

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell / Christina Laflamme

County: Gloucester | Coordinates: 20T 343303.44mE 5298926.24mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☑ No ☐ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Type: Deciduous Swamp

Rational for Determination: CWCS

Wetland Determination

YES ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	40	✓	fac
2. Abies balsamea	20	✓	fac
3. Betula papyrifera	15		facu
4. Thuja occidentalis	3		facw
5.			
	78 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Abies balsamea	2		fac
2. Alnus incana	5	✓	fac
3. Sorbus americana	2		fac
4. Viburnum nudum	5	✓	fac
5.			
	14 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Oclemena acuminata	15	✓	facu
2. Iris versicolor	10		facw
3. Carex canescens	3		obl
4. Osmunda cinnamomea	15	✓	fac
5. Clintonia borealis	10		fac
	61 = Total Cover		
Aralia nudicaulis	5		fac
Maianthemum trifolium	3		obl

Comments: N/A

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 6 (B)

% of Dominant Species that are OBL,FACW,FAC: 83 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	6	x1 =	6
FACW Species	13	x2 =	26
FAC Species	104	x3 =	312
FACU Specie	30	x4 =	120
UPL Species	0	x5 =	0
Column Totals:	153	x1 =	464

Prevalence Index = B/A = 3.03

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 11, 2018 | Sample Point: WL-E up
Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell / Christina LaFlamme
County: Gloucester | Coordinates: 20T 343309.71mE 5298912.00 mN
PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐
if no explain:
Atypical Situation? Yes ☐ No ☑ Explain
Is this a potential **Problem Area?** Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) — Yes ☑ No ☐
Wetland Hydrology — Yes ☐ No ☑
Hydric Soils — Yes ☐ No ☑
Wetland Type:
Rational for Determination:

Wetland Determination
YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	65	✓	fac
2. Abies balsamea	5		fac
3.			
4.			
5.			
	70 = Total Cover		

Shrub Stratum: (Plot size: 5 m²)			
1. Acer rubrum	10		fac
2. Abies balsamea	20	✓	fac
3. Viburnum nudum	15	✓	fac
4. Thuja occidentalis	10		facw
5.			
	55 = Total Cover		

Herb Stratum: (Plot size: 1 m²)			
1. Dryopteris intermedia	25	✓	fac
2. Cornus canadensis	20	✓	fac
3. Clintonia borealis	15	✓	fac
4. Aralia nudicaulis	5		fac
5.			
	65 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 6 (A)

Total # of Dominant Species across all strata: 6 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	10	x2 =	20
FAC Species	180	x3 =	540
FACU Specie	0	x4 =	0
UPL Species	0	x5 =	0
Column Totals:	190	x1 =	560

Prevalence Index = B/A = 2.95

Hydrophytic Vegetation Indicators:
__ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (explain)
__ Problematic Hydrophytic Vegetation[1] (explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies this site as upland.

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes___ No ✓ Depth___

Saturation Present? Yes___ No ✓ Depth___

Wetland Hydrology Present? Yes___ No ✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-9		100					organic	
9-42	7.5yr 5/1	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes___ No ✓

Comments: No restrictive layer within 40cm of the surface.
The 9-42cm layer has a low chroma, but no redoximorphic features present.

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 23, 2019 | Sample Point: W2-1 wet
Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell
County: Gloucester | Coordinates: 20T 340651.55 mE 5293947.90 mN
PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐
if no explain:
Atypical Situation? Yes ☐ No ☑ Explain
Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐
Wetland Hydrology Yes ☑ No ☐
Hydric Soils Yes ☑ No ☐
Wetland Type: Mature coniferous swamp
Rational for Determination: Canadian Wetland Classification System (CWCS)

Wetland Determination **YES** ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Thuja occidentalis	60	✓	facw
2. Betula cordifolia	15		facu
3. Abies balsamea	5		fac
4.			
5.			
	80 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Thuja occidentalis	5	✓	facw
2. Acer spicatum	2		fac
3. Abies balsamea	2		fac
4. Populus balsamifera	2		facw
5. Ribes lacustre	2		facw
Viburnum nudum	1		fac
	14 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Osmunda cinnamomea	15	✓	fac
2. Rubus pubescens	25	✓	fac
3. Cornus canadensis	5		fac
4. Equisetum sylvaticum	2		fac
5. Gymnocarpium dryopteris	2		fac
	52 = Total Cover		
Carex trisperma	3		obl

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 4 (A)
Total # of Dominant Species across all strata: 4 (B)
% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	3	x1 =	3
FACW Species	69	x2 =	138
FAC Species	59	x3 =	177
FACU Specie	15	x4 =	60
UPL Species	0	x5 =	0
Column Totals:	146	x1 =	378

Prevalence Index = B/A = 2.59

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (explain)
__ Problematic Hydrophytic Vegetation[1] (explain)
[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: N/A

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron reduction in tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes✓ No___ Depth 30cm

Saturation Present? Yes✓ No___ Depth 0cm

Wetland Hydrology Present? Yes✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5		100					Organic	
5-13	7.5yr 3/1	100					Silty organic	
13-28	5yr 5/1	100					Sandy	
28-38	7.5yr 4/1	95	7.5yr 6/5	5	RM	M	Sandy clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Suflide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ 5cm Mucky Peat or Peat (S3)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surfaces (S7)
- __ Polyvalue Below Surface (S8)
- __ Thin Dark Surface (S9)
- __ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Restrictive Layer (if observed): Type Compacted till Depth: 38cm

Hydric Soil Present? Yes✓ No___

Comments: Layer from 13-28cm has low chroma soil but no redoximorphic features present

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 24, 2019 | Sample Point: WL-1 UP

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 340651.44 mE 5293968.16 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☐ No ☑

Hydric Soils Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	20	✓	fac
2. Betula cordifolia	25	✓	fac u
3. Populus tremuloides	15	✓	fac
4. Abies balsamea	10		fac
5. Thuja occidentalis	5		facw
	75 = Total Cover		

Shrub Stratum: (Plot size: 5 m²)			
1. Abies balsamea	5	✓	fac
2. Populus tremuloides	5	✓	fac
3. Acer pensylvanicum	2		fac u
4.			
5.			
	12 = Total Cover		

Herb Stratum: (Plot size: 1 m²)			
1. Aralia nudicaulis	30	✓	fac
2. Cornus canadensis	5		fac
3. Trientalis borealis	5		fac
4. Maianthemum canadense	5		fac
5. Dryopteris intermedia	2		fac
	47 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 6 (B)

% of Dominant Species that are OBL,FACW,FAC: 83 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	5	x2 =	10
FAC Species	102	x3 =	306
FACU Specie	27	x4 =	108
UPL Species	0	x5 =	0
Column Totals:	134	x1 =	424

Prevalence Index = B/A = 3.16

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies it as upland.

Hydrophytic Vegetation Present? Yes __ **No** ✓

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes___ No✓ Depth___

Saturation Present? Yes___ No✓ Depth___

Wetland Hydrology Present? Yes___ No✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6							organic	
6-44	5yr 5/2	100					Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes___ No✓

Comments: No restrictive layer within 40cm of surface

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project Date: July 24, 2019 Sample Point: WL-2 Wet

Applicant/Owner: Naveco Field Investigator(s): Derrick Mitchell

County: Gloucester Coordinates: 20T 340421.61mE 5294726.20mN

PID: Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☑ No ☐ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule): Yes ☑ No ☐

Wetland Hydrology: Yes ☑ No ☐

Hydric Soils: Yes ☑ No ☐

Wetland Type: Mature hardwood swamp

Rational for Determination: CWCS

Wetland Determination

YES ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	40	✓	fac
2. Betula alleghaniensis	20	✓	fac
3. Thuja occidentalis	2		facw
4. Betula cordifolia	2		facu
5.			
	64 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Abies balsamea	2		fac
2. Alnus incana	2		facw
3. Acer spicatum	15	✓	fac
4. Corylus cornuta	1		fac
5.			
	20 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Onoclea sensibilis	60	✓	facw
2. Glyceria melicaria	10		obl
3. Thalictrum pubescens	5		facw
4. Rubus pubescens	5		fac
5. Equisetum sylvaticum	2		fac
	82 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 4 (A)

Total # of Dominant Species across all strata: 4 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x1 =	10
FACW Species	69	x2 =	138
FAC Species	85	x3 =	255
FACU Specie	2	x4 =	8
UPL Species	0	x5 =	0
Column Totals:	166	x1 =	411

Prevalence Index = B/A = 2.48

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments:

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- __ Water Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron reduction in tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes ✓ No___ Depth 35cm

Saturation Present? Yes ✓ No___ Depth 0cm

Wetland Hydrology Present? Yes ✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2		100					organic	
2-48	5yr 4/1	95	5yr 6/5	5	RM	M	sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Suflide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ 5cm Mucky Peat or Peat (S3)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surfaces (S7)
- __ Polyvalue Below Surface (S8)
- __ Thin Dark Surface (S9)
- __ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes ✓ No___

Comments: No restrictive layer within 40 cm of surface

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 24, 2019 | Sample Point: WL-2 up

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 340425.66mE 5294708.78mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☐ No ☑

Hydric Soils Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Betula alleghaniensis	40	✓	fac
2. Betula cordifolia	10		facu
3. Picea glauca	5		fac
4. Acer rubrum	10		fac
5. Populus tremuloides	10		fac
Thuja occidentalis 2	77 = Total Cover		fac w

Shrub Stratum: (Plot size: 5m²)			
1. Abies balsamea	10	✓	fac
2. Acer spicatum	5	✓	fac
3. Betula alleghaniensis	2		fac
4. Acer pensylvanicum	2		facu
5. Lonicera canadensis	1		fac
Acer saccharum	2		facu
	22 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Dryopteris intermedia	10	✓	fac
2. Oxalis montana	15	✓	fac
3. Maianthemum canadense	5		fac
4. Cornus canadensis	2		fac
5.			
	32 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 5 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	2	x2 =	4
FAC Species	115	x3 =	345
FACU Specie	14	x4 =	56
UPL Species	0	x5 =	0
Column Totals:	131	x1 =	405

Prevalence Index = B/A = 3.09

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies it as upland.

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes___ No ✓ Depth___

Saturation Present? Yes___ No ✓ Depth___

Wetland Hydrology Present? Yes___ No ✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2		100					organic	
2-25	5yr 6/2	100					sandy/silt	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type Roots Depth: 25 cm

Hydric Soil Present? Yes___ No ✓

Comments: layer from 2-25cm has low chroma soil, but no redoximorphic features present

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 24, 2019 | Sample Point: WL-3 wet

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 340201.92mE 5295361.90mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☑ No ☐ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Determination YES ☑ NO ☐

Wetland Type: Immature deciduous swamp

Rational for Determination: CWCS

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	30	✓	fac
2. Populus tremuloides	5		fac
3.			
4.			
5.			
	35 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Alnus incana	80	✓	facw
2. Cornus sericea	5		facw
3.			
4.			
5.			
	85 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Poa palustris	20	✓	fac
2. Glyceria striata	5		facw
3. Equisetum sylvaticum	5		fac
4. Rubus pubescens	10		fac
5. Carex trisperma	10		obl
	70 = Total Cover		
Solidago rugosa	5		fac
Athyrium filix-femina	5		fac
Carex leptalea	10		facw

Comments: N/A

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 3 (A)

Total # of Dominant Species across all strata: 3 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

	Total % Cover of:	Multiply by:
OBL Species	10	x1 = 10
FACW Species	100	x2 = 200
FAC Species	80	x3 = 240
FACU Specie	0	x4 = 0
UPL Species	0	x5 = 0
Column Totals:	190	x1 = 450

Prevalence Index = B/A = 2.37

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- __ High Water Table (A2)
- __ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- ✓ Water Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- ✓ Presence of Reduced Iron (C4)
- __ Recent Iron reduction in tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes___ No✓ Depth___

Saturation Present? Yes___ No✓ Depth___

Wetland Hydrology Present? Yes✓ No___

Comments: _____

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5		100					organic	
5-24	7.5yr 4/1	98	7.5yr 3/1	2	RM	M	sandy	
24-36	7.5yr 4/1	75	7.5yr 6/5	25	RM	M	sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Suflide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ 5cm Mucky Peat or Peat (S3)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surfaces (S7)
- __ Polyvalue Below Surface (S8)
- __ Thin Dark Surface (S9)
- __ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Restrictive Layer (if observed): Type Rock/Rock Depth: 36cm

Hydric Soil Present? Yes✓ No___

Comments: Redoximorphic

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 24, 2019 | Sample Point: WL-3 up

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 340198.43mE 5295374.55mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area?** Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☐ No ☑

Hydric Soils Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	35	✓	fac
2. Populus tremuloides	25	✓	fac
3. Betula cordifolia	2		facu
4. Abies balsamea	5		fac
5. Picea glauca	5		fac
	72	= Total Cover	

Shrub Stratum: (Plot size: 5m²)			
1. Populus tremuloides	2	✓	fac
2. Abies balsamea	5	✓	fac
3. Nemopanthus mucronatus	2	✓	fac
4.			
5.			
	9	= Total Cover	

Herb Stratum: (Plot size: 1m²)			
1. Cornus canadensis	30	✓	fac
2. Maianthemum canadense	10		fac
3. Aralia nudicaulis	5		fac
4. Trientalis borealis	5		fac
5. Osmunda cinnamomea	2		fac
	52	= Total Cover	

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 6 (A)

Total # of Dominant Species across all strata: 6 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	0	x2 =	0
FAC Species	131	x3 =	393
FACU Specie	2	x4 =	8
UPL Species	0	x5 =	0
Column Totals:	133	x1 =	401

Prevalence Index = B/A = 3.02

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies it as upland.

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes___ No ✓ Depth___

Saturation Present? Yes___ No ✓ Depth___

Wetland Hydrology Present? Yes___ No ✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5		100					organic	
5-22	7.5yr 5/1	100					sandy	
22-34	7.5yr 3/3	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type Rock Depth: 34 cm

Hydric Soil Present? Yes___ No ✓

Comments: layer from 5-22cm has low chroma soil, but no redoximorphic features present.

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 24, 2019 | Sample Point: WL-4 wet

Applicant/Owner: Naweco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 341613.71mE 5296324.55mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Type: Mixedwood basin swamp

Rational for Determination: CWCS

Wetland Determination

YES ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Acer rubrum	20	✓	fac
2. Abies balsamea	15		fac
3. Picea mariana	15		facw
4. Thuja occidentalis	20	✓	facw
5. Betula cordifolia	10		facu
	80	= Total Cover	

Shrub Stratum: (Plot size: 5m²)			
1. Viburnum nudum	15	✓	fac
2. Acer rubrum	10	✓	fac
3.			
4.			
5.			
	25	= Total Cover	

Herb Stratum: (Plot size: 1m²)			
1. Carex trisperma	10	✓	obl
2. Maianthemum canadense	5		fac
3. Osmunda cinnamomea	5		fac
4. Clintonia borealis	5		fac
5. Cornus canadensis	2		fac
	29	= Total Cover	
Carex brunnescens	2		fac

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 5 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	10	x1 =	10
FACW Species	35	x2 =	70
FAC Species	79	x3 =	237
FACU Specie	10	x4 =	40
UPL Species	0	x5 =	0
Column Totals:	134	x1 =	357

Prevalence Index = B/A = 2.66

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: N/A

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
✓ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes___ No ✓ Depth___

Saturation Present? Yes ✓ No___ Depth 0cm

Wetland Hydrology Present? Yes ✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10		100					organic	
10-22	7.5yr 5/1	95	7.5yr 3/1	5	RM	M	sandy	
22-47	7.5yr 6/4	95	7.5yr 6/3	5	RM	M	sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
✓ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes ✓ No___

Comments: No restrictive layer within 40 cm of surface

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 24, 2019 | Sample Point: WL-4 up

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 341615.00 mE 5296213.58 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation	(50/20 rule)	Yes ☑	No ☐
Wetland Hydrology		Yes ☐	No ☑
Hydric Soils		Yes ☐	No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10m²)

	%Cover	Dominant Species	Indicator Status
1. Abies balsamea	65	✓	fac
2. Picea glauca	5		fac
3. Acer rubrum	5		fac
4.			
5.			

75 = Total Cover

Shrub Stratum: (Plot size: 5m²)

1. Abies balsamea	20	✓	fac
2.			
3.			
4.			
5.			

20 = Total Cover

Herb Stratum: (Plot size: 1m²)

1.
2.
3.
4.
5.

= Total Cover

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 2 (A)

Total # of Dominant Species across all strata: 2 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

	Total % Cover of:	Multiply by:	
OBL Species	0	x1 =	0
FACW Species	0	x2 =	0
FAC Species	95	x3 =	285
FACU Specie	0	x4 =	0
UPL Species	0	x5 =	0
Column Totals:	95	x1 =	285

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (explain)
__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: No herb stratum
Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies it as upland

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes___ No✓ Depth___

Saturation Present? Yes___ No✓ Depth___

Wetland Hydrology Present? Yes___ No✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8		100					organic	
8-12	7.5yr 5/1	100					sandy	
12-40	7.5yr 6/5	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes___ No✓

Comments: No restrictive layer within 40cm of surface

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 24, 2019 | Sample Point: W2-5 wet

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 342273.27 mE 5296074.92 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation	(50/20 rule)	Yes ☑ No ☐
Wetland Hydrology		Yes ☑ No ☐
Hydric Soils		Yes ☑ No ☐

Wetland Determination — YES ☑ NO ☐

Wetland Type: Coniferous Swamp

Rational for Determination: CWCS

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Picea mariana	60	✓	facw
2. Acer rubrum	10		fac
3.			
4.			
5.			
	70 = Total Cover		

Shrub Stratum: (Plot size: 5 m²)			
1. Kalmia angustifolia	5	✓	fac
2. Picea mariana	5	✓	facw
3. Nemopanthus mucronata	10	✓	Fac
4. Viburnum nudum	5	✓	fac
5.			
	25 = Total Cover		

Herb Stratum: (Plot size: 1 m²)			
1. Osmunda cinnamomea	10		fac
2. Carex trisperma	65	✓	obl
3. Cornus canadensis	5		fac
4.			
5.			
	80 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 6 (A)

Total # of Dominant Species across all strata: 6 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	65	x1 =	65
FACW Species	65	x2 =	130
FAC Species	45	x3 =	135
FACU Specie	0	x4 =	0
UPL Species	0	x5 =	0
Column Totals:	175	x1 =	330

Prevalence Index = B/A = 1.89

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation
✓ Dominance Test is >50%
✓ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (explain)
__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: N/A

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
✓ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes✓ No___ Depth 10cm

Saturation Present? Yes✓ No___ Depth 0cm

Wetland Hydrology Present? Yes___ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-32		100					organic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

✓ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type Rock Depth: 32cm

Hydric Soil Present? Yes✓ No___

Comments:

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: July 24, 2019 | Sample Point: WL-5 up

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 342264.16mE 5296064.65 m N

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☐ No ☑

Hydric Soils Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Picea mariana	30	✓	facw
2. Acer rubrum	20	✓	fac
3. Abies balsamea	15	✓	fac
4. Thuja occidentalis	5		facw
5.			
	70 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Thuja occidentalis	5	✓	facw
2. Picea mariana	5	✓	facw
3. Balmea angustifolia	3	✓	fac
4. Vaccinium angustifolium	2		fac
5.			
	15 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Pteridium aquilinum	25	✓	facu
2. Cornus canadensis	10	✓	fac
3. Clintonia borealis	5		fac
4. Gaultheria procumbens	5		fac
5. Gaultheria hispidula	5		fac
	50 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 7 (A)

Total # of Dominant Species across all strata: 8 (B)

% of Dominant Species that are OBL,FACW,FAC: 87.5 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	45	x2 =	90
FAC Species	65	x3 =	195
FACU Specie	25	x4 =	100
UPL Species	0	x5 =	0
Column Totals:	135	x1 =	385

Prevalence Index = B/A = 2.85

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies it as upland.

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No✓ Depth___

Water Table Present? Yes___ No✓ Depth___

Saturation Present? Yes___ No✓ Depth___

Wetland Hydrology Present? Yes___ No✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10		100					organic	
10-15	7.5yr 5/1	100					sandy	
15-37	7.5yr 6/5	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes___ No✓

Comments: No restrictive layer
layer from 10-15 cm has low chroma soil, but no redox morphic features present

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: September 5, 2019 | Sample Point: W2-6 wet

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 339973.22 mE 5292973.00 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Type: Coniferous Swamp

Rational for Determination: CWCS

Wetland Determination

YES ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10m²)	%Cover	Dominant Species	Indicator Status
1. Picea mariana	80	✓	FACW
2.			
3.			
4.			
5.			
	80 = Total Cover		

Shrub Stratum: (Plot size: 5m²)			
1. Nemopanthus mucronatus	30	✓	fac
2. Viburnum nudum	10		fac
3. Kalmia angustifolia	5		fac
4. Acer rubrum	2		fac
5. Vaccinium myrtilloides	5		fac
	52 = Total Cover		

Herb Stratum: (Plot size: 1m²)			
1. Cornus canadensis	25	✓	fac
2. Cypripedium acaule	2		fac
3. Gaultheria procumbens	5		fac
4. Carex trisperma	2		obl
5. Maianthemum trifolium	10	✓	obl
	44 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 4 (A)

Total # of Dominant Species across all strata: 4 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	12	x1 =	12
FACW Species	80	x2 =	160
FAC Species	84	x3 =	252
FACU Specie	0	x4 =	0
UPL Species	0	x5 =	0
Column Totals:	176	x1 =	424

Prevalence Index = B/A = 2.41

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test >50%

✓ Prevalence Index ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: N/A

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
✓ High Water Table (A2)
✓ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes ✓ No___ Depth 25cm

Saturation Present? Yes ✓ No___ Depth 5cm

Wetland Hydrology Present? Yes ✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-40+		100					organic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

✓ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type_____ Depth:_____

Hydric Soil Present? Yes ✓ No___

Comments: No restrictive layer within 40 cm of surface.

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project | Date: September 5, 2019 | Sample Point: W2-6 up

Applicant/Owner: Naveco | Field Investigator(s): Derrick Mitchell

County: Gloucester | Coordinates: 20T 339985.50 mE 5292958.11 mN

PID: | Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) — Yes ☑ No ☐

Wetland Hydrology — Yes ☐ No ☑

Hydric Soils — Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Picea mariana	70	✓	FACW
2.			
3.			
4.			
5.			
	70 = Total Cover		

Shrub Stratum: (Plot size: 5 m²)			
1. Kalmia angustifolia	20	✓	FAC
2. Vaccinium myrtilloides	2		FAC
3. Picea mariana	20	✓	FACW
4.			
5.			
	42 = Total Cover		

Herb Stratum: (Plot size: 1 m²)			
1. Cornus canadensis	3	✓	FAC
2.			
3.			
4.			
5.			
	3 = Total Cover		

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 4 (A)

Total # of Dominant Species across all strata: 4 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	90	x2 =	180
FAC Species	25	x3 =	75
FACU Specie	0	x4 =	0
UPL Species	0	x5 =	0
Column Totals:	115	x1 =	255

Prevalence Index = B/A = 2.22

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies it as upland.

Hydrophytic Vegetation Present? Yes ✓ **No**

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No_✓_ Depth___

Water Table Present? Yes___ No_✓_ Depth___

Saturation Present? Yes___ No_✓_ Depth___

Wetland Hydrology Present? Yes___ No_✓_

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5		100					organic	
5-27	7.5yr 6/3	100					sandy	
27-35	7.5yr 4/6	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.[2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type Rock Depth: 35cm.

Hydric Soil Present? Yes___ No_✓_

Comments:

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

- __ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- __ Water Marks (B1)
- __ Sediment Deposits (B2)
- __ Drift Deposits (B3)
- __ Algal Mat or Crust (B4)
- __ Iron Deposits (B5)
- __ Inundation Visible on Aerial Imagery (B7)
- __ Sparsely Vegetated Concave Surface (B8)
- ✓ Water Stained Leaves (B9)
- __ Aquatic Fauna (B13)
- __ Marl Deposits (B15)
- __ Hydrogen Sulfide Odor (C1)
- __ Oxidized Rhizospheres on Living Roots (C3)
- __ Presence of Reduced Iron (C4)
- __ Recent Iron reduction in tilled Soils (C6)
- __ Thin Muck Surface (C7)
- __ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

- __ Surface Soil Cracks (B6)
- __ Drainage Patterns (B10)
- __ Moss Trim Lines (B16)
- __ Dry-Season Water Table (C2)
- __ Crayfish Burrows (C8)
- __ Saturation Visible on Aerial Imagery (C9)
- __ Stunted or Stressed Plants (D1)
- __ Geomorphic Position (D2)
- __ Shallow Aquitard (D3)
- __ Microtopographic Relief (D4)
- __ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes ✓ No___ Depth 10cm

Saturation Present? Yes ✓ No___ Depth 0cm

Wetland Hydrology Present? Yes ✓ No___

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-16		100					organic	
16-34	7.5yr 6/1	95	7.5yr 3/1	5	RM	M	sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

- __ Histosol (A1)
- __ Histic Epipedon (A2)
- __ Black Histic (A3)
- __ Hydrogen Suflide (A4)
- __ Stratified Layers (A5)
- __ Depleted Below Dark Surface (A11)
- __ Thick Dark Surface (A12)
- __ Sandy Mucky Mineral (S1)
- __ 5cm Mucky Peat or Peat (S3)
- __ Sandy Gleyed Matrix (S4)
- __ Sandy Redox (S5)
- __ Stripped Matrix (S6)
- __ Dark Surfaces (S7)
- __ Polyvalue Below Surface (S8)
- __ Thin Dark Surface (S9)
- __ Loamy Gleyed Matrix (F2)
- ✓ Depleted Matrix (F3)
- __ Redox Dark Surface (F6)
- __ Depleted Dark Surface (F7)
- __ Redox Depressions (F8)

Restrictive Layer (if observed): Type Roots Depth: 34cm

Hydric Soil Present? Yes ✓ No___

Comments:

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Veolus Wind Energy Project Date: September 5, 2019 Sample Point: WL-7 wet.

Applicant/Owner: Davco Field Investigator(s): Derrick Mitchell

County: Gloucester Coordinates: 20T 339711.23 mE 5292338.33 mN

PID: Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area?** Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☑ No ☐

Hydric Soils Yes ☑ No ☐

Wetland Type: Coniferous Swamp / bog complex

Rational for Determination: CWCS

Wetland Determination **YES** ☑ **NO** ☐

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Picea mariana	50	✓	facw
2. Acer rubrum	5		fac
3. Larix laricina	2		fac
4.			
5.			
	57 = Total Cover		

Shrub Stratum: (Plot size: 5 m²)			
1. Kalmia angustifolia	15	✓	fac
2. Rhododendron canadense	25	✓	fac
3. Viburnum nudum	5		fac
4. Vaccinium myrtilloides	3		fac
5. Chamaedaphne calyculata	10		obl
Nemopanthus mucronatus	3		fac
	61 = Total Cover		

Herb Stratum: (Plot size: 1 m²)			
1. Maianthemum trifolium	5	✓	obl
2. Carex trisperma	5	✓	obl
3.			
4.			
5.			
	10. = Total Cover		

Comments: N/A

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 5 (B)

% of Dominant Species that are OBL,FACW,FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	x1 =	20
FACW Species	50	x2 =	100
FAC Species	58	x3 =	174
FACU Specie	0	x4 =	0
UPL Species	0	x5 =	0
Column Totals:	128	x1 =	294

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Project Site: Chaleur Ventus Wind Energy Project. Date: September 5, 2019 Sample Point: WL-7 up

Applicant/Owner: Naveco Field Investigator(s): Derrick Mitchell

County: Gloucester Coordinates: 20T 339695.78 mE 5292344.27 mN

PID: Do normal environmental conditions exist on-site? Yes ☑ No ☐

if no explain:

Atypical Situation? Yes ☐ No ☑ Explain

Is this a potential **Problem Area**? Yes ☐ No ☑ Explain

Wetland Determination

(Check One Only For Each Criteria)

Dominant Hydrophytic Vegetation (50/20 rule) Yes ☑ No ☐

Wetland Hydrology Yes ☐ No ☑

Hydric Soils Yes ☐ No ☑

Wetland Type:

Rational for Determination:

Wetland Determination

YES ☐ **NO** ☑

Vegetation

Tree Stratum: (Plot size: 10 m²)	%Cover	Dominant Species	Indicator Status
1. Populus tremuloides	30	✓	fac
2. Acer rubrum	20	✓	fac
3. Picea mariana	5		facw
4. Abies balsamea	10		fac
5. Betula papyrifera	5		facu
	70	= Total Cover	

Shrub Stratum: (Plot size: 5 m²)			
1. Viburnum nudum	15	✓	fac
2. Nemopanthus mucronatus	10	✓	fac
3. Acer rubrum	5		fac
4. Picea mariana	5		facw
5. Vaccinium myrtilloides	15	✓	fac
	50	= Total Cover	

Herb Stratum: (Plot size: 1 m²)			
1. Pteridium aquilinum	20	✓	fac u
2. Maianthemum canadense	3		fac
3. Cornus canadensis	5		fac
4. Gaultheria procumbens	5		fac
5.			
	33	= Total Cover	

Dominance Test Worksheet:

# of Dominant Species that are OBL,FACW,FAC: 5 (A)

Total # of Dominant Species across all strata: 6 (B)

% of Dominant Species that are OBL,FACW,FAC: 83 (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	x1 =	0
FACW Species	10	x2 =	20
FAC Species	118	x3 =	354
FACU Specie	25	x4 =	100
UPL Species	0	x5 =	0
Column Totals:	153	x1 =	474

Prevalence Index = B/A = 3.1

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (explain)

__ Problematic Hydrophytic Vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Comments: Although the sample point has hydrophytic vegetation, the lack of hydric soil and wetland hydrology identifies it as upland

Hydrophytic Vegetation Present? Yes ✓ **No** ____

New Brunswick Department of Environment Wetland Delineation Data Sheet

Hydrology

Primary Hydrological Indicators: (minimum of one is required; check all that apply)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water Stained Leaves (B9)
__ Aquatic Fauna (B13)
__ Marl Deposits (B15)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres on Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron reduction in tilled Soils (C6)
__ Thin Muck Surface (C7)
__ Other (Explain in Remarks)

Secondary Indicators: *(minimum of two required)*

__ Surface Soil Cracks (B6)
__ Drainage Patterns (B10)
__ Moss Trim Lines (B16)
__ Dry-Season Water Table (C2)
__ Crayfish Burrows (C8)
__ Saturation Visible on Aerial Imagery (C9)
__ Stunted or Stressed Plants (D1)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ Microtopographic Relief (D4)
__ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes___ No ✓ Depth___

Water Table Present? Yes___ No ✓ Depth___

Saturation Present? Yes___ No ✓ Depth___

Wetland Hydrology Present? Yes___ No ✓

Comments:

Soil Profile

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators)

Depth(cm)	Matrix		Redox Features					
	Color(moist)	%	Color(moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3		100					organic	
3-15	7.5yr 6/1	100					sandy	
15-25	7.5yr 4/6	100					sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators:

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Suflide (A4)
__ Stratified Layers (A5)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ 5cm Mucky Peat or Peat (S3)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Dark Surfaces (S7)
__ Polyvalue Below Surface (S8)
__ Thin Dark Surface (S9)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Restrictive Layer (if observed): Type Rock/Rock Depth: 25cm

Hydric Soil Present? Yes___ No ✓

Comments: Layer 3-15 cm has low chroma soil, but no redoximorphic features present

D PHOTOGRAPHIC LOGS

Photo 1: Wetland A (WL-A) soil test pit, July 5, 2018.

Photo 2: WL-A vegetation, July 5, 2018.

Photo 3: WL-A, July 5, 2018.

Photo 4: WL-A, July 5, 2018.

Photo 5: WL-A upland soil test pit, July 5, 2018.

Photo 6: WL-A upland vegetation, July 5, 2018.

Photo 7: WL-A upland, July 5, 2018.

Photo 8: WL-B soil, July 4, 2018.

Photo 9: WL-B soil test pit, July 4, 2018.

Photo 10: WL-B vegetation, July 4, 2018.

Photo 11: WL-B, July 4, 2018.

Photo 12: WL-B upland soil test pit, July 4, 2018.

Photo 13: WL-B upland vegetation, July 4, 2018.

Photo 14: WL-B upland vegetation, July 4, 2018.

Photo 15: WL-C soil test pit, July 6, 2018.

Photo 16: WL-C vegetation, July 6, 2018.

Photo 17: WL-C upland soil test pit, July 6, 2018.

Photo 18: WL-C vegetation, July 6, 2018.

Photo 19: WL-D soil test pit, July 11, 2018.

Photo 20: WL-D vegetation, July 11, 2018.

Photo 21: WL-D upland soil test pit, July 11, 2018.

Photo 22: WL-D upland vegetation, July 11, 2018.

Photo 23: WL-D upland, July 11, 2018.

Photo 24: WL-E soil test pit, July 11, 2018.

Photo 25: WL-E vegetation, July 11, 2018.

Photo 26: WL-E vegetation, July 11, 2018.

Photo 27: WL-E upland soil test pit, July 11, 2018.

Photo 28: WL-E upland vegetation, July 11, 2018.

Photo 1: Wetland 1 soil test pit, July 24, 2019.

Photo 2: Wetland 1 soil, July 24, 2019.

Photo 3: Wetland 1, July 24, 2019.

Photo 4: Wetland 1, July 24, 2019.

Photo 5: Wetland 1 upland soil test pit, July 24, 2019.

Photo 6: Wetland 1 upland, July 24, 2019.

Photo 7: Wetland 1 upland, July 24, 2019.

Photo 8: Habitat 2, July 24, 2019.

Photo 9: Habitat 2, July 24, 2019.

Photo 10: Habitat 3, July 24, 2019.

Photo 11: Habitat 3, July 24, 2019.

Photo 12: Wetland 2 soil test pit, July 24, 2019.

Photo 13: Wetland 2, July 24, 2019.

Photo 14: Wetland 2, July 24, 2019.

Photo 15: Wetland 2 upland soil test pit, July 24, 2019.

Photo 16: Wetland 2 upland, July 24, 2019.


Photo 17: Wetland 2 upland, July 24, 2019.


Photo 18: Wetland 2 upland, July 24, 2019.


Photo 19: Wetland 2 upland, July 24, 2019.


Photo 20: Wetland 3 soil test pit, July 24, 2019.

Photo 21: Wetland 3, July 24, 2019.

Photo 22: Wetland 3, July 24, 2019.

Photo 23: Wetland 3 upland soil test pit, July 24, 2019.

Photo 24: Wetland 3 upland, July 24, 2019.

Photo 25: Wetland 3 upland, July 24, 2019.

Photo 26: Habitat 5, July 24, 2019.

Photo 27: Habitat 6, July 25, 2019.

Photo 28: Habitat 6, July 25, 2019.

Photo 29: Wetland 4 upland soil test pit, July 25, 2019.

Photo 30: Wetland 4 upland, July 25, 2019.

Photo 31: Wetland 4 soil test pit, July 25, 2019.

Photo 32: Wetland 4, July 25, 2019.

Photo 33: Wetland 4, July 25, 2019.

Photo 34: Wetland 5 soil test pit, July 25, 2019.

Photo 35: Wetland 5, July 25, 2019.

Photo 36: Wetland 5, July 25, 2019.

Photo 37: White-fringed bottle orchid in Wetland 5, July 25, 2019.

Photo 38: Wetland 5, July 25, 2019.

Photo 39: Wetland 6, September 5, 2019.

Photo 40: Wetland 6, September 5, 2019.

Photo 41: Wetland 7, September 5, 2019.

Photo 42: Wetland 7, September 5, 2019.

E FUNCTIONAL ASSESSMENT SPREADSHEETS

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Wind Energy Converter WL- A
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	Sept 5, 2019
Nearest Town:	Grande Anse, NB
Latitude (decimal degrees):	47.8159
Longitude (decimal degrees):	-65.1115
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1,062 ha
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	50
What percent (approx.) of the **wetland** were you able to visit?	75
What percent (approx.) of the **AA** 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:	No
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes
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: Sept 5, 2019	Site Identifier: Wind Energy Converter WL-A	Investigator: DM, BL

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	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.	1			
		0.1 - 1 hectare.	0			
		1 to 10 hectares.	0			
		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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<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.]	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.	1			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	1			
		100 - 500 m.	0			
		0.5- 1 km.	0			
		1 - 5 km.	0			
		>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.	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.	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-tida**l 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)	1.50	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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.		[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.	1			
		Southward (S, SW). south-facing contributing area.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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.	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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: Sept 5, 2019	Site Identifier: Wind Energy Converter WL - A	Investigator: DM, BL		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	1			
		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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	5			

		deciduous trees taller than 3 m.	3	PH, POL, SBM, Sens]
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		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	
*Note : 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 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]
		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.	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	
		>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.	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%) *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).	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.	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		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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 rainstorms), 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.**	1		
		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		AllSat2
		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		AllSat1
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		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	
		None, or <0.01 hectare and <1% of the AA. **SKIP to F29.**	0		NoSeasonal
		1-20% of the AA, or <1% but >0.01 ha.	0		

		20-50% of the AA.	0	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]	
		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).	1		
		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).					TooSmall
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).	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]	NoPonded
		<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.	1		
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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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 off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	1		
		2-5%.	0		
		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.					
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		BuffAllNat

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	
		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 in (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: *[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.]*		[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: *[See note above.]*		[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).	1			
		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.	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.	1			
		>500 m. away, or no information.	0			
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants_Calcar worksheet in the accompanying SuppInfo 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]		

Investigator: DM, BL	Site Identifier: Wind Energy Converter WL - A	Date: Sept 5, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	
	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.	

	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
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.				
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=	5
			Stressor subscore=	0.42

S2	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	1
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	1
	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.	

	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.	1
			Sum=	3
			Stressor subscore=	0.33

S3	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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: WL-A Naveco Turbine Site

Date: 5 Sept, '19

Observer: DM, BL

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)	5.17	Higher	5.59	Moderate	5.70	5.63
Stream Flow Support (SFS)	2.60	Lower	10.00	Higher	1.39	8.23
Water Cooling (WC)	2.29	Moderate	0.96	Lower	1.53	0.58
Sediment Retention & Stabilisation (SR)	3.38	Moderate	0.76	Lower	5.47	0.46
Phosphorus Retention (PR)	3.12	Moderate	0.55	Lower	5.11	0.83
Nitrate Removal & Retention (NR)	2.27	Lower	5.13	Moderate	5.23	5.67
Carbon Sequestration (CS)	5.68	Moderate			7.01	
Organic Nutrient Export (OE)	5.07	Moderate			5.03	
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)	1.42	Lower	4.10	Moderate	4.37	3.46
Amphibian & Turtle Habitat (AM)	6.31	Higher	6.54	Higher	6.64	6.06
Waterbird Feeding Habitat (WBF)	5.33	Moderate	6.67	Moderate	4.24	6.67
Waterbird Nesting Habitat (WBN)	3.03	Moderate	6.67	Moderate	2.59	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	8.77	Higher	6.67	Moderate	7.27	6.67
Pollinator Habitat (POL)	8.50	Higher	6.67	Moderate	6.84	6.67
Native Plant Habitat (PH)	3.75	Lower	7.98	Higher	4.60	6.93
Public Use & Recognition (PU)			2.55	Moderate		2.14
Wetland Sensitivity (Sens)			4.47	Moderate		3.54
Wetland Ecological Condition (EC)			3.25	Moderate		6.11
Wetland Stressors (STR) (higher score means more stress)			1.95	Lower		2.98
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	2.60	Moderate	5.59	Moderate	5.70	5.63
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.15	Moderate	3.64	Lower	6.36	3.99
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	3.96	Moderate	7.51	Higher	4.05	6.16
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.62	Moderate	5.32	Moderate	4.66	5.27
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.89	Higher	7.54	Higher	6.76	6.84
WETLAND CONDITION (EC)			3.25	Moderate		6.11
WETLAND RISK (average of Sensitivity & Stressors)			3.21	Moderate		3.26

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Wind Energy Converter WL- B + C
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	Sept 5, 2019
Nearest Town:	Grande Anse, NB
Latitude (decimal degrees):	47.8104
Longitude (decimal degrees):	-65.0959
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1,062 ha
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	50
What percent (approx.) of the **wetland** were you able to visit?	50
What percent (approx.) of the **AA** 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:	No
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes
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: Sept 5, 2019	Site Identifier: WL-B+C, Turbine Site	Investigator: DM, BL

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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 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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<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.]	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.	2			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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.	1			
		Bare pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	1			
		0.5- 1 km.	0			
		1 - 5 km.	0			
		>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.	0			

		>500 m.	1			
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).	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-tida**l 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)	1.25	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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.		[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.	1			
		Southward (S, SW). south-facing contributing area.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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).	1			
		None of the above, or no data.	0			
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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: Sept 5, 2019	Site Identifier: Naveco WL- B+C Turbine Site	Investigator: DM, BL		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	1			
		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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	4			

		deciduous trees taller than 3 m.	4	PH, POL, SBM, Sens]
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		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	
*Note : 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 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]
		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.	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).	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 **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).	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.	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		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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 rainstorms), 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		AllSat2
		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		AllSat1
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.**	1		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	
		None, or <0.01 hectare and <1% of the AA. **SKIP to F29.**	0		NoSeasonal
		1-20% of the AA, or <1% but >0.01 ha.	0		

		20-50% of the AA.	0	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]	
		50-95% of the AA.	1		
		>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).	1		
		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).					TooSmall
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.**	0		NoPonded
		5-30% of the water.	0		
		30-70% of the water.	0		
		70-95% of the water.	1		
		>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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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 off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	1		
		2-5%.	0		
		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.					
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		BuffAllNat

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	
		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 in (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: *[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.]*		[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: *[See note above.]*		[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).	1			
		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.	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_Calcar worksheet in the accompanying SuppInfo 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]		

Investigator: Derrick Mitchell	Site Identifier: WL-B+C, Turbine Site	Date: Sept 5, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	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.	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.	
	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.	

	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
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.				
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=	2
			Stressor subscore=	0.17

S2	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	Excavation.	1
	Ditch cleaning or dredging in or adjacent to the wetland.	1
	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.	
	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.	

	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.	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=	5
			Stressor subscore=	0.42

Assessment Area (AA) Results:

Wetland ID: WL-B+C, Turbine Site

Date:

Observer: DM

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)	2.98	Moderate	3.07	Moderate	4.03	3.13
Stream Flow Support (SFS)	3.65	Moderate	10.00	Higher	1.94	7.03
Water Cooling (WC)	1.35	Lower	0.00	Lower	0.90	0.00
Sediment Retention & Stabilisation (SR)	1.45	Lower	0.31	Lower	4.15	0.19
Phosphorus Retention (PR)	2.70	Moderate	0.00	Lower	4.82	0.33
Nitrate Removal & Retention (NR)	0.85	Lower	4.38	Moderate	4.36	5.00
Carbon Sequestration (CS)	4.41	Moderate			6.46	
Organic Nutrient Export (OE)	4.00	Moderate			4.45	
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)	2.33	Lower	4.00	Moderate	4.69	3.40
Amphibian & Turtle Habitat (AM)	5.19	Moderate	6.28	Moderate	6.04	5.90
Waterbird Feeding Habitat (WBF)	5.84	Moderate	6.67	Moderate	4.64	6.67
Waterbird Nesting Habitat (WBN)	3.88	Moderate	6.67	Moderate	3.31	6.67
Songbird, Raptor, & Mammal Habitat (SBM)	7.71	Higher	10.00	Higher	6.39	10.00
Pollinator Habitat (POL)	10.00	Higher	6.67	Moderate	8.29	6.67
Native Plant Habitat (PH)	6.00	Higher	8.20	Higher	5.51	7.12
Public Use & Recognition (PU)			2.08	Lower		1.81
Wetland Sensitivity (Sens)			6.16	Higher		4.05
Wetland Ecological Condition (EC)			6.14	Moderate		7.78
Wetland Stressors (STR) (higher score means more stress)			5.97	Higher		4.46
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	3.65	Moderate	3.07	Moderate	4.03	3.13
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.18	Lower	2.97	Lower	5.71	3.42
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	3.41	Lower	7.33	Higher	3.85	5.25
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.41	Moderate	5.29	Moderate	4.42	5.26
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.95	Higher	9.14	Higher	7.51	8.96
WETLAND CONDITION (EC)			6.14	Moderate		7.78
WETLAND RISK (average of Sensitivity & Stressors)			6.07	Higher		4.25

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Wind Energy Converter WL- D
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	Sept 5, 2019
Nearest Town:	Grande Anse, NB
Latitude (decimal degrees):	45.8211
Longitude (decimal degrees):	-65.0966
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1,062 ha
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 **wetland** were you able to visit?	100
What percent (approx.) of the **AA** 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:	No
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes
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):	

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Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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.	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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	1			
		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.	1			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	1			
		0.5- 1 km.	0			
		1 - 5 km.	0			
		>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.	0			

		>500 m.	1			
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.	1	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.	1			
		<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).	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-tida**l 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)	0.50	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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.		[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.	1			
		Southward (S, SW). south-facing contributing area.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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.	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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: Sept 5, 2019	Site Identifier: Wind Energy Converter WL- D	Investigator: DM, BL		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	3			

		deciduous trees taller than 3 m.	5	PH, POL, SBM, Sens]
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		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.	0	
*Note : 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 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]
		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.	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.	1	
		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.	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.	1	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	0	
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.	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%) *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.	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		NoHerbCov
		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.	0		
		25-50% of the herbaceous part of the AA.	0		
		50-95% of the herbaceous part of the AA.	1		
		>95% of the herbaceous part of the AA.	0		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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 rainstorms), 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		AllSat2
		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		AllSat1
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		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	NoSeasonal
		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	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]	
		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).	1		
		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).					TooSmall
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]	NoPonded
		<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.	1		
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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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 off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	1		
		2-5%.	0		
		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.					
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		BuffAllNat

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	
		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 in (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: *[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.]*		[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: *[See note above.]*		[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 SuppInfo 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]		

Investigator: DM, BL	Site Identifier: Wind Energy Converter WL- D	Date: Sept 5, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	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.	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.	
	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.	

	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.	2
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.				
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.	1
			Sum=	7
			Stressor subscore=	0.58

S2	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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 NMZ overlay in Google Earth: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	1
	Ditch cleaning or dredging in or adjacent to the wetland.	1
	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.	
	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.	

	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.	2
Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	1
			Sum=	6
			Stressor subscore=	0.50

Assessment Area (AA) Results:

Wetland ID: WL-D Naveco turbine site

Date: 5 Sept, '19

Observer: DM, BL

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)	4.61	Moderate	1.18	Lower	5.28	1.25
Stream Flow Support (SFS)	2.29	Lower	5.67	Moderate	1.22	3.30
Water Cooling (WC)	3.00	Moderate	0.27	Lower	2.00	0.16
Sediment Retention & Stabilisation (SR)	2.64	Moderate	0.61	Lower	4.97	0.37
Phosphorus Retention (PR)	2.33	Lower	0.37	Lower	4.56	0.67
Nitrate Removal & Retention (NR)	2.61	Moderate	1.56	Lower	5.44	2.50
Carbon Sequestration (CS)	5.05	Moderate			6.74	
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)	2.68	Moderate	4.80	Moderate	4.82	3.83
Amphibian & Turtle Habitat (AM)	7.89	Higher	3.36	Moderate	7.47	4.13
Waterbird Feeding Habitat (WBF)	5.56	Moderate	2.50	Moderate	4.42	2.50
Waterbird Nesting Habitat (WBN)	3.68	Moderate	0.00	Lower	3.14	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.61	Higher	0.00	Lower	7.96	0.00
Pollinator Habitat (POL)	9.32	Higher	0.00	Lower	7.51	0.00
Native Plant Habitat (PH)	5.94	Moderate	5.94	Moderate	5.48	5.16
Public Use & Recognition (PU)			2.08	Lower		1.81
Wetland Sensitivity (Sens)			2.66	Lower		3.00
Wetland Ecological Condition (EC)			7.59	Higher		8.61
Wetland Stressors (STR) (higher score means more stress)			0.00	Lower		2.24
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	2.29	Lower	1.18	Lower	5.28	1.25
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.58	Lower	1.20	Lower	6.08	1.84
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.21	Moderate	4.62	Moderate	4.17	3.13
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	5.65	Moderate	2.26	Lower	5.24	2.73
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.95	Higher	3.96	Moderate	7.47	3.44
WETLAND CONDITION (EC)			7.59	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			1.33	Lower		2.62

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Wind Energy Converter WL- E
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	Sept 5, 2019
Nearest Town:	Grande Anse, NB
Latitude (decimal degrees):	47.8251
Longitude (decimal degrees):	-65.0944
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	1,062 ha
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 **wetland** were you able to visit?	50
What percent (approx.) of the **AA** 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:	No
Have you attended a WESP-AC training session? If so, indicate approximate month & year.	Yes
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: Sept 5, 2019	Site Identifier: Wind Energy Converter WL-E	Investigator: DM, BL

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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 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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<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.	1			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	1			
		100 - 500 m.	0			
		0.5- 1 km.	0			
		1 - 5 km.	0			
		>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.	0			
		5-10 km.	0			
		>10 km.	1			
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-tida**l 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)	0.90	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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.		[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.	1			
		Southward (S, SW). south-facing contributing area.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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.	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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: Sept 5, 2019	Site Identifier: Wind Energy Converter WL-E	Data DM, BL		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	3			

		deciduous trees taller than 3 m.	5	PH, POL, SBM, Sens]
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		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	
*Note : 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 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]
		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.	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.	1	
		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.	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.	1	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	0	
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.	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%) *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.	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		NoHerbCov
		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.	0		
		25-50% of the herbaceous part of the AA.	0		
		50-95% of the herbaceous part of the AA.	1		
		>95% of the herbaceous part of the AA.	0		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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 rainstorms), 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		AllSat2
		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		AllSat1
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		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	NoSeasonal
		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	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]	
		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).					TooSmall
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]	NoPonded
		<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.	1		
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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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 off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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.	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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	1		
		2-5%.	0		
		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.					
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		BuffAllNat

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	
		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 in (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: *[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.]*		[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: *[See note above.]*		[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 SuppInfo 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]		

Investigator: DM, BL	Site Identifier: Wind Energy Converter WL-E	Date: Sept 5, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	1
	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.	
	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.	

	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
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.				
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=	2
			Stressor subscore=	0.17

S2	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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 NMZ overlay in Google Earth: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	1
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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.	1
			Sum=	3
			Stressor subscore=	0.33

S3	**Accelerated Inputs of Nutrients**	
	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]	
	Stormwater or wastewater effluent (including failing septic systems), landfills.	
	Fertilizers applied to lawns, ag lands, or other areas in the CA.	
	Livestock, dogs.	1
	Artificial drainage of upslope lands.	
	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.	

	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.	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.	1
			Sum=	3
			Stressor subscore=	0.33

S4	**Excessive Sediment Loading *from Contributing Area***	
	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]	
	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.	1
	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.	

	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.	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=**	4
			Stressor subscore=	0.33

S5	**Soil or Sediment Alteration *Within the Assessment Area***	
	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]	
	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.	1
	Ditch cleaning or dredging in or adjacent to the wetland.	1
	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.	
	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.	

	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.	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=	4
			Stressor subscore=	0.33

Assessment Area (AA) Results:

Wetland ID: Wind Energy Converter WL-E

Date:

Observer: DM, BL

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)	5.35	Higher	2.18	Lower	5.85	2.25
Stream Flow Support (SFS)	2.29	Lower	9.15	Higher	1.22	5.33
Water Cooling (WC)	3.00	Moderate	0.44	Lower	2.00	0.26
Sediment Retention & Stabilisation (SR)	3.30	Moderate	1.28	Lower	5.41	0.78
Phosphorus Retention (PR)	2.03	Lower	3.32	Moderate	4.34	3.33
Nitrate Removal & Retention (NR)	3.32	Moderate	3.25	Moderate	5.88	4.00
Carbon Sequestration (CS)	4.82	Moderate			6.64	
Organic Nutrient Export (OE)	5.27	Higher			5.13	
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)	3.20	Moderate	4.47	Moderate	5.00	3.66
Amphibian & Turtle Habitat (AM)	6.51	Higher	4.53	Moderate	6.74	4.84
Waterbird Feeding Habitat (WBF)	5.60	Moderate	3.33	Moderate	4.46	3.33
Waterbird Nesting Habitat (WBN)	3.71	Moderate	2.50	Moderate	3.17	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.13	Higher	2.50	Lower	7.57	2.50
Pollinator Habitat (POL)	8.57	Higher	0.00	Lower	6.90	0.00
Native Plant Habitat (PH)	5.89	Moderate	5.56	Moderate	5.46	4.82
Public Use & Recognition (PU)			2.55	Moderate		2.14
Wetland Sensitivity (Sens)			4.47	Moderate		3.54
Wetland Ecological Condition (EC)			7.59	Higher		8.61
Wetland Stressors (STR) (higher score means more stress)			1.75	Lower		2.90
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	2.29	Lower	2.18	Lower	5.85	2.25
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.10	Moderate	2.97	Lower	6.10	3.35
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.35	Moderate	6.92	Higher	4.23	4.21
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.84	Moderate	3.30	Moderate	4.81	3.49
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.49	Higher	4.12	Moderate	7.10	3.63
WETLAND CONDITION (EC)			7.59	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			3.11	Moderate		3.22

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Tapline WL-1
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	July 23, 2019
Nearest Town:	Grande Anse, NB
Latitude (decimal degrees):	47.779306°
Longitude (decimal degrees):	-65.127083°
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	18 ha (linear corridor)
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 **wetland** were you able to visit?	<5
What percent (approx.) of the **AA** 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
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: July 23, 2019	Site Identifier: Tapline WL-1	Investigator: DM

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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.	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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<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.	1			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	0			
		2-5 km.	0			
		5-10 km.	0			
		>10 km.	1			
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-tida**l 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)	3.75	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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.		[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.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	1			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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).	1			
		None of the above, or no data.	0			
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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: July 23, 2019	Site Identifier: Tapline WL-1	Investigator: DM		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	1			
		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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	4			

		deciduous trees taller than 3 m.	3	PH, POL, SBM, Sens]
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		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	
*Note : 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 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]
		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.	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.	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.	1	
		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.	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.	1	
		Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.	0	
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 **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.	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%) *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).	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).	1		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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 rainstorms), 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		AllSat2
		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		AllSat1
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		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	
		None, or <0.01 hectare and <1% of the AA. **SKIP to F29.**	0		NoSeasonal
		1-20% of the AA, or <1% but >0.01 ha.	0		

		20-50% of the AA.	1	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]	
		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).	1		
		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).					TooSmall
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]	NoPonded
		<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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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 off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	1		
		2-5%.	0		
		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.					
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		BuffAllNat

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 in (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: *[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.]*		[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: *[See note above.]*		[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).	1			
		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.	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_Calcar worksheet in the accompanying SuppInfo 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]		

Investigator: Derrick Mitchell	Site Identifier: Tapline WL 1	Date: July 23, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	
	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.	

	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
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.				
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=	2
			Stressor subscore=	0.17

S2	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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 NMZ overlay in Google Earth: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	1
	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.	

	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.	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=**	4
			Stressor subscore=	0.33

S5	**Soil or Sediment Alteration *Within the Assessment Area***	
	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]	
	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.	
	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.	

	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: Tapline WL 1

Date:

Observer: DM

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)	0.97	Lower	9.37	Higher	2.48	9.38
Stream Flow Support (SFS)	4.58	Moderate	10.00	Higher	2.44	19.76
Water Cooling (WC)	7.80	Higher	8.97	Higher	5.20	5.40
Sediment Retention & Stabilisation (SR)	1.87	Moderate	6.80	Moderate	4.44	4.13
Phosphorus Retention (PR)	2.79	Moderate	6.54	Higher	4.88	6.25
Nitrate Removal & Retention (NR)	2.89	Moderate	10.00	Higher	5.62	10.00
Carbon Sequestration (CS)	4.72	Moderate			6.60	
Organic Nutrient Export (OE)	5.82	Higher			5.42	
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)	6.21	Higher	3.84	Moderate	6.06	3.32
Amphibian & Turtle Habitat (AM)	4.34	Moderate	8.33	Higher	5.59	7.15
Waterbird Feeding Habitat (WBF)	4.46	Moderate	10.00	Higher	3.55	10.00
Waterbird Nesting Habitat (WBN)	3.36	Moderate	0.00	Lower	2.87	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.52	Higher	10.00	Higher	7.89	10.00
Pollinator Habitat (POL)	8.56	Higher	0.00	Lower	6.89	0.00
Native Plant Habitat (PH)	7.78	Higher	5.68	Moderate	6.22	4.93
Public Use & Recognition (PU)			1.90	Lower		1.68
Wetland Sensitivity (Sens)			9.48	Higher		5.04
Wetland Ecological Condition (EC)			4.22	Moderate		6.67
Wetland Stressors (STR) (higher score means more stress)			3.81	Moderate		3.66
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	4.58	Moderate	9.37	Higher	2.48	9.38
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.71	Lower	8.89	Higher	5.99	8.40
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.95	Higher	8.80	Higher	5.42	14.63
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	3.45	Moderate	6.83	Higher	4.00	6.71
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.07	Higher	7.61	Higher	7.45	7.49
WETLAND CONDITION (EC)			4.22	Moderate		6.67
WETLAND RISK (average of Sensitivity & Stressors)			6.65	Higher		4.35

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Tapline WL-2
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	July 24, 2019
Nearest Town:	Grande Anse, NB
Latitude (decimal degrees):	47.786160°
Longitude (decimal degrees):	-65.130557°
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	18 ha (linear corridor)
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 **wetland** were you able to visit?	<5
What percent (approx.) of the **AA** 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
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: July 24, 2019	Site Identifier: Tapline WL-2	Investigator: DM

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	1			
		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.	1			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	0			

		>500 m.	1			
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.	0			
		5-10 km.	0			
		>10 km.	1			
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-tida**l 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)	0.00	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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.		[NRv, PRv, SRv, WSv]		
		Mostly true.	0			
		Somewhat true.	1			

		Mostly untrue.	0			
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.	1			
		Southward (S, SW). south-facing contributing area.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0			
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.	1			
		100 - 1000 m.	0			
		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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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.	1			
		Is probably is 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).	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 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.	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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: July 24, 2019	Site Identifier: Tapline WL-2	Investigator: DM, BL		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	2			

		deciduous trees taller than 3 m.	4	PH, POL, SBM, Sens]
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		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	
*Note : 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 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]
		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.	0	
		broad-leaved deciduous 10-19 cm diameter.	1	
		coniferous, 20-40 cm diameter.	0	
		broad-leaved deciduous 20-40 cm diameter.	0	
		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.	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.	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).	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 **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.	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%) *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).	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.	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		
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		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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.	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 SuppInfo 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 rainstorms), 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		AllSat2
		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		AllSat1
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		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	NoSeasonal
		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	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]	
		50-95% of the AA.	1		
		>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).					TooSmall
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).	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]	NoPonded
		<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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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.	1		
		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 (*Typha* spp.), common reed (*Phragmites*), 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.**	1		NoRobustEm
		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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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 off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	1		
		2-5%.	0		
		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.					
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		BuffAllNat

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).	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%.	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 in (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: *[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.]*		[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: *[See note above.]*		[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.	1			
		Trapping of furbearers.	0			
		None of the above.	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_Calcar worksheet in the accompanying SuppInfo 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]		

Investigator: Derrick Mitchell	Site Identifier: Tapline WL-2	Date: July 24, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	
	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.	

	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.	
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.				
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	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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 RMZ overlay in Google Earth: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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: Tapline WL-2

Date:

Observer: DM

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)	2.07	Lower	1.18	Lower	3.33	1.25
Stream Flow Support (SFS)	6.56	Higher	3.99	Moderate	3.50	2.33
Water Cooling (WC)	6.35	Higher	6.55	Higher	4.23	3.94
Sediment Retention & Stabilisation (SR)	3.25	Moderate	6.62	Moderate	5.38	4.02
Phosphorus Retention (PR)	0.82	Lower	6.08	Higher	3.48	5.83
Nitrate Removal & Retention (NR)	1.43	Lower	10.00	Higher	4.71	10.00
Carbon Sequestration (CS)	4.25	Moderate			6.40	
Organic Nutrient Export (OE)	3.09	Lower			3.98	
Anadromous Fish Habitat (FA)	9.11	Higher	4.75	Higher	5.58	3.51
Resident Fish Habitat (FR)	4.54	Moderate	4.81	Higher	2.70	3.41
Aquatic Invertebrate Habitat (INV)	5.16	Moderate	7.37	Higher	5.69	5.22
Amphibian & Turtle Habitat (AM)	4.96	Moderate	6.52	Higher	5.92	6.05
Waterbird Feeding Habitat (WBF)	6.36	Moderate	5.00	Moderate	5.06	5.00
Waterbird Nesting Habitat (WBN)	4.64	Moderate	5.00	Moderate	3.97	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.75	Higher	5.00	Moderate	8.08	5.00
Pollinator Habitat (POL)	8.84	Higher	0.00	Lower	7.12	0.00
Native Plant Habitat (PH)	7.92	Higher	5.84	Moderate	6.28	5.07
Public Use & Recognition (PU)			1.81	Lower		1.62
Wetland Sensitivity (Sens)			5.65	Higher		3.89
Wetland Ecological Condition (EC)			3.25	Moderate		6.11
Wetland Stressors (STR) (higher score means more stress)			0.13	Lower		2.31
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	6.56	Higher	1.18	Lower	3.33	1.25
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.54	Lower	8.78	Higher	5.69	8.31
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.93	Moderate	6.67	Higher	5.02	4.52
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	7.52	Higher	5.87	Moderate	5.28	5.32
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.29	Higher	4.73	Moderate	7.62	4.21
WETLAND CONDITION (EC)			3.25	Moderate		6.11
WETLAND RISK (average of Sensitivity & Stressors)			2.89	Moderate		3.10

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Tapline WL 3
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	July 25, 2019
Nearest Town:	Grand Anse, NB
Latitude (decimal degrees):	47.791805°
Longitude (decimal degrees):	-65.133758°
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	18 ha (linear corridor)
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	95
What percent (approx.) of the **wetland** were you able to visit?	95
What percent (approx.) of the **AA** 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
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: July 25, 2019	Site Identifier: Tapline WL 3	Investigator: Derrick Mitchell

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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.	1			
		1 to 10 hectares.	0			
		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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	1			
		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.	1			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	1			
		0.5- 1 km.	0			
		1 - 5 km.	0			
		>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.	0			
		5-10 km.	0			
		>10 km.	1			
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-tida**l 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)	5.50	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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%.	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.		[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.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	1			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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.	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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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			

Date: July 25, 2019	Site Identifier: Tapline WL 3	Investigator: Derrick Mitchell		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	3			

		deciduous trees taller than 3 m.	3	PH, POL, SBM, Sens]
		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.	3	
		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.	1	
*Note : 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 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]
		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.	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).	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 **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.	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%) *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).	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.	1		
		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.	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		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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.	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 rainstorms), 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 persistently ponded water body larger than 1 ha in the AA.	0		AllSat2
		99-100%. AND there is no persistently ponded water body larger than 1 ha within the AA. Enter "1" and **SKIP to F42** (Channel Connection).	0		AllSat1
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.**	1		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	
		None, or <0.01 hectare and <1% of the AA. **SKIP to F29.**	0		NoSeasonal
		1-20% of the AA, or <1% but >0.01 ha.	0		

		20-50% of the AA.	1	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]	
		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		TooSmall
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.**	0		NoPonded
		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).	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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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.	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".	0		
		Neither of above. Enter "1".	1		
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	0		
		2-5%.	1		
		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.					
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		BuffAllNat

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 in (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: *[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.]*		[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: *[See note above.]*		[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.	1			
		>500 m. away, or no information.	0			
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants_Calcar worksheet in the accompanying SuppInfo 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]		

Investigator: Derrick Mitchell	Site Identifier: Tapline WL 3	Date: July 25, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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).	1
	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.	
	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.	

	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
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.				
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	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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 NMZ overlay in Google Earth: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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: WL 3

Date: August 2, 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)	2.93	Moderate	10.00	Higher	3.99	15.63
Stream Flow Support (SFS)	2.71	Lower	10.00	Higher	1.44	28.32
Water Cooling (WC)	5.85	Higher	5.66	Higher	3.90	3.41
Sediment Retention & Stabilisation (SR)	2.26	Moderate	1.56	Lower	4.71	0.94
Phosphorus Retention (PR)	1.62	Lower	1.24	Lower	4.05	1.46
Nitrate Removal & Retention (NR)	4.35	Moderate	7.19	Moderate	6.51	7.50
Carbon Sequestration (CS)	2.79	Lower			5.77	
Organic Nutrient Export (OE)	8.75	Higher			6.98	
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)	3.01	Moderate	3.99	Moderate	4.93	3.39
Amphibian & Turtle Habitat (AM)	4.67	Moderate	5.17	Moderate	5.77	5.23
Waterbird Feeding Habitat (WBF)	5.83	Moderate	5.00	Moderate	4.64	5.00
Waterbird Nesting Habitat (WBN)	4.58	Moderate	5.00	Moderate	3.91	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.30	Higher	5.00	Moderate	6.05	5.00
Pollinator Habitat (POL)	8.88	Higher	0.00	Lower	7.15	0.00
Native Plant Habitat (PH)	4.27	Moderate	5.07	Moderate	4.81	4.40
Public Use & Recognition (PU)			2.00	Lower		1.75
Wetland Sensitivity (Sens)			10.00	Higher		5.81
Wetland Ecological Condition (EC)			1.08	Lower		4.86
Wetland Stressors (STR) (higher score means more stress)			7.01	Higher		4.83
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	2.93	Moderate	10.00	Higher	3.99	15.63
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.55	Moderate	5.26	Moderate	5.89	5.40
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.92	Higher	8.28	Higher	5.65	20.02
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.42	Moderate	4.10	Moderate	4.31	4.14
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.85	Higher	4.21	Moderate	6.58	4.07
WETLAND CONDITION (EC)			1.08	Lower		4.86
WETLAND RISK (average of Sensitivity & Stressors)			8.50	Higher		5.32

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Tapline WL 4
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	July 25, 2019
Nearest Town:	Grand Anse, NB
Latitude (decimal degrees):	47.799874°
Longitude (decimal degrees):	-65.115124°
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	18 ha (linear corridor)
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 **wetland** were you able to visit?	75
What percent (approx.) of the **AA** 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
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: July 25, 2019	Site Identifier: Tapline WL 4	Investigator: Derrick Mitchell

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<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.	1			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	1			
		0.5- 1 km.	0			
		1 - 5 km.	0			
		>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			

		>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.	0			
		>10 km.	1			
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-tida**l 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)	1.42	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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%.	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.		[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).	0			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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.	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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: July 25, 2019	Site Identifier: Tapline WL 4	Investigator: Derrick Mitchell		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	1			
		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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	3			

		deciduous trees taller than 3 m.	3	PH, POL, SBM, Sens]
		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.	1	
		deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.	1	
*Note : 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 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]
		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.	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).	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 **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).	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.	1		
		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.	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		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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 rainstorms), 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 persistently ponded water body larger than 1 ha in the AA.	0		AllSat2
		99-100%. AND there is no persistently ponded water body larger than 1 ha within the AA. Enter "1" and **SKIP to F42** (Channel Connection).	0		AllSat1
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.**	1		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	
		None, or <0.01 hectare and <1% of the AA. **SKIP to F29.**	0		NoSeasonal
		1-20% of the AA, or <1% but >0.01 ha.	0		

		20-50% of the AA.	1	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]	
		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).	1		
		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		TooSmall
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.**	0		NoPonded
		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).	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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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.	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".	0		
		Neither of above. Enter "1".	1		
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	0		
		2-5%.	1		
		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.					
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		BuffAllNat

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	
		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 in (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: *[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.]*		[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: *[See note above.]*		[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.	1			
		>500 m. away, or no information.	0			
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants_Calcar worksheet in the accompanying SuppInfo 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]		

Investigator: Derrick Mitchell	Site Identifier: Tapline WL 4	Date: July 25, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	
	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.	

	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
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.				
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	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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 NMZ overlay in Google Earth: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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: WL-4 Naveco Transmission Line

Date: Sept 5, 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)	6.80	Higher	5.39	Moderate	6.96	5.43
Stream Flow Support (SFS)	0.00	Lower	0.00	Lower	0.00	0.00
Water Cooling (WC)	7.05	Higher	0.00	Lower	4.70	0.00
Sediment Retention & Stabilisation (SR)	10.00	Higher	1.07	Lower	10.00	0.65
Phosphorus Retention (PR)	10.00	Higher	0.92	Lower	10.00	1.17
Nitrate Removal & Retention (NR)	10.00	Higher	7.19	Moderate	10.00	7.50
Carbon Sequestration (CS)	6.46	Higher			7.35	
Organic Nutrient Export (OE)	6.64	Higher			5.86	
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)	3.00	Moderate	3.59	Moderate	4.93	3.18
Amphibian & Turtle Habitat (AM)	4.00	Moderate	7.63	Higher	5.42	6.72
Waterbird Feeding Habitat (WBF)	4.90	Moderate	10.00	Higher	3.90	10.00
Waterbird Nesting Habitat (WBN)	4.09	Moderate	0.00	Lower	3.49	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.54	Higher	10.00	Higher	6.25	10.00
Pollinator Habitat (POL)	9.88	Higher	0.00	Lower	7.95	0.00
Native Plant Habitat (PH)	6.87	Higher	5.46	Moderate	5.86	4.74
Public Use & Recognition (PU)			2.25	Lower		1.93
Wetland Sensitivity (Sens)			10.00	Higher		5.87
Wetland Ecological Condition (EC)			4.22	Moderate		6.67
Wetland Stressors (STR) (higher score means more stress)			1.69	Lower		2.88
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	6.80	Higher	5.39	Moderate	6.96	5.43
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	9.56	Higher	5.12	Moderate	9.67	5.30
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.61	Moderate	2.39	Moderate	4.86	2.12
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	3.75	Moderate	6.76	Higher	3.99	6.67
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.99	Higher	7.58	Higher	7.32	7.46
WETLAND CONDITION (EC)			4.22	Moderate		6.67
WETLAND RISK (average of Sensitivity & Stressors)			5.85	Higher		4.38

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Tapline WL 5
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	July 25, 2019
Nearest Town:	Grand Anse, NB
Latitude (decimal degrees):	47.798647°
Longitude (decimal degrees):	-65.106304°
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	18 ha (linear corridor)
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	70
What percent (approx.) of the **wetland** were you able to visit?	70
What percent (approx.) of the **AA** 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
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: July 25, 2019	Site Identifier: Tapline WL 5	Investigator: Derrick Mitchell

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	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 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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<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.]	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.	1			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	1			
		1 - 5 km.	0			
		>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.	1			
		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.	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.	0			
		5-10 km.	0			
		>10 km.	1			
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-tida**l 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)	2.50	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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.		[NRv, PRv, SRv, WSv]		
		Mostly true.	1			
		Somewhat true.	0			

		Mostly untrue.	0			
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).	0			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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.	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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: July 25, 2019	Site Identifier: Tapline WL 5	Investigator: Derrick Mitchell		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	5			

		deciduous trees taller than 3 m.	2	PH, POL, SBM, Sens]
		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.	0	
*Note : 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 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]
		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.	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	
		>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.	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.	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		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* spp.) occupy:		[CS]	
		<5% of the vegetated area, or none.	0		
		5-50% of the vegetated area.	0		

		50-95% of the vegetated area.	1		
		>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 SuppInfo 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 rainstorms), 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 persistently ponded water body larger than 1 ha in the AA.	0		AllSat2
		99-100%. AND there is no persistently ponded water body larger than 1 ha within the AA. Enter "1" and **SKIP to F42** (Channel Connection).	0		AllSat1
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.**	1		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	
		None, or <0.01 hectare and <1% of the AA. **SKIP to F29.**	0		NoSeasonal
		1-20% of the AA, or <1% but >0.01 ha.	0		

		20-50% of the AA.	1	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]	
		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).	1		
		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		TooSmall
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.**	0		NoPonded
		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).	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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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.	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".	0		
		Neither of above. Enter "1".	1		
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	0		
		2-5%.	1		
		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.					
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		BuffAllNat

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	
		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 in (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: *[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.]*		[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: *[See note above.]*		[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.	1			
		>500 m. away, or no information.	0			
F66	Calcareous Fen	The AA is, or is part of, a calcareous fen. See the Plants_Calcar worksheet in the accompanying SuppInfo 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]		

Investigator: Derrick Mitchell	Site Identifier: Tapline WL 5	Date: July 25, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	1
	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.	
	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.	

	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.	2
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.				
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.	1
			Sum=	8
			Stressor subscore=	0.67

S2	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	1
	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.	
	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.	

	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: WL-5 Naveco Transmisison Line

Date: Sept 5, 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)	6.71	Higher	8.74	Higher	6.89	8.75
Stream Flow Support (SFS)	0.00	Lower	0.00	Lower	0.00	0.00
Water Cooling (WC)	7.05	Higher	0.00	Lower	4.70	0.00
Sediment Retention & Stabilisation (SR)	10.00	Higher	1.53	Lower	10.00	0.93
Phosphorus Retention (PR)	10.00	Higher	1.47	Lower	10.00	1.67
Nitrate Removal & Retention (NR)	10.00	Higher	5.00	Moderate	10.00	5.56
Carbon Sequestration (CS)	5.09	Moderate			6.76	
Organic Nutrient Export (OE)	5.99	Higher			5.51	
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)	2.09	Lower	4.22	Moderate	4.61	3.52
Amphibian & Turtle Habitat (AM)	4.37	Moderate	5.56	Moderate	5.61	5.47
Waterbird Feeding Habitat (WBF)	6.16	Moderate	5.00	Moderate	4.90	5.00
Waterbird Nesting Habitat (WBN)	4.81	Moderate	5.00	Moderate	4.11	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.84	Higher	5.00	Moderate	6.50	5.00
Pollinator Habitat (POL)	9.73	Higher	3.33	Moderate	7.83	3.33
Native Plant Habitat (PH)	8.17	Higher	6.79	Higher	6.38	5.89
Public Use & Recognition (PU)			2.31	Lower		1.98
Wetland Sensitivity (Sens)			7.29	Higher		4.39
Wetland Ecological Condition (EC)			4.22	Moderate		6.67
Wetland Stressors (STR) (higher score means more stress)			7.48	Higher		5.01
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	6.71	Higher	8.74	Higher	6.89	8.75
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	9.39	Higher	3.83	Lower	9.59	4.14
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.42	Moderate	2.81	Moderate	4.61	2.35
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.61	Moderate	4.34	Moderate	4.27	4.28
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.15	Higher	5.91	Higher	7.37	5.31
WETLAND CONDITION (EC)			4.22	Moderate		6.67
WETLAND RISK (average of Sensitivity & Stressors)			7.39	Higher		4.70

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Tapline WL-6
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	July 24, 2019
Nearest Town:	Grand Anse, NB
Latitude (decimal degrees):	47.770160°
Longitude (decimal degrees):	-65.135788°
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	18 ha (linear corridor)
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 **wetland** were you able to visit?	10
What percent (approx.) of the **AA** 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
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: July 24 ,2019	Site Identifier: Tapline WL-6	Investigator: DM

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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.	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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation.	1			
		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.	1			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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 pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	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.	0			
		5-10 km.	0			
		>10 km.	1			
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-tida**l 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)	1.00	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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.		[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.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	1			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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).	1			
		None of the above, or no data.	0			
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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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.	1			

Date: July 24, 2019	Site Identifier: Tapline WL- 6	Investigator: DM		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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.	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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	3			

		deciduous trees taller than 3 m.	3	PH, POL, SBM, Sens]
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		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	
*Note : 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 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]
		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.	0	
		broad-leaved deciduous 20-40 cm diameter.	0	
		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.	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.	1	
		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.	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.	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 **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.	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.	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).	1		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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 rainstorms), 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		AllSat2
		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		AllSat1
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		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	
		None, or <0.01 hectare and <1% of the AA. **SKIP to F29.**	0		NoSeasonal
		1-20% of the AA, or <1% but >0.01 ha.	0		

		20-50% of the AA.	0	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]	
		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).					TooSmall
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		NoPonded
		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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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 off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]			
		Conductivity is [E*nter 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]	TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	0		
		2-5%.	1		
		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.					
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		BuffAllNat

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	
		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 in (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: *[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.]*		[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: *[See note above.]*		[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 SuppInfo 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]		

Investigator: Derrick Mitchell	Site Identifier: Tapline WL 6	Date: July 24, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	
	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.	

	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.	3
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.				
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.	1
			Sum=	8
			Stressor subscore=	0.67

S2	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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 RMZ overlay in Google Earth: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	1
	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.	

	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.	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=**	4
			Stressor subscore=	0.33

S5	**Soil or Sediment Alteration *Within the Assessment Area***	
	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]	
	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.	
	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.	

	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: Tapline WL 6

Date:

Observer: DM

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)	4.96	Moderate	2.44	Lower	5.55	2.50
Stream Flow Support (SFS)	2.60	Lower	10.00	Higher	1.39	6.03
Water Cooling (WC)	0.00	Lower	0.00	Lower	0.00	0.00
Sediment Retention & Stabilisation (SR)	3.50	Moderate	1.10	Lower	5.56	0.67
Phosphorus Retention (PR)	2.65	Lower	0.37	Lower	4.78	0.67
Nitrate Removal & Retention (NR)	2.67	Moderate	2.50	Lower	5.48	3.33
Carbon Sequestration (CS)	6.44	Higher			7.34	
Organic Nutrient Export (OE)	6.77	Higher			5.93	
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)	6.63	Higher	0.66	Lower	6.21	1.60
Amphibian & Turtle Habitat (AM)	2.11	Lower	2.15	Lower	4.41	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)	6.27	Moderate	10.00	Higher	5.20	10.00
Pollinator Habitat (POL)	7.33	Moderate	0.00	Lower	5.90	0.00
Native Plant Habitat (PH)	5.31	Moderate	4.26	Moderate	5.23	3.70
Public Use & Recognition (PU)			2.15	Lower		1.86
Wetland Sensitivity (Sens)			8.27	Higher		4.68
Wetland Ecological Condition (EC)			7.83	Higher		8.75
Wetland Stressors (STR) (higher score means more stress)			1.84	Lower		2.93
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	2.60	Moderate	2.44	Lower	5.55	2.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.22	Moderate	1.91	Lower	6.57	2.44
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.39	Moderate	6.78	Higher	4.79	4.29
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	1.26	Lower	1.29	Lower	2.65	2.04
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	6.82	Moderate	7.38	Higher	5.67	7.28
WETLAND CONDITION (EC)			7.83	Higher		8.75
WETLAND RISK (average of Sensitivity & Stressors)			5.05	Higher		3.81

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	Tapline WL-7
Investigator Name:	Derrick Mitchell
Date of Field Assessment:	July 24, 2019
Nearest Town:	Grand Anse, NB
Latitude (decimal degrees):	47.763225°
Longitude (decimal degrees):	-65.139596°
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	18 ha (linear corridor)
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 **wetland** were you able to visit?	<5
What percent (approx.) of the **AA** 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
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: July 24, 2019	Site Identifier: Tapline WL-7	Investigator: DM

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. 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: https://www.google.com/earth/download/gep/agree.html

GeoNB: http://www.snb.ca/geonb1/ and http://www.snb.ca/geonb1/e/apps/apps-E.asp

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	Cell Name	Comments
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		NB	
		Nova Scotia	0		NS	
		Prince Edward Island	0		PEI	
		Newfoundland-Labrador	0		NL	
OF2	Ponded Area Within 1 km.	The area of **surface wate**r 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.	1			
		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.	0			
		>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.		

		<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	[AM, PH, POL, SBM, Sens]		
		<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).	1			
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.	1			
		60 to 90% of the land.	0			
		>90% of the land. **SKIP to OF10.**	0			
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.	1			
		Bare pervious surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1			
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.	1			
		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.	0			
		5-10 km.	0			
		>10 km.	1			
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-tida**l 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)	1.10	[FA, NR, Sens, SFSv, WCv, WSv]	ShedPos	
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): http://atlas.gc.ca/toporama/en/index.html [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%.	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.		[NRv, PRv, SRv, WSv]		
		Mostly true.	0			
		Somewhat true.	1			

		Mostly untrue.	0			
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.	1			
		Southward (S, SW). south-facing contributing area.	0			
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	0			
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.	0			
		1- 2 km.	0			
		>2 km, **or wetland lacks an inlet and outlet.**	1			
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.	1500	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]	GrowD	
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [M*ark 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: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]		
		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: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	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 is 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 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).	1			
		None of the above, or no data.	0			
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: http://www.ibacanada.com/mapviewer.jsp?lang=EN [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.		[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.**		[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**		[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 http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [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.	0			
		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			

Date: July 24, 2019	Site Identifier: Tapline WL-7	Investigator: DM		

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 knowledgable 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	Cell Name	Comments
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 (*Myrica gale*) 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 (*Carex rariflor* a). 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		Fen_	
		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** 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		Marsh	
		Reminder *: 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 (*Morella*), 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,		
		coniferous trees (may include tamarack) taller than 3 m.	4			

		deciduous trees taller than 3 m.	4	PH, POL, SBM, Sens]
		coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.	4	
		deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.	3	
		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	
*Note : 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 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]
		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.	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.	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	
		>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.	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.	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		NoHerbCov
		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		AllForbCov
F18	Sedge Cover	Sedges (*Carex* spp.) and cottongrass (*Eriophorum* 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 SuppInfo 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 rainstorms), 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		AllSat2
		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		AllSat1
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		NoPersis
		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		AllWet
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 visualizing where that would intersect the land along	
		None, or <0.01 hectare and <1% of the AA. **SKIP to F29.**	0		NoSeasonal
		1-20% of the AA, or <1% but >0.01 ha.	1		

		20-50% of the AA.	0	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]	
		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).	1		
		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).					TooSmall
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]	NoPonded
		<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.	1		
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.	OpenW
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		NoOpenPonded
		1-4% of the ponded water. Enter "1" and **SKIP to F41** (Floating Algae & Duckweed).	0		NoOpenPonded1
		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		AllOpenPond
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 (*Typha* spp.), common reed (*Phragmites*), 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]	NoRobustEm
		<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		DeepPersis
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 (http://atlas.nrcan.gc.ca/toporama/en/index.html) [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		OutNone1
		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		Outnone
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]	Inflows
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 off 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: [E*nter the reading* ***in ppm or mg/L*** *in the column to the right, if measured, or answer next row.*]		
		Conductivity is [E*nter 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] TooSteep
		<2% **or** the AA has no surface water outlet (not even seasonally).	1	
		2-5%.	0	
		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.				
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	BuffAllNat

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 in (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: *[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.]*		[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: *[See note above.]*		[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).	1			
		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.	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_Calcar worksheet in the accompanying SuppInfo 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]		

Investigator: Derrick Mitchell	Site Identifier: Tapline WL-7	Date: July 24, 2019

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

		Data
S1	**Aberrant Timing of Water Inputs**	
	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]	
	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.	
	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.	

	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.	
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.				
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	**Accelerated Inputs of Contaminants and/or Salts**	
	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]	
	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 NMZ overlay in Google Earth: https://www.ec.gc.ca/inrp-npri/default.asp?lang=En&n=B85A1846-1	
	Road salt.	
	Spraying of pesticides, as applied to lawns, croplands, roadsides, or other areas in the CA.	
	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.	

	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	**Accelerated Inputs of Nutrients**	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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***	
	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]	
	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.	
	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.	

	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: Tapline WL-7

Date:

Observer: DM

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)	1.42	Lower	6.47	Higher	2.82	6.50
Stream Flow Support (SFS)	10.00	Higher	10.00	Higher	5.56	6.27
Water Cooling (WC)	3.50	Moderate	4.67	Moderate	2.33	2.81
Sediment Retention & Stabilisation (SR)	1.28	Lower	1.76	Lower	4.03	1.07
Phosphorus Retention (PR)	2.94	Moderate	1.86	Moderate	4.98	2.01
Nitrate Removal & Retention (NR)	1.41	Lower	5.50	Moderate	4.70	6.00
Carbon Sequestration (CS)	6.67	Higher			7.44	
Organic Nutrient Export (OE)	5.55	Higher			5.28	
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)	2.11	Lower	4.38	Moderate	4.61	3.60
Amphibian & Turtle Habitat (AM)	5.57	Moderate	5.62	Moderate	6.24	5.50
Waterbird Feeding Habitat (WBF)	5.19	Moderate	5.00	Moderate	4.13	5.00
Waterbird Nesting Habitat (WBN)	4.55	Moderate	5.00	Moderate	3.89	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	8.89	Higher	10.00	Higher	7.37	10.00
Pollinator Habitat (POL)	7.97	Higher	0.00	Lower	6.42	0.00
Native Plant Habitat (PH)	4.25	Moderate	5.29	Moderate	4.80	4.59
Public Use & Recognition (PU)			1.90	Lower		1.68
Wetland Sensitivity (Sens)			5.46	Higher		3.84
Wetland Ecological Condition (EC)			7.11	Higher		8.33
Wetland Stressors (STR) (higher score means more stress)			3.00	Moderate		3.36
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	10.00	Higher	6.47	Higher	2.82	6.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.41	Lower	4.27	Moderate	6.36	4.51
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.64	Higher	8.17	Higher	5.00	5.25
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.32	Moderate	4.37	Moderate	4.55	4.30
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.96	Higher	7.55	Higher	6.78	7.43
WETLAND CONDITION (EC)			7.11	Higher		8.33
WETLAND RISK (average of Sensitivity & Stressors)			4.23	Moderate		3.60

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.

New Brunswick Reference Scores

Min	Max	Range	F_JenksLo	F_JenksHigh	Min	Max	Range	B_JenksLo	B_JenksHigh
1.73	9.42	7.68	2.48	5.12	0.08	10.00	9.92	2.58	5.67
0.00	5.33	5.33	2.92	6.56	0.00	5.83	5.83	2.08	6.16
0.00	6.67	6.67	1.80	5.30	0.00	6.02	6.02	1.45	4.79
3.16	10.00	6.84	1.76	5.26	0.00	6.07	6.07	3.75	7.95
2.90	10.00	7.10	2.66	4.17	0.33	9.38	9.04	1.71	4.55
3.83	10.00	6.17	2.27	4.36	1.11	10.00	8.89	2.50	7.19
4.56	8.88	4.31	3.13	5.70					
2.33	7.64	5.30	3.12	5.26					
0.00	6.13	6.13	1.80	6.71	0.00	7.39	7.39	0.00	4.44
0.00	5.95	5.95	1.40	6.29	0.00	7.09	7.09	0.00	4.48
3.87	7.39	3.52	2.58	5.58	1.24	6.64	5.39	0.85	5.74
3.30	8.58	5.28	3.30	6.25	2.09	8.16	6.06	2.27	6.30
0.00	7.96	7.96	0.00	6.84	0.00	10.00	10.00	0.83	6.67
0.00	8.54	8.54	1.95	5.42	0.00	10.00	10.00	0.00	6.67
0.00	8.29	8.29	2.50	7.24	0.00	10.00	10.00	3.33	6.67
0.00	8.05	8.05	0.00	7.81	0.00	10.00	10.00	0.00	6.67
3.08	7.12	4.03	3.96	5.98	0.00	8.68	8.68	0.00	6.33
					0.33	7.44	7.11	2.40	5.51
					2.20	5.20	2.99	2.88	5.30
					4.24	10.00	5.76	3.25	6.39
					2.26	5.93	3.67	2.15	4.97
			2.48	5.12				2.58	5.67
			3.07	5.39				4.15	7.64
			3.82	6.04				1.34	4.99
			2.41	6.22				3.15	6.29
			4.68	7.60				0.00	5.33
								3.25	6.39
								2.71	4.33

F WETLAND PARCEL IDENTIFICATION NUMBERS (PIDS)

Table F-1 Parcel Identification Numbers (PIDs) for WEC Site Study Area Wetlands

WETLAND ID	AREA (m^2)	AREA (ha)	PID	
A	1,209,905	121	20086146	20145215
			20083317	20684429
			20096673	20080297
			20083325	20631123
			20561023	20077905
			20499273	20499695
			20499265	20563474
			20499182	20498713
			20086237	20100582
			20885273	20660486
			20885281	20593109
			20824520	20100137
			20885265	00000003
			20640793	20162194
			20619458	20489746
			20619441	20081279
			20089900	20503090
			20684437	20077863
			20881777	20499687
B	2,013,435	201	20094009	20097762
			20528436	20138830
			20126637	20499208
			20083382	20078275
			20598603	20087565
			20667630	20126629
			20652608	20077830
			20088381	20498713
			20096921	20498986
			20599189	20644696
			20078325	20498754
			20657722	20086260
			20508396	20782033
			20098646	20100590
			20097754	20100582
			20496816	20660486
			20078317	20086252
			20824645	20100004
			20078432	20099990
			20675849	20086179
			20088779	20092680
			20613055	20086146
			20721767	20503124
			20509279	00000003
			20086195	20162194
			20098638	-

WETLAND ID	AREA (m^2)	AREA (ha)	PID	
C	458,256	5	20098646	20563953
			20097754	20097762
			20496816	20138830
			20078317	20499208
			20078432	20078275
			20675849	20087565
			20088779	20077830
			20613055	20798195
			20721767	20498713
D	34,225	3	20498713	-
E	30,715	3	20840351	20798195
			20077830	20498713

Table F-2 Parcel Identification Numbers (PIDs) for Tapline Study Area Wetlands

WETLAND ID	AREA (m^2)	AREA (ha)	PID	
1	31,844	3	20498457	20080149
			20090825	20695391
			00000003	20080149
			20081196	-
2	4,328	<1	20498457	20509725
			20090825	-
3	2,489	<1	20498457	20509725
5	2,274	<1	20503587	-
6	14,487	1	20075925	-
7	22,747	2	20745501	20075925