

HIS TABERNACLE FAMILY CHURCH

ENVIRONMENTAL IMPACT ASSESSMENT

PID 55214803

28 Base Road, Garnett Settlement, New Brunswick

Prepared for:

His Tabernacle Family Church
% Reverend Philip Hutchins

Correspondence via email: hlcc@live.ca

FUNDY Engineering

Serving Our Clients' Needs First

8 July 2022

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PROFESSIONAL SEAL:

CONTENTS

1.0	PROPONENT.....	1
1.1	Proponent Name.....	1
1.2	Proponent Address	1
1.3	Proponent Contact.....	1
1.4	Principal Contact for Purposes of Environmental Impact Assessment.....	1
1.5	Property Ownership	1
2.0	PROJECT DESCRIPTION.....	3
2.1	Project Name	3
2.2	Project Overview.....	3
2.3	Purpose of this Environmental Impact Assessment	4
2.4	Project Purpose / Rationale / Need	4
2.5	Project Location	4
2.6	Project Alternatives.....	5
2.7	Project Details.....	5
2.7.1	Project Construction	5
2.7.1.1	Environmental Protection Measures Installation.....	6
2.7.1.2	Tree Cutting.....	7
2.7.1.3	Grubbing and Stripping.....	7
2.7.1.4	Site Levelling	7
2.7.1.5	Project Construction	8
2.7.1.6	Landscaping	8
2.7.1.7	Environmental Protection Measures Removal.....	8
2.7.2	Project Operation and Maintenance	8
2.7.3	Project Abandonment	9
2.8	Project Schedule.....	9
3.0	DESCRIPTION OF THE BASLINE ENVIRONMENT.....	10
3.1	Surface Water Environment.....	10
3.2	Biological Environment	10
3.2.1	Federal and Provincial Species At Risk Locally Present	10
3.2.2	Location Sensitive Species.....	13
3.2.3	Locally Observed Rare Species	13
3.2.4	Environmentally and Significant Managed Areas	15
3.3	Archaeological and Cultural Features.....	15
3.4	Historical Land-Use	15
4.0	IMPACT ASSESSMENT	19
4.1	Wetland Ecosystem Services Protocol – Atlantic Canada Assessment	19
4.2	Critical Adverse Environmental Effects Assessment	19
5.0	PROPOSED MITIGATION AND COMPENSATION MEASURES	27
5.1	Air Quality	27
5.2	Sound Emissions	27
5.3	Groundwater and Surface Water Quantity and Quality	27
5.4	Terrestrial Flora and Fauna	28
5.5	Aquatic Flora and Fauna	29
5.6	Archaeological and Cultural Features.....	29
5.7	Health and Safety	30

5.8	Accidents, Malfunctions, and / or Unforeseen Events	30
5.9	Wetland Compensation	31
6.0	FIRST NATIONS ENGAGEMENT AND PUBLIC INVOLVEMENT	32
6.1	First Nations Engagement	32
6.2	Public Involvement.....	32
6.2.1	Direct Communication with Elected Officials and Service Groups	32
6.2.2	Direct Written Communication with Nearby Residents	32
6.2.3	Notification on the NBDELG Website and at the Head Office	32
6.2.4	Document Availability with Stakeholder and NBDELG Offices.....	33
6.2.5	Documentation of Public Involvement Activities	33
7.0	PROJECT APPROVALS.....	34
7.1	Fisheries Act Authorization	34
7.2	Watercourse and Wetland Alteration Permit.....	34
7.3	On-Site Sewage Disposal System Approval.....	35
7.4	Building Permit.....	36
7.5	Access Road Permit / Certificate of Setback	37
8.0	PROJECT FUNDING	38
9.0	SIGNATURES	39
10.0	REFERENCES.....	40
11.0	REPORT DISCLAIMERS AND DISCLOSURES.....	41
11.1	Project Team	41
APPENDIX I:	Service New Brunswick Property Information	
APPENDIX II:	Standard Watercourse and Wetland Delineation and Wetland Functional Assessment	
APPENDIX III:	Atlantic Canada Conservation Data Centre Reports	
APPENDIX IV:	Archaeological Predictive Modelling	

TABLES

Table 1.	Typical list of heavy equipment anticipated for use during construction of the Project at 28 Base Road in Garnett Settlement, New Brunswick.....	5
Table 2.	Potential critical adverse environmental effects assessment completed for the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick.	20
Table 3.	Summary of the potential critical adverse environmental effects assessment completed for the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick.	26

FIGURES

Figure 1. Aerial photograph showing the location of PID 55214803 at 28 Base Road in Garnett Settlement, New Brunswick that is the subject of this environmental impact assessment.	2
Figure 2. Aerial photograph showing the land unconstrained by wetland, watercourses, and buffers (<i>i.e.</i> , that shown hatched in white) on PID 55214803 at 28 Base Road in Garnett Settlement, New Brunswick. The red polygons denote areas where infill is proposed to facilitate construction of the church and associated infrastructure.	3
Figure 3. Photographs of species listed under the fSARA, pSARA, and by the COSEWIC that have been observed within a 5 km radius of the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick.	11
Figure 4. Map showing the recorded observations of species listed under the fSARA, pSARA, and by the COSEWIC within a 5 km radius of the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick. Data obtained from the ACCDC.	12
Figure 5. Map showing the recorded observations of rare species within a 5 km radius of the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick. Data obtained from the ACCDC.	14
Figure 6. Aerial photograph, circa 1962, of the property proposed for His Tabernacle Family Church in Garnett Settlement, New Brunswick.	16
Figure 7. Aerial photograph, circa 1984, of the property proposed for His Tabernacle Family Church in Garnett Settlement, New Brunswick.	17
Figure 8. Aerial photograph, circa 2003, of the property proposed for His Tabernacle Family Church in Garnett Settlement, New Brunswick.	18

ACRONYMS

ACCDC:	Atlantic Canada Conservation Data Centre
B.Sc.:	Bachelor of Science
cm:	centimetre
COSEWIC:	Committee On the Status of Endangered Wildlife in Canada
CWS:	Canadian Wildlife Service
DFO:	Department of Fisheries and Oceans
e.g.:	(<i>exempli gratia</i>) for example
EIA:	Environmental Impact Assessment
ENR:	Environment and Natural Resources
EP:	Environmental Professional
ESA:	Environmentally Significant Area
<i>et al.</i> :	(<i>et alii</i>) and others
<i>etc.</i> :	<i>et cetera</i>
FGC:	Fellow of Geoscience Canada
fSARA:	federal <i>Species At Risk Act</i>
ha:	hectare

HTFC:	His Tabernacle Family Church
<i>i.e.</i> :	<i>(id est)</i> namely / that is
Inc.:	Incorporated
km:	kilometre
km ² :	kilometres squared
Ltd.:	Limited
m:	metre
m ² :	metres squared
<i>n.b.</i> :	<i>(nota bene)</i> note well / take note
NBDELG:	New Brunswick Department of the Environment and Local Government
NBDJPS:	New Brunswick Department of Justice and Public Safety
NBDNRED:	New Brunswick Department of Natural Resources and Energy Development
<i>P.Geo.</i> :	Professional Geoscientist
pSARA:	provincial <i>Species At Risk Act</i>
<i>P.Tech.</i> :	Professional Technologist
PDF:	Portable Document Format
<i>Ph.D.</i> :	Doctorate of Philosophy
PID:	Property Identification number
<i>PMP</i> :	Project Management Professional
<i>Q.C.</i> :	Queen's Council
RCMP:	Royal Canadian Mounted Police
SNBSC:	Southwest New Brunswick Service Commission
TRC:	Technical Review Committee
WESP-AC:	Wetland Ecosystem Services Protocol – Atlantic Canada
%:	percent
>:	greater than
<:	less than
%:	Care Of

1.0 PROPONENT

1.1 PROPONENT NAME

The proponent for this Project is His Family Tabernacle Church (HFTC), which is Canadian charitable organization registered under the federal *Income Tax Act* [RSC, 1985, c.1].

1.2 PROPONENT ADDRESS



1.3 PROPONENT CONTACT

Reverend Philip Hutchings
Lead Pastor

📞 506.567.0070

✉ hlcc@live.ca

1.4 PRINCIPAL CONTACT FOR PURPOSES OF ENVIRONMENTAL IMPACT ASSESSMENT

Fundy Engineering & Consulting Ltd. (Fundy Engineering) prepared this Environmental Impact Assessment (EIA) Registration Document. The principal contact at Fundy Engineering with respect to this EIA is:

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1.5 PROPERTY OWNERSHIP

The property subject of the Work is identified in the New Brunswick Geomatics Information Corporation's database as Property Identification (PID) number 55214803 (Figure 1). The 2.79 hectare (ha) property is owned by Reverend Philip Hutchings and Ms. Jamie Hutchings who is also a Lead Pastor for HFTC. Please refer to Appendix I for a copy of the property information records.



Figure 1. Aerial photograph showing the location of PID 55214803 at 28 Base Road in Garnett Settlement, New Brunswick that is the subject of this environmental impact assessment.

2.0 PROJECT DESCRIPTION

2.1 PROJECT NAME

For the purposes of this EIA, the Project is referred to as:

HIS TABERNACLE FAMILY CHURCH

2.2 PROJECT OVERVIEW

About 2.2 ha or 79 % of PID 55214803 comprises wetland (Figure 2). The 2 025 m² of upland (*i.e.*, land that is not wetland and not within the 30 m regulated wetland buffer) is not a sufficient size to build a church, a septic system (*i.e.*, septic tank and leach field) roadway access, and a parking lot. Infilling approximately 10 621 m² of wetland (*i.e.*, land that is not upland and not the 30 m regulated wetland buffer) is required to facilitate development.

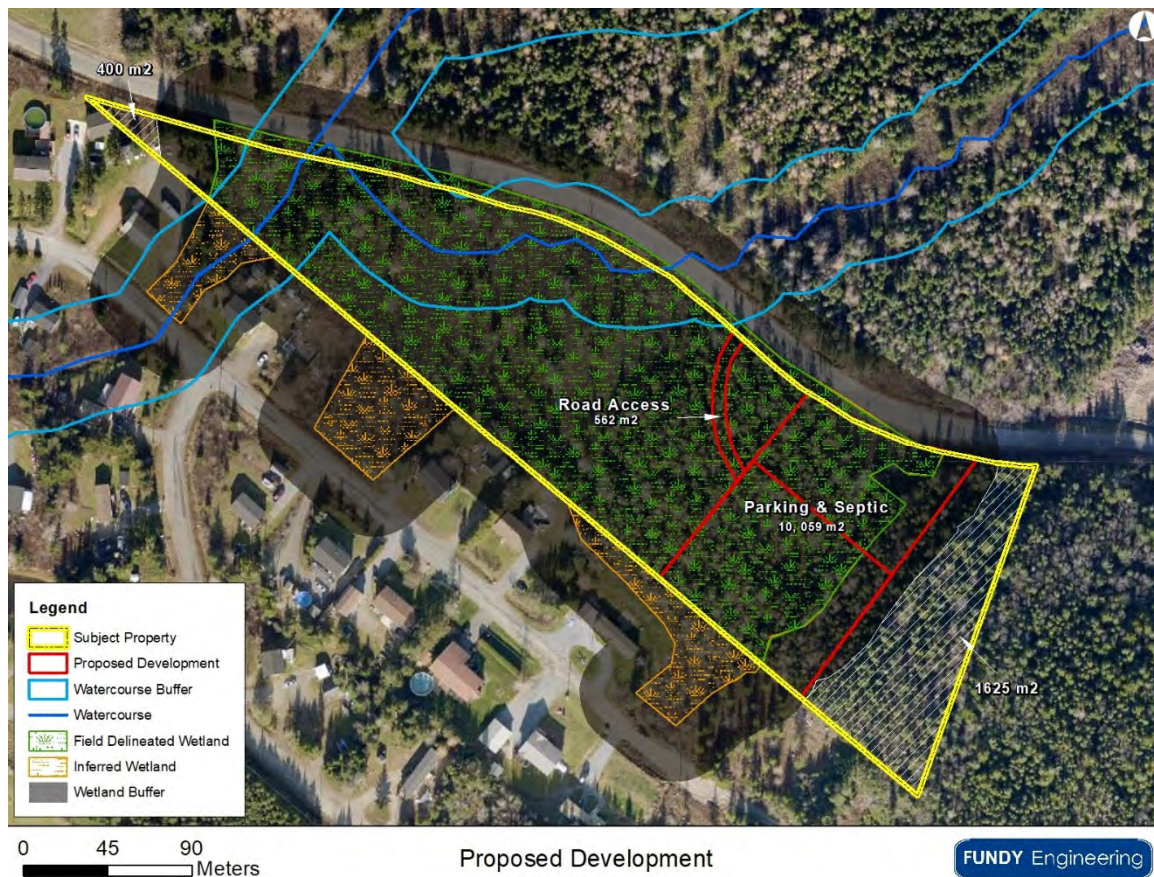


Figure 2. Aerial photograph showing the land unconstrained by wetland, watercourses, and buffers (*i.e.*, that shown hatched in white) on PID 55214803 at 28 Base Road in Garnett Settlement, New Brunswick. The red polygons denote areas where infill is proposed to facilitate construction of the church and associated infrastructure.

2.3 PURPOSE OF THIS ENVIRONMENTAL IMPACT ASSESSMENT

The purpose of an EIA is to identify and evaluate the potential impacts that the proposed Project may have on the environment. As per Schedule A, item v) (*i.e.*, all enterprises, activities, projects, structures, works, or programs affecting two hectares or more of bog, marsh, swamp, or other wetland ...) of the Environmental Impact Assessment Regulation [87-83] of the New Brunswick *Clean Environment Act* [R.S.N.B. 1973, c. C-6], the Project triggers EIA review. This EIA was prepared by Fundy Engineering & Consulting Ltd. (Fundy Engineering) on behalf of HTFC (% Rev. Philip Hutchings). The EIA identifies potential environmental impacts this Project may pose and presents measures to mitigate those potential environmental impacts. This EIA meets the requirements of the NBDELG [2018] guide to EIAs.

2.4 PROJECT PURPOSE / RATIONALE / NEED

Prior to the COVID-19 pandemic, HTFC was conducting services at 348 Rockland Road in Saint John. Since the pandemic, services have been conducted outdoors under a tent on Ashburn Road in east Saint John until a new permanent location could be secured. HTFC searched many areas for a suitable location to build a new church. Ultimately, the property at 28 Base Road in Garnett Settlement was purchased for the development. Prior to purchasing the property, members of HTFC reviewed watercourse and wetland mapping on file with the New Brunswick Department of Environment and Local Government (NBDELG). Information within that database did not indicate the presence of watercourses and wetlands.

During initial tree clearing on the site, it is understood that representatives with the NBDELG advised HTFC to stop all work on the site due to the potential presence of watercourses and wetlands. It is further understood that HTFC applied for a Watercourse And Wetland Alteration (WAWA) permit (*i.e.*, Alt 63374). During review of the WAWA permit application, NBDELG representatives issued a letter noting that that much of the property lies within an unmapped wetland > 2 ha in size.

A watercourse and wetland delineation and wetland functional assessment was completed by Fundy Engineering in May 2022 and a copy of that report is provided in Appendix II. Results of that work indicated that about 79 % or 2.2 ha of the overall property is occupied by a forested wetland.

A portion of the wetland requires infilling to facilitate the overall development. That infill will primarily be to support construction of a church, a septic system roadway access, and a parking lot.

2.5 PROJECT LOCATION

The property is located at 28 Base Road in Garnett Settlement, New Brunswick (*i.e.*, Saint John County, Simonds Parish) as shown in Figure 1. The property is bound by Base Road to the north, undeveloped residential land to the east, residential properties along Mill Avenue to the south, and residential properties to the west. Base Road is accessed from NB Route 825. Approximate coordinates for the centre of the property are 45.304572 °N and 65.844412 °W. The property is located in the Fundy Coast ecoregion of New Brunswick.

2.6 PROJECT ALTERNATIVES

The null alternative (*i.e.*, the do-nothing approach) is not an option as it would not allow HTFC to build their church on the property that was purchased solely for that purpose. Abandoning this location and building in another location would result in the loss of money used to purchase the property at 28 Base Road.

2.7 PROJECT DETAILS

The Project will be designed, constructed, operated, maintained, and abandoned using acceptable standards and methods that are in accordance to the applicable Acts, permits, authorizations, regulations, and guidelines. Those standards and methods will reflect current legislation. Below is a brief summary of the works that will be completed during the specific Phases of the Project.

2.7.1 Project Construction

Project construction will be confined to the boundaries of PID 55214803 and development will comprise the following steps:

- environmental protection measures installation;
- tree cutting;
- grubbing and stripping;
- site levelling;
- Project construction;
- landscaping; and
- environmental protection measures removal.

The heavy equipment anticipated for use during Project construction is listed in Table 1.

Project construction will occur between Monday through Saturday from 7AM to 7PM.

Table 1. Typical list of heavy equipment anticipated for use during construction of the Project at 28 Base Road in Garnett Settlement, New Brunswick.

Equipment Use / Type	Typical Task
<u>ENVIRONMENTAL PROTECTION MEASURES INSTALLATION AND REMOVAL</u>	
Pick-up support truck or van	Transport of equipment and personnel
<u>TREE CUTTING</u>	
Semi-trailer truck and float trailer	Floating equipment to and from site
Tracked excavator with tree shears	Cutting trees
Semi-trailer truck trailer equipped with a grappler	Transport of trees offsite
Shredder	Shredding and mulching of non-merchantable timber
Pick-up support truck or van	Transport of equipment and personnel
<u>GRUBBING AND STRIPPING</u>	
Semi-trailer truck and float trailer	Floating equipment to and from site

Equipment Use / Type	Typical Task
Bulldozer with root rake	Removal of stumps and roots
Tracked excavator	Loading of materials into dump trucks
Dump truck	Hauling of materials offsite
Pick-up support truck or van	Transport of equipment and personnel
<u>SITE LEVELLING</u>	
Semi-trailer truck and float trailer	Floating equipment to and from the site
Bulldozer	Movement of material
Tracked excavator	Movement of material; may be equipped with a pneumatic hammer to breakup shallow bedrock
Dump truck	Hauling of materials onsite and offsite
Roller	Compaction of material
Pick-up support truck or van	Transport of equipment and personnel
<u>PROJECT CONSTRUCTION</u>	
Semi-trailer truck and trailer	Transport of materials to the site
Semi-trailer truck and float trailer	Floating equipment to and from the site
Tracked excavator	Movement of material
Dump truck	Hauling of materials
Roller	Compaction of material
Asphalt paving machine	Laying asphalt
Concrete truck	Hauling concrete to the site
Concrete pumper truck	Movement of concrete about the site
Concrete pumps and vibratory equipment	Placing and compacting concrete
Truck crane (10 t)	Erection of roof trusses and walls
Self-propelled elevating work platforms	Safely positioning personnel in above-ground areas
Pick-up support truck or van	Transport of equipment and personnel
<u>LANDSCAPING</u>	
Semi-trailer truck and float trailer	Floating equipment to and from the site
Tractor	Movement of materials, raking, etc.
Hydroseeding truck	Spraying of hydroseed
Pick-up support truck or van	Transport of equipment and personnel
<u>GENERAL CONSTRUCTION EQUIPMENT</u>	
Compressors	Operating pneumatic tools
Generators	Supplying localized power
Heaters	Heating work areas
Lighting plants	Lighting work areas

2.7.1.1 Environmental Protection Measures Installation

Site preparation activities typically alter the natural vegetative cover of the land and can result in soil being more susceptible to wind and water erosion. To help mitigate soil erosion and subsequent sedimentation, environmental protection measures are often

employed prior to the commencement of land disturbance work. For this Project, those erosion and sedimentation control measures will include erection of:

- silt fence; and
- strawbale barriers.

Silt fence will be erected at the perimeter of the Project site where there is a potential for surface water runoff to leave the disturbed area (*i.e.*, the southwestern, western, and northwestern boundary). Strawbale barriers will be erected within the roadside ditch (*i.e.*, adjacent to Base Road) to mitigate sedimentation within the wetland and unnamed watercourses.

2.7.1.2 Tree Cutting

Many of the trees required to be removed for the Project were felled prior to the NBDELG issuing a Stop Work Order. Some additional standing timber will require cutting to allow the parking lot and access road to be constructed. All clearing activities will adhere to the relevant regulatory requirements and will only be done to the extent required (*i.e.*, unnecessary tree removal outside of the Project area will be forbidden). Where possible, all clearing activities will be completed outside of the migratory birds breeding season (*i.e.*, annually from 5 April to 31 August). Where practical, all merchantable timber will be salvaged and non-merchantable timber will be shredded / mulched onsite using appropriate equipment.

Vegetation removal within 30 m of the onsite wetland and / or watercourses will be minimized to the extent possible and further cutting will not occur until permits / authorizations are issued by the Regulator(s). When the vegetation is removed, it will be done in accordance with the conditions outlined in the issued permits / authorizations and as per the developed Best-Management Practices (BMPs) for this Project.

2.7.1.3 Grubbing and Stripping

Following tree clearing, stumps, roots, rocks, and organic material will be grubbed and stripped from the ground surface to prepare the site for levelling. Grubbed and stripped material will be collected and likely disposed offsite. The grubbed and stripped material will be disposed of > 30 m from the edge of a wetland and / or watercourse.

2.7.1.4 Site Levelling

Site levelling will be done to bring the footprint to a grade / elevation that can be used to build the Project atop. The existing topography within the Project footprint will be levelled. Topographically high areas will be excavated or cut and topographically low areas will be filled in. The cuts and fill will be controlled such that the material will be handled for optimal use and any and all suitable material that is cut will be salvaged as fill.

Any additional fill required will be obtained from offsite. Fill will be clean material that is ensured to be non-acid generating in order to protect adjacent wetlands, watercourses, and their associated inhabitants.

2.7.1.5 Project Construction

Project construction will involve building the church, parking lot, and roadway access. The church will be wood-framed and founded on a concrete foundation. The information presented within this document with respect to the Project layout is conceptual. Design drawings of the church have not yet been prepared. Design will be initiated if the Project receives EIA approval.

The property is located in a rural area not serviced with potable water and sanitary sewer. Potable water will be supplied via a drilled onsite groundwater well. Drilling and installation of the groundwater well will be done by a qualified and licensed water well driller. Wastewater will be collected and treated onsite using a septic tank and constructed leach field. The septic tank and leach field design will be completed by an approved installer. Electrical services are available for connection along Base Road. Exterior lighting will be minimal and only that necessary for users to safely move between their vehicles and the church.

Some excavation will be associated with this Project and include excavations for: the church foundation; connection of the groundwater well; installation of the septic tank and leach field and connection to the church.

It is expected that a pre-cast concrete culvert will be placed within the roadside ditch to facilitate construction of the roadway access from Base Road to the parking lot. The roadway and parking lot materials (*i.e.*, clean crushed rock and asphalt) will be obtained from local suppliers. Those materials will be spread and rolled in place to provide a smooth surface.

2.7.1.6 Landscaping

Once the church, roadway access, and parking lot are complete, the remaining exposed lands will be landscaped. It is expected that those lands will be developed with a typical residential-style lawn, trees, and gardens.

2.7.1.7 Environmental Protection Measures Removal

Once the site has been stabilized (*i.e.*, exposed lands have been landscaped and have had a few months of growth), the environmental protection measures that were installed prior to Project construction will be removed.

2.7.2 Project Operation and Maintenance

Once the Project is constructed, it will serve the HFTC faith community over the long-term. Activity will occur at the church daily. Routine maintenance will include general landscaping during the summer months (*e.g.*, lawn mowing, gardening, mulching, fertilizing, *etc.*) and snow and ice removal during the winter months (*e.g.*, snowplowing, application of salt and sand, *etc.*) and garbage removal throughout the year. Every few years, the septic tank may require cleanout to ensure proper operation.

2.7.3 *Project Abandonment*

The Project has an unknown lifespan that is likely > 50 years. Environmental protection measures are continually evolving and improving. Therefore, specific protection measures regarding Project abandonment cannot adequately or appropriately be made at this time. The abandonment will be subject to future study for assessing the environmental impacts and how the activities can be done in an environmentally appropriate manner.

2.8 PROJECT SCHEDULE

The Proponent desires to start construction immediately pending a successful EIA determination. It is anticipated that it will take 12 to 24 months to complete Project construction. Ideally, the Church would be built and operational in 2023.

3.0 DESCRIPTION OF THE BASLINE ENVIRONMENT

This EIA document has been streamlined to include only that information believed necessary for the Technical Review Committee to make a determination. Therefore, the information is limited to the surface water environment and the local flora and fauna.

3.1 SURFACE WATER ENVIRONMENT

The wetland and watercourses delineated at the site on 24 May 2022 are described in the standard watercourse and wetland delineation and wetland functional assessment report included in Appendix II.

3.2 BIOLOGICAL ENVIRONMENT

To assist with characterizing the biological environment, data from the Atlantic Canada Conservation Data Centre (ACCDC) was purchased. The reports obtained are provided in Appendix III and the data are summarized below.

3.2.1 *Federal and Provincial Species At Risk Locally Present*

The ACCDC databases were queried for known observation data of species listed under the federal *Species At Risk Act* (fSARA) [S.C. 2002, c. 29] and the provincial *Species At Risk Act* (pSARA) [S.N.B. 2012, c.6] within a 5 km radius of the Project site (*i.e.*, refer to Appendix III). According to the ACCDC data, nine listed species (Figure 3) have been observed (Figure 4):



Figure 3. Photographs of species listed under the fSARA, pSARA, and by the COSEWIC that have been observed within a 5 km radius of the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick.

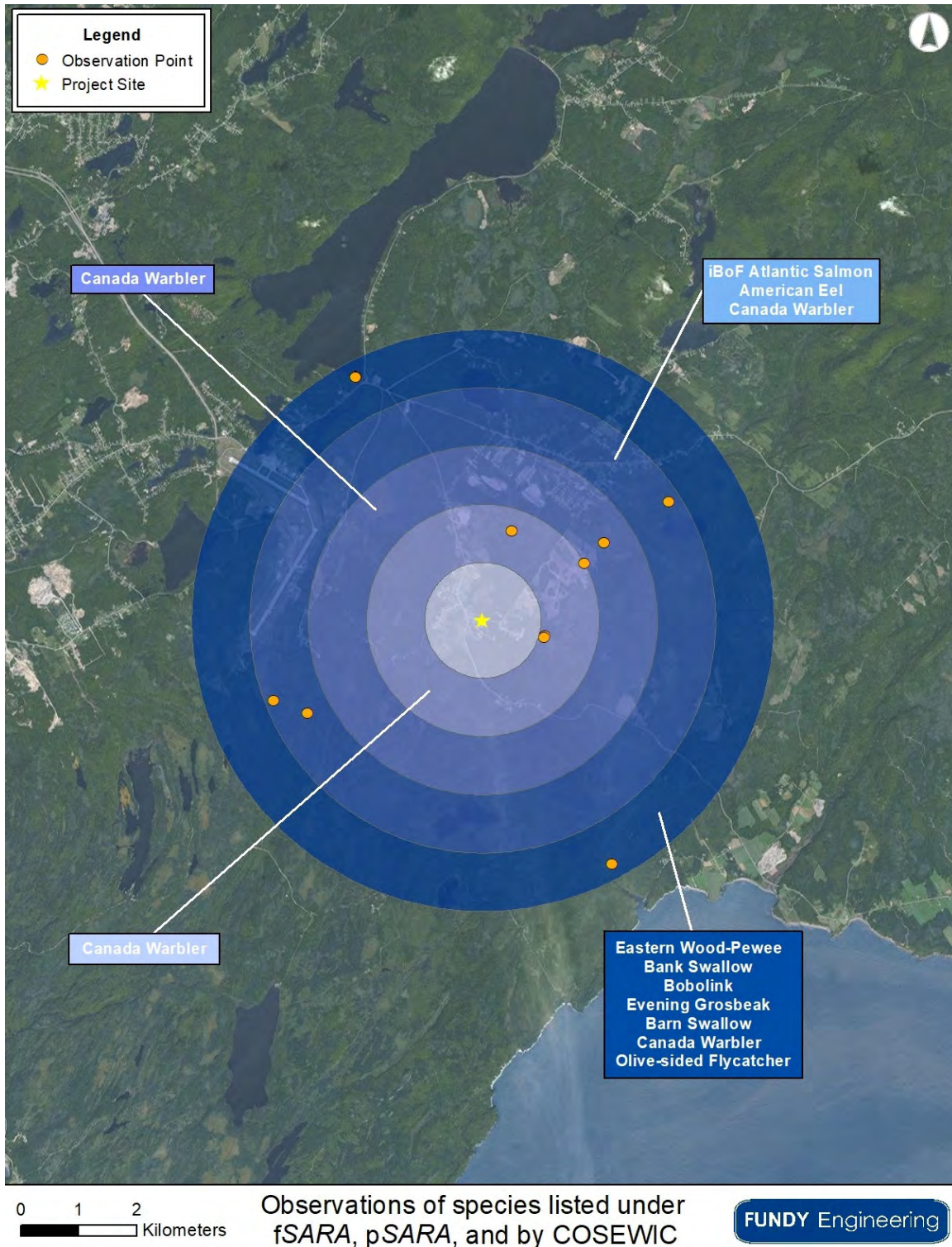


Figure 4. Map showing the recorded observations of species listed under the fSARA, pSARA, and by the COSEWIC within a 5 km radius of the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick. Data obtained from the ACCDC.

3.2.2 *Location Sensitive Species*

The New Brunswick Department of Natural Resources and Energy Development (NBDNRED) considers several species in the Province as “location-sensitive”. The ACCDC databases show one location-sensitive species for the area. The Bald Eagle (*Haliaeetus leucocephalus*) is listed as endangered under the pSARA. During the field assessment of the watercourses and wetlands on the property, no bald eagles were observed.

3.2.3 *Locally Observed Rare Species*

The ACCDC databases show 28 observations of rare species within 5 km of the Project site (Figure 5). None of those rare species were observed during the field assessment of the watercourses and wetlands on the property.

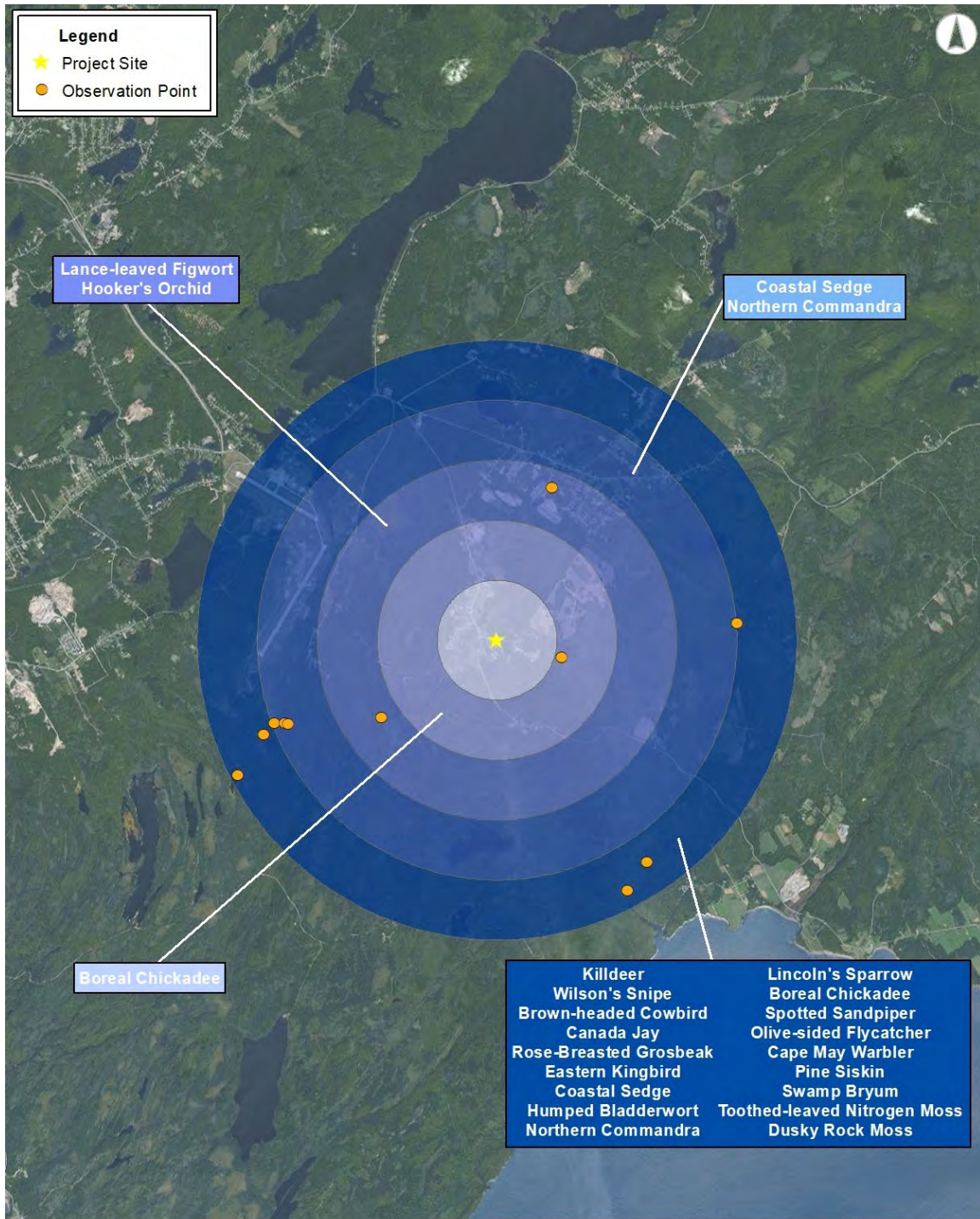


Figure 5. Map showing the recorded observations of rare species within a 5 km radius of the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick. Data obtained from the ACCDC.

3.2.4 *Environmentally and Significant Managed Areas*

The ACCDC query yielded no Environmentally Significant Areas (ESAs) and no managed areas within 5 km of the Project site.

3.3 **ARCHAEOLOGICAL AND CULTURAL FEATURES**

The Project site is located within traditional Wolastoqiyik territory. Archaeological predictive modelling was requested for the Project site from the New Brunswick Department of Tourism, Heritage, and Culture and is provided in Appendix IV. Results of that request do not show any concerns with respect to archaeological features. There is a cemetery located near the intersection of Base Road and NB Route 825, but it is well outside the boundaries of the proposed Project.

3.4 **HISTORICAL LAND-USE**

Historical aerial photographs of the Project site are shown in Figure 6 through Figure 8. The property has never been previously developed.



Figure 6. Aerial photograph, circa 1962, of the property proposed for His Tabernacle Family Church in Garnett Settlement, New Brunswick.



Figure 7. Aerial photograph, circa 1984, of the property proposed for His Tabernacle Family Church in Garnett Settlement, New Brunswick.



Figure 8. Aerial photograph, circa 2003, of the property proposed for His Tabernacle Family Church in Garnett Settlement, New Brunswick.

4.0 IMPACT ASSESSMENT

The impact assessment for the wetland was established using two commonly used methods. Results of those two assessments are discussed below.

4.1 WETLAND ECOSYSTEM SERVICES PROTOCOL – ATLANTIC CANADA ASSESSMENT

The Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC) [Adamus, 2018] was completed for the wetland and is included in the report of Appendix II. That assessment produced a higher rating for the following five functions:

- water cooling;
- phosphorous retention;
- organic nutrient export;
- songbird, raptor, and mammal habitat; and
- pollinator habitat.

Details of those five functions are provided in the report of Appendix II.

4.2 CRITICAL ADVERSE ENVIRONMENTAL EFFECTS ASSESSMENT

The federally-recognized general wetland evaluation of *Bond et al.* [1992] was used to identify potential critical adverse environmental effects of development on the wetland. A critical adverse environmental effect on wetlands is one that alters wetland habitat physically, chemically, or biologically, in quality or extent, in such a way as to cause a change or decline in the ecological function of that habitat, or a change or decline in the distribution or abundance of a rare plant or animal population (*i.e.*, as indicated by federal or provincial authorities) that is dependent upon that habitat, such that natural recruitment would not re-establish the community to its original level within one generation. For wetlands, this refers to a loss of wetland function, as defined in the Federal Policy on Wetland Conservation [CWS, 1991]. With regards to rare vascular plant species (*i.e.*, those ranked by the ACCDC or the NBDNRED as At Risk, May Be At Risk, or Sensitive), a critical adverse environmental effect is one that alters the terrestrial habitat within the assessment area physically, chemically, or biologically, in quality or extent, in such a way as to cause a change or decline in the distribution or abundance of a viable plant population that is dependent upon that habitat, such that the likelihood of the long-term survival of the population within the Ecoregion (Fundy Coastal Ecoregion) is substantially reduced as a result. A critical adverse environmental effect on any threatened or endangered species listed by the fSARA or the pSARA is one that results in the loss of any individual of these species, or the permanent loss of critical habitat for these species.

The *Bond et al.* [1992] assessment completed for the proposed HTFC in Garnett Settlement, New Brunswick is provided in Table 2.

Table 2. Potential critical adverse environmental effects assessment completed for the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick.

Wetland Function, Value	Evaluation Criteria	Criteria Presence					Comments	Criteria Importance					Why?	Criteria Impact			Criteria Description
		Yes	Likely	Possibly	No	Unknown		National	Provincial	Regional	Local	Negligible		High	Moderate	Low	

LIFE-SUPPORT FUNCTIONS

HYDROLOGICAL VALUES

The wetland contributes to recharge of regional water supply aquifers			✓							✓		Only a few houses in the local area			✓	The majority of the landscape, in the absence of the proposed wetland loss, will still be available space for groundwater recharge to actively occur	Remaining wetland will still provide this value
The wetland provides flood protection benefits			✓							✓		May provide some benefit to the few houses in the local area			✓	> 50 % of the wetland will not be impacted and that unaffected wetland will still provide this function	Remaining wetland will still provide this value
The wetland contributes to usable surface water			✓							✓		Supplies some water to the unnamed and unmapped watercourse on the property			✓	Only retains water for downstream sections of onsite streams; loss may end up producing streams that are flashier	Supplies some water to the unnamed and unmapped watercourse on the property
The wetland provides erosion control	✓									✓		Retains water on a local scale, ↓ runoff, and ↓ erosion			✓	Will lose some of the control of local erosion	Remaining wetland will still provide this function
The wetland provides flow augmentation to users through a headwater position in the catchment				✓								Located at the bottom of the catchment					Not present
The wetland dampens tidal or lake shoreline impacts				✓								Not located in a tidally influenced area or along a lake shoreline					Not present
SCORE	1	0	3	2	0	0	0	0	0	4	0		0	0	4		
CRITICAL SCORE	0	0	2	0	0	0	0	0	0	2	0		0	0	2		

BIOGEOCHEMICAL VALUES

The wetland receives significant pollution of a type amenable to amelioration by wetlands or it is used as a form of sewage treatment				✓		Does not receive surface water input with known pollution											Not present
The wetland provides storage for agricultural runoff				✓		No agricultural operations in immediate vicinity											Not present
The wetland provides for containment of toxics contained in surface water runoff or through discharge flow			✓							✓		If any toxics exist (none are known) in surface water runoff they would likely be filtered out			✓	Wetland system is only capable of localized contaminant cleansing	No toxics are known to enter this wetland system; function will still persist considering > 50 % of wetland will remain
The wetland provides for sediment flow stabilization	✓									✓		↓ streamflow by retaining water; energy dissipation, ↓ sediment transport			✓	Wetland system is only at a localized spatial scale	Value will likely still exist considering > 50 % of wetland will remain
The wetland has high nutrient levels that support significant wildlife populations or it provides a discharge of value to downstream ecosystems			✓			Not known to have high nutrient concentrations that support significant wildlife populations				✓					✓	Wetland system is only at a localized spatial scale	Value will likely still exist considering > 50 % of wetland will remain
SCORE	1	0	2	2	0		0	0	0	3	0		0	0	3		
CRITICAL SCORE	0	0	1	1	0		0	0	0	1	0		0	0	1		

HABITAT VALUES

There are rare, threatened, or endangered plant or animal species present (i.e., as listed by COSEWIC or others)				✓		Delineation did not show this											Not present
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Wetland Function, Value	Evaluation Criteria	Criteria Presence					Comments	Criteria Importance					Why?	Criteria Impact			Why?	Criteria Description	Highlights
		Yes	Likely	Possibly	No	Unknown		National	Provincial	Regional	Local	Negligible		High	Moderate	Low			
	The wetland contains high quality significant habitats for migratory birds				✓		Very little open space or ponded water												Not present
	The wetland provides habitat for sport and / or commercial fish			✓			No fish presence in the wetland, but fish were observed in the connected watercourses					✓					✓	No fish presence in the wetland	The wetland impacts will not occur within the watercourses or their 30 m regulated buffer
	The wetland provides habitat for herpetiles				✓		ACCDC data do not show presence of herpetiles in the local area												Not present
	The wetland provides significant habitat for crustaceans				✓		Not a tidal habitat												Not present
	The wetland provides significant plant or animal species in unusual abundance				✓		Delineation did not show this												Not present
	The wetland supports significant plant or animal species in unusual abundance				✓		Delineation did not show this												Not present
	The wetland and its associated vegetation protect natural shorelines				✓		Wetland is not adjacent to a shoreline												Not present
	The wetland is ranked as a Class I, II, or III wetland by Canada Inventory or other accepted evaluation systems				✓														Not present
	SCORE	0	0	1	8	0		0	0	0	1	0		0	0	1			
	CRITICAL SCORE	0	0	0	4	0		0	0	0	1	0		0	0	0			

ECOLOGICAL VALUES

	The wetland contributes to recharge of regional water supply aquifers			✓							✓	Does not form part of an identified regional aquifer system			✓	This local aquifer is used by local dwellings to supply potable water	The majority of the landscape, in the absence of these wetlands, will still be available space for groundwater recharge to actively occur	
	A regional threshold been reached where the significance of wetland ecosystems for the entire region will be compromised by further degradation				✓		Wetlands are ubiquitous in the region											Not present
	The wetland is considered a classic example of its type				✓		Wetlands of this type are ubiquitous in the region											Not present
	There are few remaining natural, unimpacted wetlands of this type in the region				✓		Wetlands of this type are ubiquitous in the region											Not present
	The wetland contains, owes its existence to, or is part of or ecologically associated with, a geological feature that is an excellent representation of its type				✓		No unique geological features that resulted in this wetland development											Not present
	The wetland forms an integral part of an important water drainage system			✓						✓		It captures surface water runoff and supplies water to the unnamed and unmapped watercourse during low flow			✓	The remaining wetland will still retain water	Helps retain surface water flow before discharge to the contiguous watercourse and Black River downstream	
	The wetland displays biological diversity that is of interest				✓		Delineation did not show this											
	SCORE	0	0	2	5	0		0	0	0	1	1		0	0	2		
	CRITICAL SCORE	0	0	0	3	0		0	0	0	0	0		0	0	0		

Wetland Function, Value	Evaluation Criteria	Criteria Presence					Comments	Criteria Importance					Why?	Criteria Impact			Why?	Criteria Description	Highlights
		Yes	Likely	Possibly	No	Unknown		National	Provincial	Regional	Local	Negligible		High	Moderate	Low			

SOCIAL / CULTURAL FUNCTIONS

AESTHETIC VALUES

The wetland is visible from a provincial / territorial highway, designated scenic highway / road or passenger railroad				✓		Surrounded by local roadways													Not present
The wetland provides a valuable aesthetic or open space function				✓		Little open space within wetland													Not present
The wetland adds substantially to the visual diversity of the landscape				✓		Wetland type is common to the area													Not present
The wetland is an important sightseeing locale				✓		Not a unique wetland													Not present
SCORE	0	0	0	4	0		0	0	0	0	0		0	0	0				
CRITICAL SCORE	0	0	0	1	0		0	0	0	0	0		0	0	0				

RECREATIONAL VALUES

The wetland provides a base for viewing or photographing large numbers of wildlife				✓		Minimal and common wildlife likely use this wetland													Not present
The wetland provides opportunities for boating				✓		No open water present													Not present
The wetland provides winter recreation activities				✓		No open spaces conducive to winter activities													Not present
The wetland provides high quality sport hunting or fishing				✓		No good areas for hunting and fishing													Not present
SCORE	0	0	0	4	0		0	0	0	0	0		0	0	0				

EDUCATION AND PUBLIC AWARENESS VALUES

The wetland is used for scientific research				✓															Not present
The wetland is used for educational and interpretation purposes				✓															Not present
The wetland exists close to a large urban population				✓		Saint John centre is about 20 km distant													Not present
The wetland receives a large number of visitors each year				✓		Some local residents likely walk through the wetland													Not present
SCORE	0	0	0	4	0		0	0	0	0	0		0	0	0				
CRITICAL SCORE	0	0	0	1	0		0	0	0	0	0		0	0	0				

PUBLIC STATUS VALUES

The wetland is part of the pattern of settlement and rural / urban lifestyle				✓		Formed as the result of its geomorphic position and soil characteristics													Not present
The wetland is a designated site of special public interest				✓		The wetland is not a site of special public interest													Not present
The wetland is a unique national, provincial, or regional resource				✓		There are no unique resources within the wetland													Not present
There are policies / programs to support conservation / restoration of the wetland				✓		The wetland is not protected													Not present
The wetland provides for easy public access	✓					Located adjacent to Base Road						✓					✓		Value will likely still exist considering > 50 % of wetland will remain
The wetland is public land				✓		Privately owned land													Not present
SCORE	1	0	0	5	0		0	0	0	0	1		0	0	1				
CRITICAL SCORE	0	0	0	1	0		0	0	0	0	0		0	0	0				

Wetland Function, Value	Evaluation Criteria	Criteria Presence					Comments	Criteria Importance					Why?	Criteria Impact			Why?	Criteria Description	Highlights
		Yes	Likely	Possibly	No	Unknown		National	Provincial	Regional	Local	Negligible		High	Moderate	Low			

CULTURAL ATTRIBUTES VALUES

The wetland forms part of the historical / cultural heritage of a regional population				✓		Not identified as such													Not present
The wetland contains archaeological or paleontological resources				✓															Not present
The wetland is utilized for cultural events or cultural renewal				✓		Not identified as such													Not present
The wetland forms part of a native traditional use area				✓		Not identified as such													Not present
SCORE	0	0	0	4	0		0	0	0	0	0		0	0	0				
CRITICAL SCORE	0	0	0	2	0		0	0	0	0	0		0	0	0				

PRODUCTION FUNCTIONS

AGRICULTURAL VALUES

The wetland provides water for livestock				✓		No agricultural operations in the immediate area													Not present
The wetland provides a source of forage				✓		No agricultural operations in the immediate area													Not present
The wetland provides a source of water for crop irrigation				✓		No agricultural operations in the immediate area													Not present
The wetland serves to reduce topsoil erosion				✓		No agricultural operations in the immediate area													Not present
The wetland serves to increase soil moisture and enhance agricultural crop production				✓		No agricultural operations in the immediate area													Not present
SCORE	0	0	0	5	0		0	0	0	0	0		0	0	0				Not present
CRITICAL SCORE	0	0	0	1	0		0	0	0	0	0		0	0	0				

RENEWABLE RESOURCES VALUES

The wetland is used for commercial or subsistence hunting, trapping, or fishing				✓															Not present
The wetland provides opportunities for non-commercial uses of fish, wildlife, crustaceans, and / or water resources				✓															Not present
Forest resources of the wetland can be harvested	✓					The trees cut from the wetland to be infilled could be used by a fuel-wood contractor						✓	Potentially up to several cord of fuel-wood could be harvested			✓	Trees will be harvested for infilling work, those trees will likely be used for fuel-wood and some trees will be planted in landscaped areas	Renewable resource and not all of the wetland will be infilled; > 50 % of the wetland will be unaffected	
There are other commercial uses of the wetland, such as harvesting opportunities for wild rice, cranberries, or gathering crabs and oysters				✓															Not present
SCORE	1	0	0	3	0		0	0	0	0	1		0	0	1				
CRITICAL SCORE	0	0	0	2	0		0	0	0	0	0		0	0	0				

NON-RENEWABLE RESOURCES VALUES

The wetland is used as a commercial source of peat for horticulture or energy				✓		Not a peatland													Not present
The wetland occurs over known mineral or gas and oil deposits				✓		Not located within the Maritimes Basin of New Brunswick													Not present

Wetland Function, Value	Evaluation Criteria	Criteria Presence					Comments	Criteria Importance					Why?	Criteria Impact			Why?	Criteria Description
		Yes	Likely	Possibly	No	Unknown		National	Provincial	Regional	Local	Negligible		High	Moderate	Low		Highlights
	SCORE	0	0	0	2	0		0	0	0	0	0		0	0	0		
	CRITICAL SCORE	0	0	0	1	0		0	0	0	0	0		0	0	0		

TOURISM AND RECREATION VALUES

The wetland represents an important local, regional, or provincial tourism or recreation attraction				✓														Not present
The wetland contributes to the local, regional, or provincial tourism and recreation economy				✓														Not present
The wetland contributes to national and international tourism development				✓														Not present
SCORE	0	0	0	3	0		0	0	0	0	0		0	0	0			
CRITICAL SCORE	0	0	0	1	0		0	0	0	0	0		0	0	0			

URBAN VALUES

The wetland is used to provide water for industry				✓														
The wetland is used as a means of sewage treatment				✓														
The wetland is a direct source of domestic water supply				✓														
The wetland enhances residential, commercial, or industrial development values				✓														
The wetland contributes to urban flood protection and associated land value				✓														
SCORE	0	0	0	5	0		0	0	0	0	0		0	0	0			
CRITICAL SCORE	0	0	0	3	0		0	0	0	0	0		0	0	0			

PROJECT FUNCTIONS

EMPLOYMENT VALUES

The Project will stimulate new employment opportunities or stabilize existing employment levels in the region			✓							✓	Very few jobs would be created and they would only be short-term		✓	Very few jobs would be created and they would only be short-term	These types of jobs would likely be mid-paying blue collar type jobs		
The Project will provide for high income jobs?			✓							✓	Very few jobs would be created and they would only be short-term		✓	Very few jobs would be created and they would only be short-term	These types of jobs likely be mid-paying blue collar type jobs		
The Project will stimulate employment upgrading				✓											Not present		
The Project will stimulate additional research and educational spinoffs				✓											Not present		
SCORE	0	0	2	2	0		0	0	0	2			0	0	2		
CRITICAL SCORE	0	0	1	0	0		0	0	0	1			0	0	1		

ECONOMIC VALUES

Project construction will stimulate the local and regional economy			✓							✓	Local economy will benefit from onsite development activities		✓	Full development would likely be under \$0.5 million	
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Wetland Function, Value	Evaluation Criteria	Criteria Presence					Comments	Criteria Importance					Why?	Criteria Impact			Why?	Criteria Description	Highlights
		Yes	Likely	Possibly	No	Unknown		National	Provincial	Regional	Local	Negligible		High	Moderate	Low			
	Project operation will stimulate the local and regional economy			✓								✓	Local economy will benefit from Project operation and maintenance			✓	Little property maintenance, energy costs, etc.		
	Project operation will stimulate value-added production to the provincial or national economy				✓												Not present	Not present	
	The Project will generate significant new taxes and / or enhance the tax base				✓		Places of worship are tax exempt												
	SCORE	0	0	2	2	0	0	0	0	0	0	2		0	0	2			
	CRITICAL SCORE	0	0	1	1	0	0	0	0	0	0	1		0	0	1			

PRODUCTION VALUES

The Project will stimulate agricultural production				✓														Not present
The Project will stimulate forest production				✓														Not present
The Project will stimulate energy production				✓														Not present
The Project will stimulate tourism and recreational benefits				✓														Not present
The Project will stimulate manufacturing production				✓														Not present
The Project will stimulate other production				✓														Not present
SCORE	0	0	0	6	0		0	0	0	0	0	0		0	0	0		

URBAN / INDUSTRIAL INFRASTRUCTURE VALUES

The Project will provide accommodation and ease housing shortages				✓														Not present
The Project will facilitate a major transport link for the region				✓														Not present
The Project will provide a harbour for region				✓														Not present
The Project will solve regional waste disposal problems				✓														Not present
The Project will provide an alternate location for infrastructure which is incompatible with the urban built-up area				✓														Not present
SCORE	0	0	0	5	0		0	0	0	0	0	0		0	0	0		

Results of the *Bond et al.* [1992] assessment are summarized in Table 3. The assessment showed that no critical adverse environmental effects will be realized as a result of developing the proposed HTFC.

Table 3. Summary of the potential critical adverse environmental effects assessment completed for the proposed His Tabernacle Family Church in Garnett Settlement, New Brunswick.

Summary of wetland values importance and expected impact	Value Presence						Value Importance					Value Impact		
	Yes	Likely	Possibly	No	Unknown	Critical*	National	Provincial	Regional	Local	Negligible	High	Moderate	Low
LIFE-SUPPORT FUNCTIONS														
Hydrological Values	1		3	2						4				4
Biogeochemical Values	1		2	2						3				3
Habitat Values			1	8						1				1
Ecological Values			2	5						1	1			2
SOCIAL / CULTURAL FUNCTIONS														
Aesthetic Values				4										
Recreational Values				4										
Education Awareness Values				4										
Public Status Values	1			5							1			1
Cultural Attribute Values				4										
PRODUCTION FUNCTIONS														
Agricultural Values				5										
Renewable Resource Values	1			3							1			1
Non-Renewable Resource Values				2										
Tourism and Recreational Values				3										
Urban Values				5										
TOTAL OCCURRENCES	4		8	56						9	3			12
PROJECT FUNCTIONS														
Employment Values			2	2							2			2
Economic Values			2	2							2			2
Production Values				6										
Urban Development Values				5										
TOTAL OCCURRENCES			4	15							4			4

*Refers to yes category; 3 critical values or more = high wetland value, 2 critical values = moderate wetland value, 1 critical value = low wetland value, and 0 = not available or not applicable

The overall analysis yielded a non-critical loss of wetland due to the Project. Therefore, the Project should proceed as planned and outlined in this EIA document.

5.0 PROPOSED MITIGATION AND COMPENSATION MEASURES

Mitigation measures are provided in the sections that follow in order to reduce or eliminate potential environmental impacts as a result of the Project. These mitigation measures were primarily developed for the construction phase of the Project.

5.1 AIR QUALITY

The mitigation measures provided below are proposed to reduce potential impacts on air quality.

- Construction, operation, and maintenance equipment should only be operated at optimum loading rates and at moderate and steady speeds.
- Equipment should be turned off when not in use and / or when practical (*i.e.*, anti-idling).
- Heavy equipment should be operated using clean fuels (*i.e.*, ultra-low sulphur diesels), where available and practical.
- Equipment exhaust emission systems should meet the recommended standards.
- Only water will be used for the suppressant of dusts and should be applied using suitable equipment (*e.g.*, tanker truck equipped with spray bars and methods of controlling water flow, *etc.*).
- Activities that generate large amounts of fugitive emissions should be limited during windy periods.
- If infill materials transported by trucks generate excessive amounts of fugitive dust, the loads should be covered.

5.2 SOUND EMISSIONS

To reduce potential impacts of sound emissions on local receptors, the mitigation measures listed below should be followed.

- All equipment should be equipped with appropriate manufacturer designed sound level abatement equipment (*i.e.*, mufflers and shrouds).
- The exhaust systems of equipment should be inspected regularly to ensure that sound level abatement equipment is working properly.
- Equipment should be maintained according to manufacturer's recommended servicing periods.
- The idling of equipment should be kept to a minimum and excessive engine throttling should be avoided.
- Loud construction activity should be scheduled to occur during 7AM through 7PM Monday through Saturday, where possible.

5.3 GROUNDWATER AND SURFACE WATER QUANTITY AND QUALITY

The mitigation measures outlined below are designed to reduce the potential impacts on groundwater and surface water quantity and quality.

- Silt fence should be erected at the perimeter of the Project site where there is a potential for surface water runoff to leave the disturbed area (*i.e.*, the cleared and infilled areas).
- Strawbale barriers should be erected within the ditches adjacent to the access road.
- Erosion and sedimentation control structures (*i.e.*, silt fences and strawbale barriers) should be inspected regularly and maintained / replaced as necessary.
- All equipment used onsite should be in good repair and free of excess oil and grease, the equipment should be equipped with appropriately-sized spill response kits.
- Construction debris, surplus materials, and other solid waste materials should not be disposed of onsite.
- Regular maintenance and inspection of equipment onsite should be performed to minimize the risk of spills of oil-based fluids.
- Infill material should be clean and free of ore, inorganics substances or toxic materials, wood waste, and other environmentally-harmful materials.
- The infill area should be minimized to that necessary to facilitate development.
- Areas to be revegetated will be done using species native to New Brunswick (*i.e.*, non-invasive species).
- During construction, all sanitary waste should be collected using self-contained portable washroom facilities and those wastes should be handled and disposed of by a licensed waste disposal operator.
- Equipment refueling and maintenance should be done > 30 m from the edge of any watercourses / wetlands and groundwater wells and the refueling should only be done by competent personnel using a means of spill containment (*i.e.*, spill collection pans) and any materials used to clean-up spills should be disposed of properly.
- Sand should be used for winter roadway and driveway maintenance instead of salt.

5.4 TERRESTRIAL FLORA AND FAUNA

The mitigation measures provided below are proposed to reduce potential impacts on terrestrial flora and fauna. In this instance, terrestrial fauna includes birds.

- Any vegetation clearing activity during construction should be undertaken outside the migration and breeding season for migratory birds (*i.e.*, 5 April through 31 August).
- If an active nest, den, *etc.* is encountered during construction, a no-disturbance buffer zone of 30 m + should be established around the area until a qualified biologist determines if the buffer zone should remain, if the size should be increased, or if the buffer zone can be eliminated (*i.e.*, the animal has abandoned the feature).
- If an active nest, den, *etc.* is encountered during construction, then the Canadian Wildlife Service should be contacted for consultation on buffer size and types of construction activities that may continue.
- Construction equipment should arrive at the Project site in a clean condition free of invasive and noxious weeds.

- Contractors should properly dispose of food scraps and garbage.
- Any waste stored on-site should be stored in an appropriate manner and be transported to an appropriate disposal facility on a regular basis.
- Project personnel should be advised, prior to working on the Project site, to not feed or harass nuisance wildlife (e.g., pigeons, sea gulls, rodents, etc.).
- Heavy equipment and other vehicles used on the Project site should yield the right-of-way to wildlife.
- No attempt should be made to chase, catch, divert, follow, or otherwise harass wildlife by vehicle or on foot.
- If injured or diseased wildlife are encountered, then representatives with the New Brunswick Department of Natural Resource and Energy Development and the Canadian Wildlife Service should be contacted to determine the appropriate course of action.
- If deceased animals are encountered, they should be removed and disposed of, as soon as possible, in consultation with representatives with the New Brunswick Department of Natural Resource and Energy Development and the Canadian Wildlife Service.
- No Project personnel should affect wildlife populations by either hunting or trapping and firearms should be strictly prohibited on the Project site.
- No Project personnel should deposit or permit to be deposited oil, oil wastes, or any other substance harmful to wildlife in any waters or in any area frequented by wildlife.

5.5 AQUATIC FLORA AND FAUNA

The mitigation measures provided below are proposed to reduce potential impacts on aquatic flora and fauna.

- Equipment refueling and maintenance should be done > 30 m from the edge of any watercourses / wetlands and the refueling should only be done by competent personnel using a means of spill containment (i.e., spill collection pans) and any materials used to clean-up spills should be disposed of properly.
- Heavy equipment working in or within 30 m of watercourses and / or wetland should use eco-friendly biodegradable and non-toxic hydraulic fluids as opposed to petroleum-based hydraulic fluids.

5.6 ARCHAEOLOGICAL AND CULTURAL FEATURES

The mitigation measures outlined below are designed to reduce the potential impacts on archaeological and cultural features.

- Any archaeological or cultural features discovered should be reported immediately to the appropriate Regulator(s) as per the New Brunswick *Heritage Conservation Act* [S.N.B. 2010, c. H-4.05].
- If archaeological or cultural features require removal to facilitate Project development, then excavation, recording, and reporting should occur for those features as per the New Brunswick *Heritage Conservation Act* [S.N.B. 2010, c. H-4.05].

- Should human remains be discovered, the Hampton detachment of the Royal Canadian Mounted Police (RCMP) should be contacted (506.832.5566) to determine if the remains are an archaeological or cultural resource whereupon they will contact the appropriate authorities to have a licensed Resource Archaeologist examine the remains.

5.7 HEALTH AND SAFETY

The mitigation measures provided below are proposed to reduce potential impacts on worker health and safety.

- All individuals working on the Project should be instructed on what personal protective equipment is required to be worn (*e.g.*, steel-toed work boots, hard hat, safety glasses, safety vest, *etc.*), what guards should be in place, and what measures should be taken to protect other workers and the general public.
- All individuals working on the Project should conduct their work in accordance with applicable provincial and federal regulations.
- During construction, a complete general First Aid kit and fire extinguishers (*n.b.*, the fire extinguishers should be of sufficient size and ULC approved) should be available onsite to be used in the event of an emergency.
- Individuals working with hazardous materials (*e.g.*, hydrocarbons, paints, solvents, lubricants, *etc.*) should be trained appropriately for their safe use, handling, and storage.
- All specialized work should only be completed by trained, competent, and / or certified / licensed professionals.

5.8 ACCIDENTS, MALFUNCTIONS, AND / OR UNFORESEEN EVENTS

The mitigation measures provided below are proposed to reduce potential impacts associated with accidents, malfunctions, and / or unforeseen events.

- Construction equipment should be refueled in a manner designed to mitigate environmental risks.
- Equipment refueling and maintenance should be done > 30 m from the edge of any watercourses / wetlands and groundwater wells and the refueling should only be done by competent personnel using a means of spill containment (*i.e.*, spill collection pans) and any materials used to clean-up spills should be disposed of properly.
- Appropriately stocked and maintained spill response kits should be located on heavy equipment during construction.
- All spills or hazardous materials should be reported immediately to the appropriate Regulator(s), such as the New Brunswick Department of the Environment and Local Government's Saint John Environmental Emergency Line (506.658.2558) during normal operating hours (*i.e.*, 8:15AM to 4:30PM Monday through Friday) or Environment and Climate Change Canada's 24 hour National Environmental Emergencies Centre (800.565.1633).

5.9 WETLAND COMPENSATION

As noted in Section 2.2, about 10 621 m² of wetland will be infilled to facilitate the proposed church, septic system roadway access, and a parking lot. The Proponent understands that wetland impacts must be compensated for and that the compensation ratio is 2:1 (*i.e.*, 21 242 m² of wetland compensation required). For this Project, the Proponent intends to enter a professional service agreement with Ducks Unlimited Canada to provide an offsetting service for this wetland impact.

6.0 FIRST NATIONS ENGAGEMENT AND PUBLIC INVOLVEMENT

6.1 FIRST NATIONS ENGAGEMENT

The Project site is located within traditional Wolastoqiyik (Maliseet) territory. Section 35 of the *Constitution Act, 1982* “recognizes and affirms” the “existing” Aboriginal and treaty rights in Canada and a duty to consult. In New Brunswick, First Nation communities are right-holders as opposed to stakeholders. No First Nations consultation has occurred regarding this work and the Proponent will look to the New Brunswick Department of Aboriginal Affairs to undertake engagement as necessary.

6.2 PUBLIC INVOLVEMENT

The public involvement plan for this Project was developed in accordance with the process described in Appendix C of *A Guide to Environmental Impact Assessment in New Brunswick* [NBDELG, 2018]. The step-wise process proposed for the public involvement plan for this EIA is described in detail below.

6.2.1 Direct Communication with Elected Officials and Service Groups

Formal notification of the Project registration document (*i.e.*, in the form of an information letter) will be sent to elected officials, local service groups and community groups, environmental groups, and other key stakeholder groups. Direct communication will enable those individuals and groups to become more familiar with the Project, ask questions, and / or raise any and all issues / concerns. That information will be sent to:

- Honourable Gary Crossman, Member of the Legislative Assembly;
- Wayne Long, Saint John-Rothesay Member of Parliament; and
- Brittany Merrifield, Chair of Fundy Regional Service Commission.

6.2.2 Direct Written Communication with Nearby Residents

An information flyer will be hand-delivered to residents in the immediate area on Mills Avenue, NB Route 825, Base Road, and White Road.

6.2.3 Notification on the NBDELG Website and at the Head Office

The NBDELG shall place notice of the EIA registration on its website (*i.e.*, http://www2.gnb.ca/content/gnb/en/departments/elg/environment/content/environmental_impactassessment/registrations.html) and shall have the EIA document available for public review at the Project Assessment Branch head office located on the second floor of 20 McGloin Street in Fredericton, New Brunswick. To satisfy this requirement, HTFC will provide an electronic version of the registration document (*i.e.*, as a PDF document) and two hard copies to the NBDELG.

6.2.4 Document Availability with Stakeholder and NBDELG Offices

Copies of the Project registration document, and any subsequent submissions made in response to issues raised by the Technical Review Committee (TRC), will be made available at the local NBDELG office. A copy of the EIA document along with any subsequent revision(s) will be placed at the Saint John NBDELG regional office at 8 Castle Street where it will be made available to the public.

6.2.5 Documentation of Public Involvement Activities

Within 60 days of registering the proposed Project, a report documenting the public involvement activities will be submitted to the NBDELG. The report will:

- describe the public involvement activities;
- identify key public and private stakeholders and First Nations directly contacted;
- include copies of all correspondence received from and sent to stakeholders and the general public;
- describe any issues or concerns received as a result of the public involvement program;
- indicate how those issues and concerns were considered or addressed; and
- describe any proposed future consultation with respect to the Project.

7.0 PROJECT APPROVALS

7.1 FISHERIES ACT AUTHORIZATION

On 6 February 2018, changes were proposed to restore lost protections and incorporate modern safeguards into the *Fisheries Act* [R.S.C., 1985, c. F-14]. The changes came into force on 21 June 2019 and the new provisions and strong protections better support the sustainability of Canada's fisheries resources while providing clearer permitting for development projects. Subsection 34.4(1) of the *Act* prohibits conducting a work, undertaking, or activity, other than fishing, that results in the death of fish. Subsection 35(1) of the *Act* prohibits conducting any work, undertaking, or activity that results in the harmful alteration, disruption, or destruction of fish habitat. Paragraphs 34.4(2)(b) and 35(2)(b) of the *Act* allow the Minister to issue an authorization with any terms and conditions in relation to a proposed work, undertaking, or activity that may, result in the death of fish or the harmful alteration, disruption or destruction of fish habitat.

A copy of the federal *Fisheries Act* can be found at:

<https://laws.justice.gc.ca/PDF/F-14.pdf>.

No work is planned within the two unnamed watercourses delineated on the property; however, should work be required within them, then an application should be submitted to the DFO to allow representatives to determine whether an authorization is required or not.

An applicant's guide to submitting a *Fisheries Act* Authorization application can be found at:

<https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/applicants-guide-candidats-eng.html>; and

an application for a *Fisheries Act* Authorization can be found at:

<https://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/forms-formes/apply-auth-applique-eng.pdf>.

Contact information for the DFO is as follows:

Fisheries Protection Program
Fisheries and Oceans Canada
343 University Avenue
Moncton, New Brunswick
E1C 9B6

☎ 506.851.2824
☎ 506.851.6579
🌐 <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/index-eng.htm>
✉ gulflhabitatgolfe@dfo-mpo.gc.ca

7.2 WATERCOURSE AND WETLAND ALTERATION PERMIT

New Brunswick's watercourses and wetlands are afforded protection under the Watercourse And Wetland Alteration (WAWA) Regulation [90-80] of the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1]. Any proposed alterations within watercourses

and / or wetlands, or within their 30 m regulated buffer, require permitting through the NBDELG's WAWA program. Part of the wetland delineated on the property requires infilling to facilitate development. That infilling will also be within 30 m of at least one of the two watercourses delineated on the property. That work can only be done through authorization under a WAWA permit.

A copy of the New Brunswick *Clean Water Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/C-6.1.pdf>>;

a copy of the WAWA Regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/90-80.pdf>>;

the WAWA application portal can be found at:

<<https://www.elgegl.gnb.ca/WAWAG/en/Home/Site>>; and

a copy of the WAWA technical guidelines can be found at:

<<https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/Water-Eau/WatercourseWetlandAlterationTechnicalGuidelines.pdf>>.

Contact information for the NBDELG WAWA program is as follows:

NBDELG
Surface Water Protection
Sustainable Development and Impact Evaluation
Marysville Place
PO Box 6000
Fredericton, NB
E3B 5H1

📞 506.457.4850

📠 506.453.6862

🌐 <http://www2.gnb.ca/content/gnb/en/departments/elg/environment.html>

✉ elg/egl-info@gnb.ca

7.3 ON-SITE SEWAGE DISPOSAL SYSTEM APPROVAL

All on-site sewage disposal system installations, constructions, repairs, and replacements require approval from the Department of Justice and Public Safety. As per the On-Site Sewage Disposal System Regulation [2009-137] of the New Brunswick *Public Health Act* [S.N.B. 1998, c. P-22.4] only licensed installers can install, construct, repair, or replace on-site sewage disposal systems after receiving approval from the Department of Justice and Public Safety. Inspectors with that Department assess applications to ensure the proposed systems will not contaminate groundwater resources and / or cause health hazards.

A copy of the *Public Health Act* can be found at:

<http://laws.gnb.ca/en/showpdf/cs/P-22.4.pdf>;

a copy of the Sewage Disposal System Regulation can be found at:

<http://laws.gnb.ca/en/showpdf/cr/2009-137.pdf>; and

a copy of the on-site sewage system application can be found at:

<https://www.pxw1.snb.ca/snb9000/product.aspx?ProductID=A001P351631A&l=e>.

Contact information for the New Brunswick Department of Justice and Public Safety's (NBDJPS) Technical Inspection Services:

NBDJPS
 Technical Inspection Services
 12 McGloin Street
 PO Box 6000
 Fredericton, NB
 E3A 5T8

📞 506.453.2336

📠 506.457.7394

🌐 <https://www2.gnb.ca/content/gnb/en/departments/public-safety.html>

✉ DPS-MSP.Information@gnb.ca

7.4 BUILDING PERMIT

Pursuant to Part 4, Division B of the New Brunswick *Community Planning Act* [**S.N.B. 2017, c.19**], a building permit must be obtained prior to the construction, relocation, demolition, and / or altering of any structures on land within a municipality and / or Local Service District.

Building permits will be required for the construction of new buildings or structures as well as the demolition, relocation, alteration, or replacement of an existing building or structure associated with the initiative. Planning and development and issuance of building permits within the Simonds Local Service District is administered by the Fundy Regional Service Commission.

A copy of the New Brunswick *Community Planning Act* can be found at:

<http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf>; and

an application for a building permit from the Fundy Regional Service Commission can be found at:

<https://www.fundyrecycles.com/planning-building-inspection/forms-fees/applications/building-permit-form/>.

Contact information for the Fundy Regional Service Commission is provided below.

Fundy Regional Service Commission
 10 Crane Mountain Road

Saint John, New Brunswick
E2M 7T8

📞 506.738.2014
📠 506.738.1207
🌐 <http://www.fundyrecycles.com>
✉ info@frsc.ca

7.5 ACCESS ROAD PERMIT / CERTIFICATE OF SETBACK

As per the Provincial Set-Back Regulation [84-292] of the New Brunswick *Community Planning Act* [S.N.B. 2017, c.19], an access road permit or certificate of setback is required when constructing a new access road, using an existing access road, or building a structure near roadways under NBDTI jurisdiction. Permits / certificates are administered by NBDTI district offices.

A copy of the New Brunswick *Community Planning Act* can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cs/2017-c.19.pdf>>; and

a copy of the Provincial Set-Back regulation can be found at:

<<http://laws.gnb.ca/en/ShowPdf/cr/84-292.pdf>>.

Contact information for the NBDTI Saint John district office is as follows:

NBDTI
District 4, Saint John Office
% Mr. Alan Kerr
Special Projects
50 Crown Street, Suite 105
Saint John, NB
E2L 2X6

📞 506.643.7463
📠 506.643.7464
🌐 https://www2.gnb.ca/content/gnb/en/departments/dti/district_offices.html
✉ alan.kerr@gnb.ca

8.0 PROJECT FUNDING

All costs associated with this project are being borne by HTFC. No provincial or federal monies are being used for this Project.

9.0 SIGNATURES

This Project Environmental Impact Assessment was prepared in accordance with the Environmental Impact Assessment Regulation [87-83] under the New Brunswick *Clean Environment Act* [R.S.N.B. 1973, c. C-6] and on the advice of and in consultation with the various Regulators. Fundy Engineering & Consulting Ltd. prepared the document on behalf of His Tabernacle Family Church. The Proponent has reviewed the document and understands the information contained within.

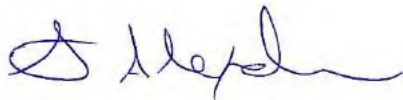
Respectfully submitted,

Proponent Signature:



**Reverend Philip Hutchings
His Tabernacle Family Church**

Environmental Consultant Signature:



**Dr. Matt Alexander, P.Ge., FGC, EP
Environmental Scientist
Fundy Engineering & Consulting Ltd.**

8 July 2022

10.0 REFERENCES

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- Tiner, R.W. 1999. *Wetland Indicators, a guide to wetland identification, delineation, classification, and mapping*. Lewis Publishers, Boca Raton. 392p.
- United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS). 2003. *Field book for describing and sampling soils*. National Soil Survey Center, Lincoln, New England.
- U.S Army Corps of Engineers. 2008. *Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region*. Wetlands Regulatory Assistance Program, draft for peer review and field testing. 7-3-2008.

11.0 REPORT DISCLAIMERS AND DISCLOSURES

The sole purpose of this report and the associated services performed by Fundy Engineering & Consulting Ltd. is to complete an Environmental Impact Assessment document for a new church at 28 Base Road in Garnett Settlement, New Brunswick. The scope of services was defined by the New Brunswick Department of the Environment and Local Government's guidelines to Environmental Impact Assessment in New Brunswick [NBDELG, 2018].

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

11.1 PROJECT TEAM

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

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

Qualifications at a glance



- *Ph.D.*, University of New Brunswick, 2006
- *B.Sc. (Honours)*, St. Francis Xavier University, 2000
- *Environmental Engineering Diploma (Honours)*, Sault College, 1998
- *Professional Geoscientist*, APEGNB, APGNS
- *Environmental Professional*, CECAB
- *Management Certificate*, Harvard Business, 2012

SPECIALTY AREAS: environmental impact assessments, hydrogeology and hydrology, environmental permitting, monitoring, and compliance, fisheries and wildlife, communications and public awareness, environmental research, environmental sustainability, and green initiatives

Profile

Matt has authored several papers published in international peer-reviewed scientific journals relating to his areas of expertise. He was named one of NB's 21 Leaders for the 21st Century and was a finalist in the Premier's Awards for Ontario College Graduates. He has worked on many projects including: assessing the quality of and threats to water supplied to RCMP facilities across PEI; environmental permitting, monitoring, and compliance for portions of the \$750 million (USD) Canaport™ LNG_{LP} Terminal; environmental impact assessment, permitting, monitoring, and compliance for the chip handling and continuous cooking digester plant and the pulp dryer modernization project at the Reversing Falls Mill; environmental impact assessment, permitting, monitoring, and compliance for the Lake Utopia Paper effluent treatment upgrade; a white paper on considerations for responsible gas development of the Frederick Brook Shale in New Brunswick; a brochure on wastewater treatment options for natural gas development; environmental permitting for replacing the monobuoy and portions of its anchor chains at

the Canaport™ Crude Receiving Terminal; development of high-yield groundwater supplies for aquaculture facilities in southwestern NB, including Acadian Sturgeon & Caviar Inc. at Carters Point and Quoddy Savour Seafood Ltd. in Pennfield; environmental impact assessments for several utility-scale green energy projects; and assisting with a due diligence technical investigation of a globally integrated aquaculture and seafood business to support an investment decision by the Public Sector Pension Board. Matt is the Deputy Mayor of Rothesay where he also Chair's the Works and Utilities Committee, is Vice Chair of the Finance Committee, and is Past Chair of the Kennebecasis Regional Joint Board of Police Commissioners. He also serves as a Director for Geoscientists Canada on the APEGNB Provincial Council and as a peer reviewer for the Journal of Hydrology.

Crystal Caines, P.Tech., B.E.T. (Env. St.), PMP **Project Management Lead**

Qualifications at a glance



- *B.E.T.*, Cape Breton University, 2004
- *Environmental Technology Diploma*, New Brunswick Community College, 2001
- *Professional Technologist*, NBSCETT
- *Project Management Professional*, PMI®

SPECIALTY AREAS: project management, environmental permitting, monitoring, and compliance, greenhouse gas emissions assessments, national pollutant release inventory reporting, and health and safety

Profile

Crystal was the environmental compliance officer for two large-scale construction projects, the Canaport™ LNG_{LP} Marine Terminal & Multi-Purpose Pier Project and the Red Head Secondary Access Road. In that capacity she ensured that the environment was held in the highest regard. During those projects, Crystal also gained considerable project management experience, such that she currently manages several medium- to large-scale projects. Crystal actively managed the transformation of the former Dutch Point Sewage Lagoon in Hampton and the former Matthew's Cove Wastewater Treatment Lagoon in Quispamsis to vibrant and functioning wetlands. She also managed the design of a fuel depot for a major airport in the Caribbean. Crystal has managed several environmental permitting and design projects for Irving Oil and the Burchill Wind Project proposed for west Saint John by Saint John Energy and Natural Forces. She performed greenhouse gas emission assessments for Cooke Aquaculture to receive environmental stewardship certification and routinely undertakes greenhouse gas and national pollutant release inventory reporting for Canaport™ LNG_{LP} in addition to having provided routine environmental professional services over the long-term. Most recently, she managed an international due diligence technical investigation involving subject matters experts reviewing a globally integrated aquaculture and seafood business to support an investment decision by the Public Sector Pension Board.

Angela Dick, B.Sc. ENR *fluent en français*
Intermediate GIS Analyst / Environmental Technologist

Qualifications at a glance



- *B.Sc. ENR, University of New Brunswick, 2019*
- *Certified Outdoor Educator, Canadian Wildlife Federation*
- *Certified Backpack Electrofisher*
- *Certified in CABIN sampling, Rapid Geomorphic Assessments, and Rapid Stream Assessments*

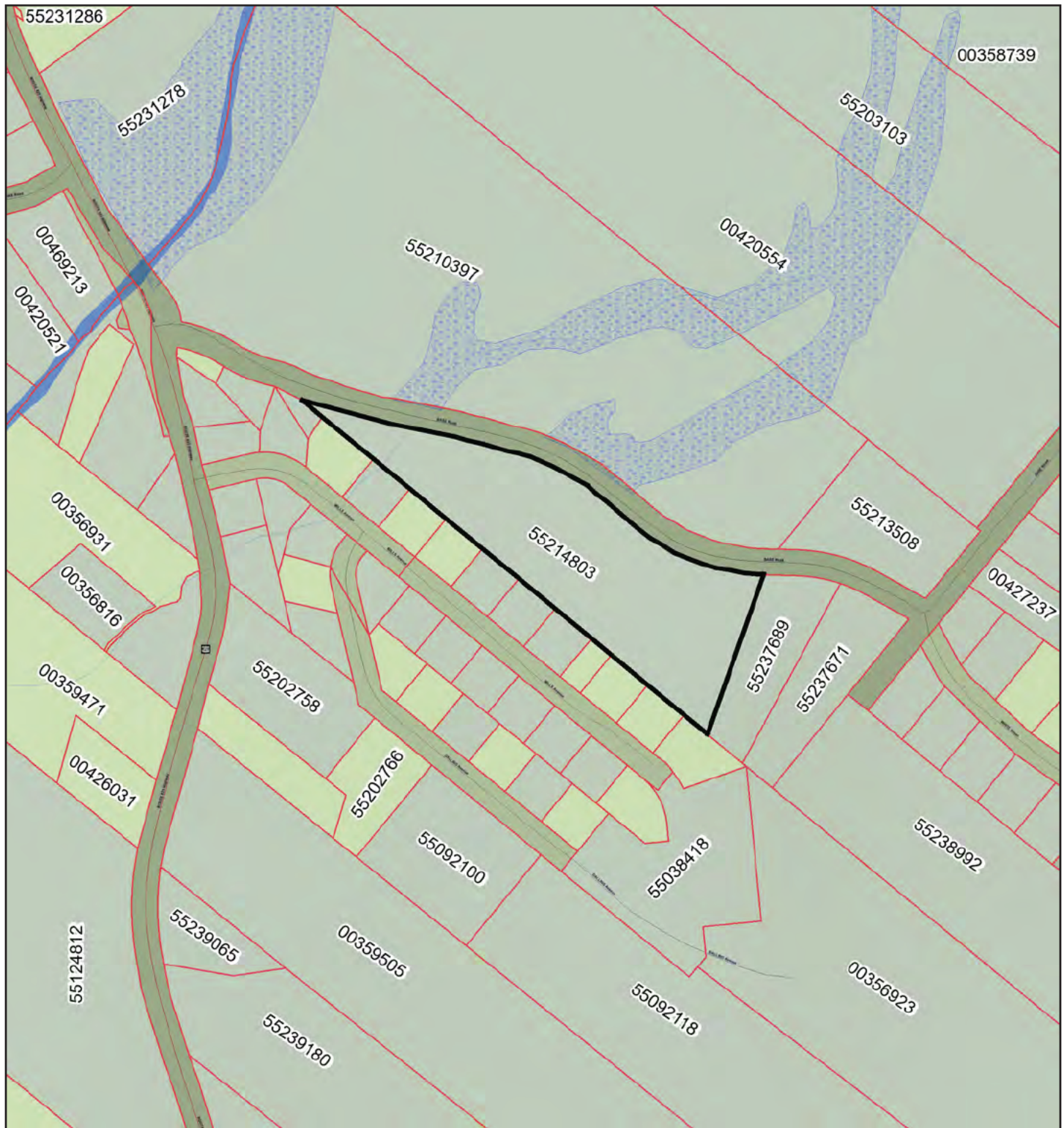
SPECIALTY AREAS: ArcGIS, data management, project management, environmental field sampling, flora surveys, habitat assessment, and fish sampling

Profile

Angela came to Fundy Engineering after working for Fort Folly Habitat Recovery for two years where she focused on helping restore traditionally important species, such as the inner Bay of Fundy Atlantic salmon, and their habitats. She holds a Bachelor of Science in Environment and Natural Resources from the University of New Brunswick. Angela works with our environmental team to tell data stories with maps. She has been actively involved in the development of a fish ladder on Bean Brook in east Saint John, the environmental treatment facility for the Reversing Falls Mill, and several environmental assessments throughout New Brunswick.

Appendix I:

Service New Brunswick Property Information



Scale/Échelle 1:4300

Date: 2022/05/03 15:56:20



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

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

PID:	55214803	County:	Saint John
Status:	Active	Active Date/Time:	2012-01-06 14:16:27
Land Related Description:	Land	Management Unit:	NB1113
Area:	2.79	Area Unit:	Hectares
Date Last Updated:	2022-03-23 10:39:07	Harmonization Status:	Harmonized
Land Titles Status:	Land Titles	Land Titles Date/Time:	2012-01-06 09:43:53
Date of Last CRO:	2022-03-23 10:43:02	Manner of Tenure:	Joint Tenants
Land Gazette Information:	NO		
Description of Tenure:			

Public Comments:

Parcel Interest Holders

Owner	Qualifier	Interest Type
Hutchings, Jamie Patricia		Owner
Hutchings, Philip James		Owner

Assessment Reference

PAN	PAN Type	Taxing Authority Code	Taxing Authority
6772736		553	L.S.D. OF/D.S.L. DE SIMONDS

Parcel Locations

Civic Number	Street Name	Street Type	Street Direction	Place Name
	Base	Road		Garnett Settlement

County Parish

County	Parish
Saint John	Simonds

Documents

Number	Registration Date	Book	Page	Code	Description
42423682	2022-03-17			1100	Deed/Transfer
41415275	2021-06-16			1100	Deed/Transfer
34786062	2015-04-28			6110	Discharge of Mortgage
31032981	2012-01-06			1100	Deed/Transfer
30797469	2011-11-02			5100	Mortgage

Plans

Number	Suffix	Registration Date	Code	Description	Lot Information	Orientation
40496029		2020-09-24	9050	Subdivision & Amalgamations		Provincial Grid

Parcel Relations

Related PID	Type Of Relation	Lot Information
55210397	Parent	
55237671	Infant	Lot 2020-1
55237689	Infant	Lot 2020-2
55238992	Infant	

PAN:	6772736	Status:	OPEN
Location:	BASE RD	County:	Saint John
Property Description:	VACANT LAND	Tax Class:	Fully Taxable
Property Type Code:	701	Property Type Name:	Timberland
Taxing Authority Code:	553	Neighbourhood Code:	02
Taxing Authority Description:	L.S.D. OF/D.S.L. DE SIMONDS	Neighbourhood Description:	GAR SETT/THRU TO FAIRFIELD RHS-REI 2001
Sequence Number:	A102B	Sub Unit:	00
Harmonization:	COMPLETED (One to one match of parcels)	Farm Land Identification Program:	No

Assessed Owner

Owner(s)	Mailing Address	Postal Code	Owner Type
HUTCHINGS,JAMIE PATRICIA & PHILIP JAMES HUTCHINGS	[REDACTED]	[REDACTED]	Fee Simple, Joint Tenancy

Assessments

Year	Assessment	Levy
2022	\$ 10,900.00	\$ 174.86

Sales Price Information

Sale Price	Sale Date
\$ 55,000.00	2022-03-17
\$ 1.00	2012-01-06

PID(s)**PID**

55214803

Appendix II:
Standard Watercourse and Wetland Delineation
and Wetland Functional Assessment

**STANDARD WATERCOURSE AND WETLAND
DELINEATION AND WETLAND FUNCTIONAL
ASSESSMENT**

PID 55214803

28 Base Road in Garnett Settlement, New Brunswick

Prepared for:

Mr. Philip Hutchings



Correspondence via email: hlcc@live.ca

FUNDY Engineering


Serving Our Clients' Needs First

27 May 2022

Project No: 15807

OFFICES IN SAINT JOHN AND CLYDE RIVER



JOB FILE:	15807		
PROJECT TITLE:	28 Base Road in Garnett Settlement, New Brunswick Standard Watercourse and Wetland Delineation and Wetland Functional Assessment		
VERSION	ISSUANCE DATE	PREPARED BY	REVIEWED BY
FINAL	27 May 2022	MDA	AKD
 <p>FUNDY Engineering</p> <p><i>Serving Our Clients' Needs First</i></p> <p><i>This report was prepared for the sole use of the Client. The material and observations presented reflects Fundy Engineering & Consulting Ltd.'s opinion and best judgment based on the information available. Fundy Engineering & Consulting Ltd. accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon the material, observations, and / or opinions by any third-party or for any damages suffered by any third-party resulting from the use of this report.</i></p>		<p>PROFESSIONAL SEAL:</p>	

CONTENTS

1.0	INTRODUCTION.....	1
1.1	Regulatory Framework	1
1.1.1	Definitions.....	3
1.2	Scope of Work	4
2.0	METHODOLOGY	5
2.1	Watercourse Delineations.....	5
2.1.1	Desk-Top Assessment	5
2.1.2	Field Assessment	5
2.2	Wetland Delineations.....	5
2.2.1	Desk-Top Assessment	5
2.2.2	Field Assessment	5
2.2.2.1	Hydrology	6
2.2.2.2	Hydric Soils.....	7
2.2.2.3	Hydrophytic Vegetation	7
2.2.2.4	Boundary Delineation	8
2.3	Wetland Functional Assessment	8
2.4	WESP-AC Model	8
2.4.1	WESP-AC Model	8
2.4.2	Desk-Top Assessment	11
2.4.3	Field Assessment	11
2.5	Assessor	11
3.0	DESK-TOP ASSESSMENT	12
3.1	Site Location and Features.....	12
3.1.1	Proposed Development.....	13
4.0	FIELD ASSESSMENT.....	14
4.1	Watercourse Delineation	15
4.2	Wetland Delineation.....	16
4.2.1	Hydrology	16
4.2.2	Hydric Soils.....	16
4.2.3	Hydrophytic Vegetation	17
4.2.4	Boundary Delineation	19
5.0	FUNCTIONAL ASSESSMENT.....	21
5.1	WESP-AC Model Selection	21
5.2	WESP-AC Model Results	21
5.2.1	Water Cooling.....	22
5.2.2	Phosphorous Retention	22
5.2.3	Organic Nutrient Export.....	23
5.2.4	Songbird, Raptor, and Mammal Habitat	23
5.2.5	Pollinator Habitat	23
5.2.6	Overall Condition Risk Assessment	23
6.0	SUMMARY	24
6.1	Closing.....	24
7.0	GLOSSARY	25

8.0	REFERENCES.....	29
9.0	REPORT DISCLAIMERS AND DISCLOSURES.....	30
9.1	Project Team	30

APPENDIX I:	NBDELG Letter
APPENDIX II:	Service New Brunswick Property Information
APPENDIX III:	Wetland Delineation Data Forms
APPENDIX IV:	Field Assessment Photographs
APPENDIX V:	Delineated Wetland Boundary Coordinates
APPENDIX VI:	WESP-AC Nontidal Model Input and Output

TABLES

Table 1.	Classification of wetland hydrophytic vegetation used by Fundy Engineering for completing Standard Wetland Delineations. After <i>Reed</i> [1988]......	7
Table 2.	Wetland functions and other attributes scored by Nontidal WESP-AC in Atlantic Canada after [NBDELG, 2018]......	9
Table 3.	Wetland functions and other attributes scored by Tidal WESP-AC in Atlantic Canada after [NBDELG, 2018]......	10
Table 4.	List of flora observed on 24 May 2022 at 28 Base Road in Garnett Settlement, New Brunswick.	18
Table 5.	Summary of the functional assessment results for the wetland delineated at 28 Base Road in Garnett Settlement, New Brunswick.	22

FIGURES

Figure 1.	Aerial photograph showing the location of PID 55214803 at 28 Base Road in Back Bay, New Brunswick that is the subject of the standard watercourse and wetland delineation.	2
Figure 2.	Federal and Provincial Government's preference hierarchy. Based on reports by <i>Bond et al.</i> [1992], <i>Environment Canada</i> [1996], <i>Milko</i> [1998], <i>Cox and Grose</i> [2000], and the <i>Interagency Workshop on Wetland Restoration</i> [Undated].	3
Figure 3.	Example of the flagging tape used by Fundy Engineering for marking out the boundaries of wetlands.	8
Figure 4.	Aerial photograph showing the location of the project site at 28 Base Road in Garnett Settlement, New Brunswick.....	12
Figure 5.	Photograph taken on 24 May 2022 showing the concrete culvert installed within the ditch adjacent to Base Road for accessing 28 Base Road in Garnett Settlement, New Brunswick.	14
Figure 6.	Panoramic photograph taken on 24 May 2022 looking southwest towards from the driveway off of Base Road showing the area where trees were recently cut on 28 Base Road in Garnett Settlement, New Brunswick.....	15

Figure 7. Photographs taken on 24 May 2022 showing flagging tape placed by NBDELG representatives evidence at the approximate boundaries of the wetland at 28 Base Road in Garnett Settlement, New Brunswick.....	15
Figure 8. Photographs taken on 24 May 2022 showing the three test pits used to assess the presence of hydric soils at the project site at 28 Base Road in Garnett Settlement, New Brunswick.	17
Figure 9. Aerial photograph showing the wetland delineated at the project site at 28 Base Road in Garnett Settlement, New Brunswick on 24 May 2022.	20
Figure 10. Condition risk assessment for the wetland delineated at 28 Base Road in Garnett Settlement, New Brunswick.....	23

ACRONYMS

cm:	centimetre
DFO:	Department of Fisheries and Oceans
e.g.:	(<i>exempli gratia</i>) for example
EIA:	Environmental Impact Assessment
EP:	Environmental Professional
et al.:	(<i>et alii</i>) and others
etc.:	<i>et cetera</i>
FGC:	Fellow of Geoscience Canada
GPS:	Global Positioning System
ha:	hectare
HADD:	Harmful Alteration, Disruption, and Destruction
i.e.:	(<i>id est</i>) namely / that is
LiDAR:	Light Detection And Ranging
Ltd.:	Limited
mm:	millimetre
m:	metre
m ² :	metres squared
n.b.:	(<i>nota bene</i>) note well / take note
NBDELG:	New Brunswick Department of the Environment and Local Government
NBDNRED:	New Brunswick Department of Natural Resources and Energy Development
NRCS:	Natural Resources Conservation Service
P.Geo.:	Professional Geoscientist
P.Tech.:	Professional Technologist
Ph.D.:	Doctorate of Philosophy
PID:	Property Identification number
PSW:	Provincially Significant Wetland
SNB:	Service New Brunswick
WAWA:	Watercourse And Wetland Alteration
WESP-AC:	Wetland Ecosystem Services Protocol – Atlantic Canada
USACE:	United States Army Corps of Engineers

USDA:	United States Department of Agriculture
° C:	degrees Celsius
µm:	micrometres
%:	percent
~:	approximately
>:	greater than
≥:	greater than or equal to
<:	less than
%:	Care Of
±:	plus or minus
° N:	degrees North
° W:	degrees West
':	minutes
":	seconds

1.0 INTRODUCTION

Fundy Engineering & Consulting Ltd. (Fundy Engineering) was contracted by Mr. Philip Hutchings (*i.e.*, the Client) to complete a standard watercourse and wetland delineation (*i.e.*, the Work) for a property at 28 Base Road in Garnett Settlement, New Brunswick. The property subject of the Work is identified in the New Brunswick Geomatics Information Centre database as Property IDentification (PID) number 55214803 (Figure 1). This report describes the results of the Work.

It is understood that representatives with the New Brunswick Department of the Environment and Local Government (NBDELG) advised the Client to stop all work on the Project site due to the potential presence of watercourses and wetlands. It is further understood that the Client applied for a Watercourse And Wetland Alteration (WAWA) permit (*i.e.*, Alt 63374). During review of the WAWA permit application, NBDELG representatives issued a letter noting that that much of the property lies within an unmapped wetland > 2 ha in size (*i.e.*, a copy of the letter is included in Appendix I). A watercourse and wetland delineation must be conducted to confirm the size of the wetland(s) in order for NBDELG representatives to determine next steps.

1.1 REGULATORY FRAMEWORK

New Brunswick's wetlands and watercourses (*i.e.*, streams, ponds, and lakes) are afforded protection under the *Watercourse and Wetland Alteration Regulation* [90-80] of the *New Brunswick Clean Water Act* [S.N.B. 1989, c. C-6.1]. Any proposed alterations within most wetlands and / or streams, or within their 30 m regulated buffer, require permitting through the NBDELG's WAWA Program through a WAWA permit. Any project that has the potential to impact a wetland > 2 ha in size, and / or its regulated 30 m buffer, must be registered through the *Environmental Impact Assessment Regulation* [87-83] of the *New Brunswick Clean Environment Act* [R.S.N.B. 1973, c. C-6].

New Brunswick's fish-bearing wetlands and watercourses are also afforded protection under Section 35(2) of the *Fisheries Act* [R.S.C., 1985, c. F-14] administered by the Department of Fisheries and Oceans (DFO). Subsection 34.4(1) of the *Act* prohibits conducting any work, undertaking, or activity, other than fishing, that results in the death of fish. Subsection 35(1) of the *Act* prohibits conducting any work, undertaking, or activity that results in the harmful alteration, disruption, or destruction of fish habitat. Paragraphs 34.4(2)(b) and 35(2)(b) of the *Act* allow the Minister to issue a Fisheries Authorization with any terms and conditions in relation to a proposed work, undertaking, or activity that may, result in the death of fish or the harmful alteration, disruption or destruction of fish habitat.

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

project. Wetland compensation ratios are established by the NBDELG. A Wetland Functional Assessment (WFA) may also be required to determine wetland functions, values, and benefits and assess the required compensation ratio.



Figure 1. Aerial photograph showing the location of PID 55214803 at 28 Base Road in Back Bay, New Brunswick that is the subject of the standard watercourse and wetland delineation.

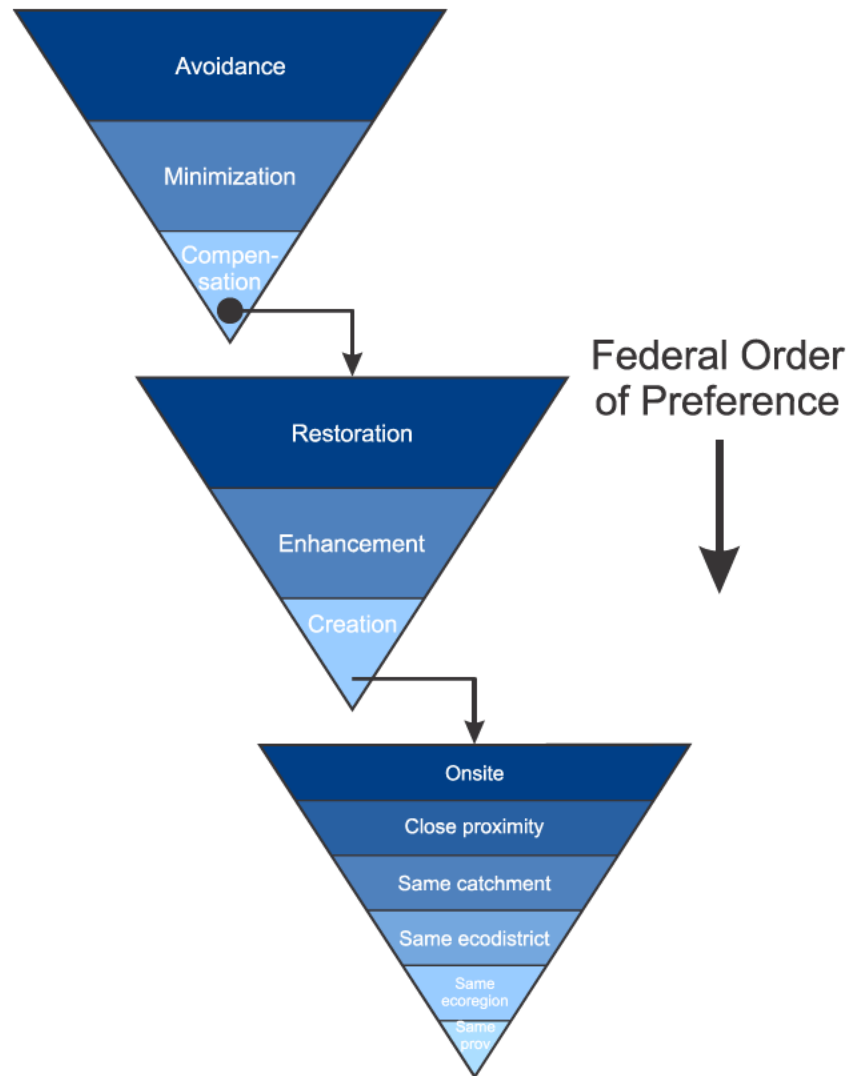


Figure 2. Federal and Provincial Government's preference hierarchy. Based on reports by *Bond et al.* [1992], *Environment Canada* [1996], *Milko* [1998], *Cox and Grose* [2000], and the *Interagency Workshop on Wetland Restoration* [Undated].

1.1.1 Definitions

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

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

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

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

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

1.2 SCOPE OF WORK

The scope of work was to:

- review mapping within the NBDELG's databases regarding watercourses and wetlands in the vicinity of the property;
- complete the desktop assessment portion of the Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC);
- visit the property to delineate watercourses and wetlands;
- complete the field assessment portion of the WESP-AC, including a delineation of the wetland boundaries on the property in vicinity of the proposed development; and
- generate a report, complete with maps, describing the results of the delineations and the WESP-AC assessment.

2.0 METHODOLOGY

2.1 WATERCOURSE DELINEATIONS

2.1.1 Desk-Top Assessment

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

2.1.2 Field Assessment

Fundy Engineering's watercourse assessments are based on the New Brunswick *Clean Water Act* [S.N.B. 1989, c. C-6.1] definition of a wetland (*i.e.*, Section 1.1.1). Watercourses are delineated in the field by first walking the perimeter of the subject area. Potential watercourses are flagged at that time. Later, the potential watercourses are followed into the subject area to confirm their identification and determine their extent. Generally, location measurements (*i.e.*, latitude and longitude) are made every 5 m to 10 m along the flowpath. Assessment of watercourses includes collecting the following information:

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

2.2 WETLAND DELINEATIONS

2.2.1 Desk-Top Assessment

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

2.2.2 Field Assessment

Fundy Engineering's process for delineating a wetland boundary is based upon the United States Army Corps of Engineers (USACE) Wetlands Delineation Manual [*Environmental Laboratory*, 1987], the USACE [2008] regional supplement, and Tiner [1999]. We base our wetland assessments on the New Brunswick *Clean Environment Act* [R.S.N.B. 1973, c. C-6] definition of a wetland (*i.e.*, Section 1.1.1).

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

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

The three criteria noted above are not required to be perennially present for an area to be deemed a wetland. For example, wetland hydrology may not exist during a drought or vegetation may not be present if the wetland has been impacted by infilling. The three criteria are discussed in detail below. During the field assessment, Wetland Delineation Data Forms adapted from the USACE form for North Central and North East Region (Version 2.0) and field indicators for identifying hydric soils in New England (Version 4.0) supplement for use in New Brunswick (2019) were used.

2.2.2.1 Hydrology

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

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

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

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

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

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

2.2.2.2 Hydric Soils

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

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

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

2.2.2.3 Hydrophytic Vegetation

Hydrophytic vegetation is defined as the sum total of macrophytic plant life that occurs in areas where the frequency and duration of inundation or soil saturation produce permanent or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present [Environmental Laboratory, 1987]. Hydrophytic vegetation should be the dominant plant type and is characterized by the dominant species that comprises the plant community as per the classifications provided in Table 1.

Table 1. Classification of wetland hydrophytic vegetation used by Fundy Engineering for completing Standard Wetland Delineations. After Reed [1988].

Plant Species Classification	Abbreviation*	Wetland Occurrence Probability
Obligate	OBL	> 99 %
Facultative Wetland	FACW	66 % to 99 %
Facultative	FAC	33 % to 66 %
Facultative Upland	FACU	1 % to 33 %
Upland	UPL	< 1 %
No Indicator Status	NI	Insufficient information exists to determine status
Unlisted Species (assumed as upland species)	NL	Do not occur in wetlands in any region

Notes: *A '+' or '-' is typically added to the classification to indicate greater or lesser probability of occurring within a wetland, respectively

2.2.2.4 Boundary Delineation

The wetland perimeter is delineated assessing the relationship between hydrological indicators, hydrophytic vegetation, and hydric soils. Each datum point in the field, spaced about 5 m apart and marked using specially labeled flagging tape (*i.e.*, Figure 3), is collected using a Garmin GPSmap 60Cx handheld Global Positioning System (GPS) unit with an estimated accuracy rating of ± 3 m. As noted in Section 1.1, the NBDELG regulates activities within 30 m of wetlands; however, the 30 m buffer is not marked in the field unless it is required by the client.

STREAM / WETLAND / BUFFER - FUNDY ENG.

Figure 3. Example of the flagging tape used by Fundy Engineering for marking out the boundaries of wetlands.

2.3 WETLAND FUNCTIONAL ASSESSMENT

2.4 WESP-AC MODEL

2.4.1 WESP-AC Model

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

There are two versions of the WESP-AC model:

- one for nontidal wetlands; and
- one for tidal wetlands.

Nontidal wetlands are vegetated wetlands that do not experience fluctuation of their surface water levels at any time during the year as a result of oceanic tides. They are commonly categorized as swamps, marshes, bogs, or fens. Tidal wetlands are areas predominantly vegetated by vascular plants that experience surface water flooding by tides at least once annually, regardless of salinity.

After completing a desk-top assessment and a field assessment, input data are used by the logic models programmed within the WESP-AC Excel® spreadsheets to calculate normalized scores and ratings for each of the wetland attributes. Wetland functions and other attributes for nontidal wetlands are summarized in Table 2 while those for tidal wetlands are summarized in Table 3.

Table 2. Wetland functions and other attributes scored by Nontidal WESP-AC in Atlantic Canada after [NBDELG, 2018].

Function or Attribute	Definition	Potential Benefits
<u>Hydrologic Functions</u>		
Water storage and delay	The effectiveness for storing runoff or delaying the downslope movement of surface water for long or short periods	Flood control and maintain ecological systems
Stream flow support	The effectiveness for contributing water to streams especially during the driest part of a growing season	Support fish and other aquatic life
<u>Water Quality Maintenance Functions</u>		
Water cooling	The effectiveness for maintaining or reducing temperature of downslope waters	Support coldwater fish and other aquatic life
Sediment retention and stabilization	The effectiveness for intercepting and filtering suspended inorganic sediments, thus allowing their deposition, as well as reducing energy of waves and currents, resisting excessive erosion, and stabilizing underlying sediments or soil	Maintain quality of receiving waters and protect shoreline structures from erosion
Phosphorus retention	The effectiveness for retaining phosphorus for long periods (> 1 growing season)	Maintain quality of receiving waters
Nitrate removal and retention	The effectiveness for retaining particulate nitrate and converting soluble nitrate and ammonium to nitrogen gas while generating little or no nitrous oxide (a potent greenhouse gas)	Maintain quality of receiving waters
Organic nutrient export	The effectiveness for producing and subsequently exporting organic nutrients (mainly carbon), either particulate or dissolved	Support food chains in receiving waters
<u>Ecological Habitat Functions</u>		
Fish habitat	The capacity to support an abundance and diversity of native fish (both anadromous and resident species)	Support recreational and ecological values
Aquatic invertebrate habitat	The capacity to support or contribute to an abundance or diversity of invertebrate animals, which spend all or part of their life cycle underwater or in moist soil and includes dragonflies, midges, clams, snails, water beetles, shrimp, aquatic worms, and others	Support salmon and other aquatic life and maintain regional biodiversity
Amphibian and reptile habitat	The capacity to support or contribute to an abundance or diversity of native frogs, toads, salamanders, and turtles	Maintain regional biodiversity
Waterbird feeding habitat	The capacity to support or contribute to an abundance or diversity of waterbirds that migrate or winter, but do not breed in the region	Support hunting and ecological values and maintain regional biodiversity
Waterbird nesting habitat	The capacity to support or contribute to an abundance or diversity of waterbirds that nest in the region	Maintain regional biodiversity
Songbird, raptor, and mammal habitat	The capacity to support or contribute to an abundance or diversity of native songbird, raptor, and mammal species and functional groups, especially those that are most dependent on wetlands or water	Maintain regional biodiversity

Function or Attribute	Definition	Potential Benefits
Native plant habitat and pollinator habitat	The capacity to support or contribute to a diversity of native, hydrophytic, vascular plant species, communities, and / or functional groups, as well as the pollinating insects linked to them	Maintain regional biodiversity and food chains
Public use and recognition*	Prior designation of the wetland, by a natural resource or environmental agency, as some type of special protected area; also, the potential and actual use of a wetland for low-intensity outdoor recreation, education, or research	Commercial and social benefits of recreation and protection of prior public investments

NOTES: *A wetland benefit that is not considered a function

Table 3. Wetland functions and other attributes scored by Tidal WESP-AC in Atlantic Canada after [NBDELG, 2018].

Function or Attribute	Definition	Potential Benefits
Storm surge reduction	The effectiveness for buffering surges of tidal water for short periods before they reach vulnerable uplands	Flood control, protect shoreline structures from erosion
Water purification	The effectiveness for intercepting and filtering suspended inorganic sediments thus allowing their deposition, as well as reducing energy of waves and currents, resisting excessive erosion, and stabilizing underlying sediments or soil	Maintain quality of coastal waters and protect shoreline structures from erosion
Organic nutrient export	The effectiveness for producing and subsequently exporting organic nutrients (mainly carbon), either particulate or dissolved	Support food chains in coastal waters
Fish habitat	The capacity to support an abundance and diversity of native fish (both anadromous and resident species)	Support recreational and ecological values
Waterbird habitat	The capacity to support or contribute to an abundance or diversity of waterbirds, mainly those that migrate or winter in the region	Support hunting and ecological values
Songbird, raptor, and mammal habitat	The capacity to support or contribute to an abundance or diversity of native songbird, raptor, and mammal species and functional groups, especially those that are most dependent on tidal wetlands or water	Maintain regional biodiversity and food webs
Biodiversity support	The capacity to support or contribute to a diversity of native plant and animal species, communities, and / or functional groups	Maintain food webs and system stability
Wetland stability*	The potential for long term persistence of a tidal wetland in the face of direct or indirect effects of sea level rise	Protection of the above functions and benefits
Public use and recognition*	Prior designation of the wetland, by a natural resource or environmental agency, as some type of special protected area; also, the potential and actual use of a wetland for low-intensity outdoor recreation, sustainable consumptive uses, education, or research	Commercial and social benefits of recreation and protection of prior public investments

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

2.4.2 Desk-Top Assessment

A desk-top assessment is completed prior to visiting the wetland. Aerial images and data from various sources, such as Google Earth, are consulted in order to answer mostly multiple-choice questions about the wetland (*i.e.*, 38 for non-tidal wetlands and 28 for tidal wetlands).

2.4.3 Field Assessment

After the desk-top assessment is completed, the wetland is visited. Field observations and discussions with the landowner(s) are used to answer specific questions related to the wetland (*i.e.*, 66 for nontidal wetlands and 18 for tidal wetlands). A stressor datasheet is also completed for non-tidal wetlands.

2.5 ASSESSOR

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

3.0 DESK-TOP ASSESSMENT

3.1 SITE LOCATION AND FEATURES

The Project site is located at 28 Base Road in Garnett Settlement (Saint John County, Simonds Parish), New Brunswick (Figure 1). A property information report is included in Appendix II. According to the GeoNB database, a mapped watercourse crosses the property near the western boundary (Figure 4). No mapped wetlands are shown on the property. Approximate coordinates for the centre of the property are 45.304572 °N and 65.844412 °W. The property is located in the Fundy Coast ecoregion of New Brunswick.

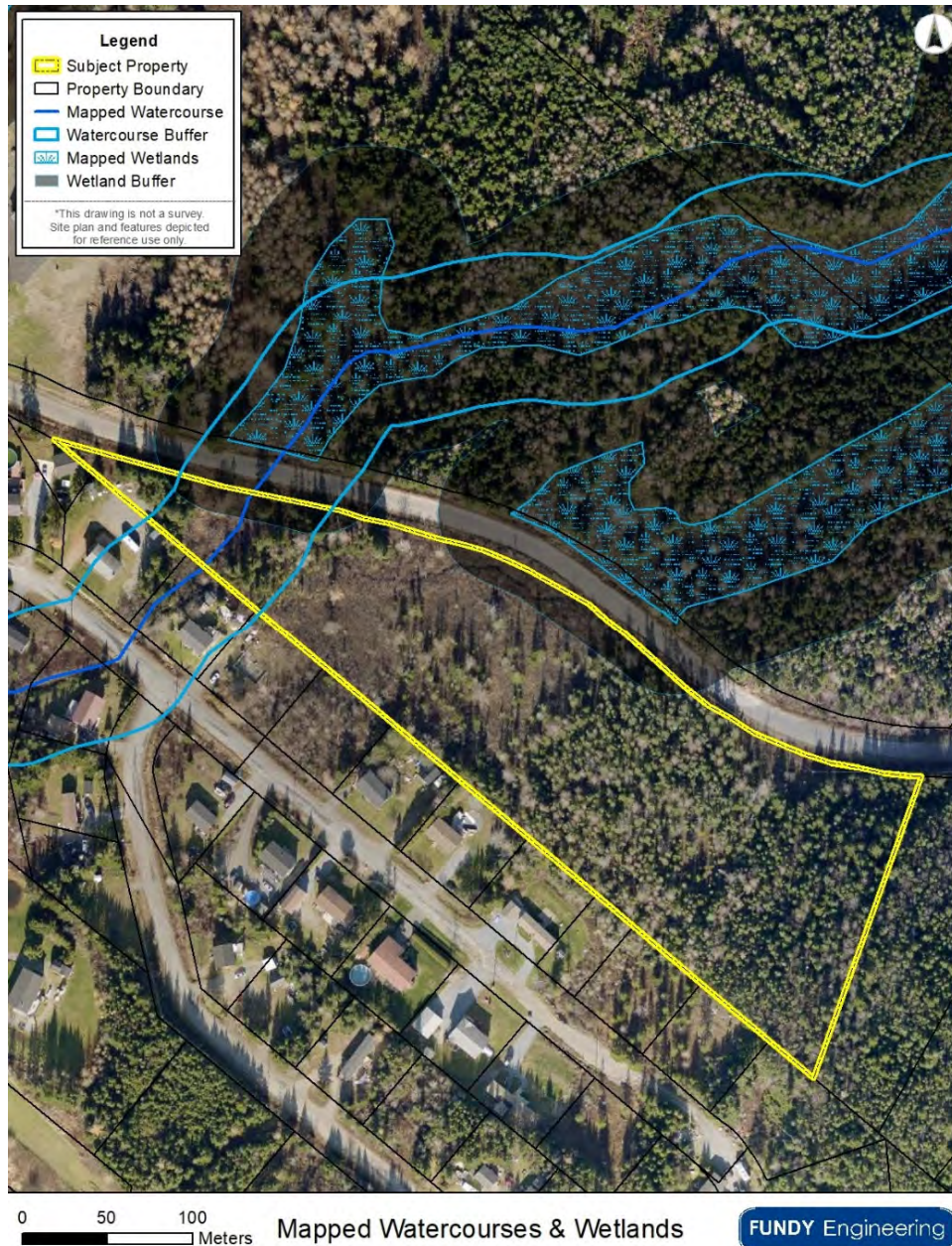


Figure 4. Aerial photograph showing the location of the project site at 28 Base Road in Garnett Settlement, New Brunswick.

3.1.1 *Proposed Development*

It is understood that the Client intends to build a church, roadway access, a parking lot, and garden plots on a portion of the property. During review of the WAWA permit application, representatives with the NBDELG determined that up to 0.7 ha of wetland could be impacted through the proposed development (*n.b.*, the actual impact can only be determined after the wetland is delineated and the lost wetland is delineated).

4.0 FIELD ASSESSMENT

On 24 May 2022, Matt Alexander visited PID 55214803 between 12PM and 3PM to complete the field component of the Work. During the assessment, skies were mainly clear, air temperature was about 15 °C, and there were light winds. During the previous 48 hours, there had been < 1 mm of precipitation.

The vacant and undeveloped site is bound by Base Road to the north, vacant land to the east, and residential dwellings along Mill's Avenue to the south and west. The site was accessed from a newly constructed driveway off of Base Road. A round 38 cm concrete culvert was placed in the ditch adjacent to Base Road to facilitate construction of the driveway on to the property. There is some evidence of sediment recently washing down slope in that ditch (Figure 5). The site is relatively flat save for the eastern edge where the driveway enters from Base Road, which rises about 10 m above the remainder of the property.



Figure 5. Photograph taken on 24 May 2022 showing the concrete culvert installed within the ditch adjacent to Base Road for accessing 28 Base Road in Garnett Settlement, New Brunswick.

Trees on about 0.4 ha of the site were recently cut prior to the Client being advised by the NBDELG to stop work until permits are in place (Figure 6). Two pieces of pink flagging tape placed by NBDELG representatives at the approximate boundaries of the wetland were observed near the northern and southern property lines (Figure 7).



Figure 6. Panoramic photograph taken on 24 May 2022 looking southwest towards from the driveway off of Base Road showing the area where trees were recently cut on 28 Base Road in Garnett Settlement, New Brunswick.



Figure 7. Photographs taken on 24 May 2022 showing flagging tape placed by NBDELG representatives evidence at the approximate boundaries of the wetland at 28 Base Road in Garnett Settlement, New Brunswick.

4.1 WATERCOURSE DELINEATION

Two watercourses were delineated on the property (*n.b.*, only the westernmost watercourse was shown in the NBDELG mapping as shown in Figure 4). Both are primary

and unnamed watercourses that merge on the property and discharge to Black River located about 0.5 km to the southwest. Both watercourses flow on to the property via 100 cm round corrugated steel culverts from a wetland on the northern side of Base Road. The watercourses were about 1.5 m to 2 m wide on the property and < 0.4 m deep. Bottom sediments were comprised of silt, sands, gravel, and cobble, woody debris was moderate, as was stream shade. During the delineation, brook trout (*Salvelinus fontinalis*) were observed swimming above and below the western culvert under Base Road.

4.2 WETLAND DELINEATION

As noted in Figure 4, no mapped wetlands are shown to exist on the property; however, mapping does show mapped wetlands on the northern side of Base Road. Upon arrival at the site, it was apparent that topography and vegetation are similar on both sides of Base Road at this location.

Three parameter datum points in close proximity were used to characterize hydrology, hydric soils, and hydrophytic vegetation; two upland datum points and one wetland datum point. Coordinates for the datum points are as follows:

- Upland: 45 ° 18 ' 13.22 " N and 65 ° 50 ' 35.52 " W;
- Upland 2: 45 ° 18 ' 13.42 " N and 65 ° 50 ' 36.09 " W; and
- Wetland: 45 ° 18 ' 13.58 " N and 65 ° 50 ' 36.38 " W.

All three datum points were in undisturbed areas on the property. The completed datasheets for the three parameter datum points are included in Appendix III.

4.2.1 Hydrology

No primary or secondary hydrology indicators were observed at the two upland datum points.

Surface water, a high water table, saturation, which were all observed at the wetland datum point, were used as positive primary indicators of wetland hydrology. Secondary indicators, including moss trim lines, stunted or stressed plants, and microtopographic relief, were also observed.

4.2.2 Hydric Soils

A 70 cm deep test pit was excavated using a shovel to observe the underlying soil conditions on the hillslope adjacent to the low-lying area on the property (Figure 8). The area selected for this test pit and the other two was in an area not recently disturbed by tree clearing activity. A 5 cm thick root mat was observed atop 20 cm of dark brown (7.5 YR 3 / 3) sandy clay, atop 5 cm of light gray (5 YR 7 / 1) sandy clay, and 40 cm of dark brown (7.5 YR 3 / 3) sandy clay. No water table was encountered and the soils were not saturated. This test pit datum point was identified as Upland.

A 55 cm deep test pit was excavated very near the base of the slope on the property. A 5 cm thick root mat was observed atop 10 cm of strong brown (7.5 YR 5 / 6) sandy clay, atop 5 cm of light gray (5 YR 7 / 1) sandy clay, and 35 cm of gray (7.5 YR 6 / 1) sandy

clay. The water table was observed at a depth of 45 cm and saturation was observed within 30 cm of the surface. This test pit datum point, identified as Upland 2 (Figure 8), was considered very near the separation between upland and wetland.

One 30 cm deep test pit was excavated using a shovel within the wetland. A 5 cm thick root layer was present atop 25 cm of black (10 YR 2 / 1) silty clay classified as a histic epipedon. This test pit datum point was identified as Wetland (Figure 8).

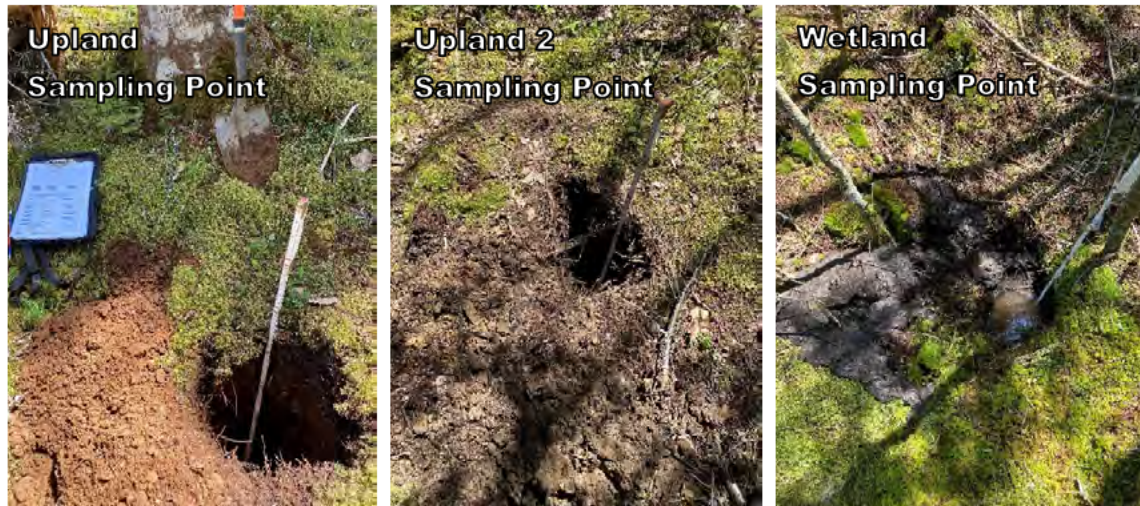


Figure 8. Photographs taken on 24 May 2022 showing the three test pits used to assess the presence of hydric soils at the project site at 28 Base Road in Garnett Settlement, New Brunswick.

4.2.3 *Hydrophytic Vegetation*

The dominance test and the prevalence index for both upland points as noted in the data forms of Appendix III was $\leq 50\%$ and > 3.0 , respectively, suggesting the absence of hydrophytic vegetation. The rapid test, dominance test, and prevalence index at the wetland datum point were all positive for hydrophytic vegetation.

Table 4 summarizes the vegetation that was observed during the site visit. None of the species observed are considered rare or extremely rare. Appendix IV includes photographs showing the representative vegetation.

Table 4. List of flora observed on 24 May 2022 at 28 Base Road in Garnett Settlement, New Brunswick.

Common Name	Scientific Name	Provincial Rarity Rank	Indicator
Balsam fir	<i>Abies balsamea</i>	Secure (S5)	FAC
Common yarrow	<i>Achillea millefolium</i>	Not applicable (SNA)	FACU
Speckled alder	<i>Alnus incana</i>	Secure (S5)	NI
Sandwort	<i>Arenaria serpyllifolia</i>	Not applicable (SNA)	FAC
Yellow birch	<i>Betula alleghaniensis</i>	Secure (S5)	FAC
White birch	<i>Betula papyrifera</i>	Secure (S5)	FACU
Common knapweed	<i>Centaurea nigra</i>	Not applicable (SNA)	NI
Leatherleaf	<i>Chamaedaphne calyculata</i>	Secure (S5)	OBL
Bunchberry	<i>Cornus canadensis</i>	Secure (S5)	FAC-
Red osier dogwood	<i>Cornus sericea</i>	Not applicable (SNA)	NI
Marginal woodfern	<i>Dryopteris marginalis</i>	Secure (S5)	FACU-
Horsetail	<i>Equisetum fluviatile</i>	Secure (S5)	OBL
Wild strawberry	<i>Fragaria virginiana</i>	Secure (S5)	FACU
Bedstraw	<i>Galium asprellum</i>	Secure (S5)	OBL
Blessed herb	<i>Geum urbanum</i>	Not applicable (SNA)	NI
Giant hogweed	<i>Heracleum mantegazzianum</i>	Not applicable (SNA)	NI
Hawkweed	<i>Hieracium lachenalia</i>	Not applicable (SNA)	NI
Mountain holly	<i>Ilex mucronate</i>	Secure (S5)	NI
Sheep laurel	<i>Kalima angustifolia</i>	Secure (S5)	FACU
Tamarack	<i>Larix laricina</i>	Secure (S5)	FACW
Perennial ryegrass	<i>Lolium perenne</i>	Not applicable (SNA)	FACU-
Starflower	<i>Lysimachia borealis</i>	Secure (S5)	NI
Creeping Jenny	<i>Lysimachia nummularia</i>	Not applicable (SNA)	OBL
Wild-lily-of-the-valley	<i>Maianthemum canadense</i>	Secure (S5)	FAC-
Ostrich fern	<i>Matteuccia struthiopteris</i>	Secure (S5)	FACW
Sensitive fern	<i>Onoclea sensibilis</i>	Secure (S5)	FACW
Cinnamon fern	<i>Osmundastrum cinnamomeum</i>	Secure (S5)	FACW
Black spruce	<i>Picea mariana</i>	Secure (S5)	FACW-
Red-stemmed feather moss	<i>Pleurozium schreberi</i>	Secure	NI
Chokecherry	<i>Prunus virginiana</i>	Secure (S5)	FACU
Pink wintergreen	<i>Pyrola asarifolia</i>	Secure (S5)	FACW
Gooseberry	<i>Ribes hirtellum</i>	Secure (S5)	FAC
Blackberry	<i>Rubus allegheniensis</i>	Secure (S5)	FACU-
Red raspberry	<i>Rubus idaeus</i>	Secure (S5)	FAC-
Curled dock	<i>Rumex crispus</i>	Not applicable (SNA)	FAC
Bebb's willow	<i>Salix bebbiana</i>	Secure (S5)	FACW
Dandelion	<i>Taraxacum officinale</i>	Secure (S5)	FACU-
Canadian yew	<i>Taxus canadensis</i>	Secure (S5)	FAC
Northern meadow rue	<i>Thalictrum confine</i>	Vulnerable / apparently secure (S3/S4)	FACW
Broadleaf cattail	<i>Typha latifolia</i>	Secure (S5)	OBL
Ligonberry	<i>Vaccinium vits-idaea</i>	Apparently secure (S4)	FAC

4.2.4 *Boundary Delineation*

The boundaries of the wetland, which is characterized as a forested wetland, were only delineated on the Proponent's property (Figure 9). Coordinates for the wetland boundary and watercourses delineated in the field are provided in Appendix V. The overall wetland size on PID 55214803 is estimated at 2.2 ha and occupies about 79 % of the overall property. Based on data collected in the field, the extent of the wetland on adjacent properties was inferred using topographical data and LiDAR data. It is estimated that the wetland has an overall size of about 2.6 ha.

Prior to historical development on surrounding properties, it is likely that the wetland was larger in size. For example, it is believed that before Base Road existed, the wetland on the northside and southside were one large wetland.

Results show that the delineated wetland is > 2 ha in size. Potential impacts to the wetland must be approved by undergoing an EIA review and then subsequently obtaining a WAWA permit. If any impacts to the onsite watercourses and or their 30 m buffer are required, representatives with the DFO must be consulted to determine if a Fisheries Authorization is required.

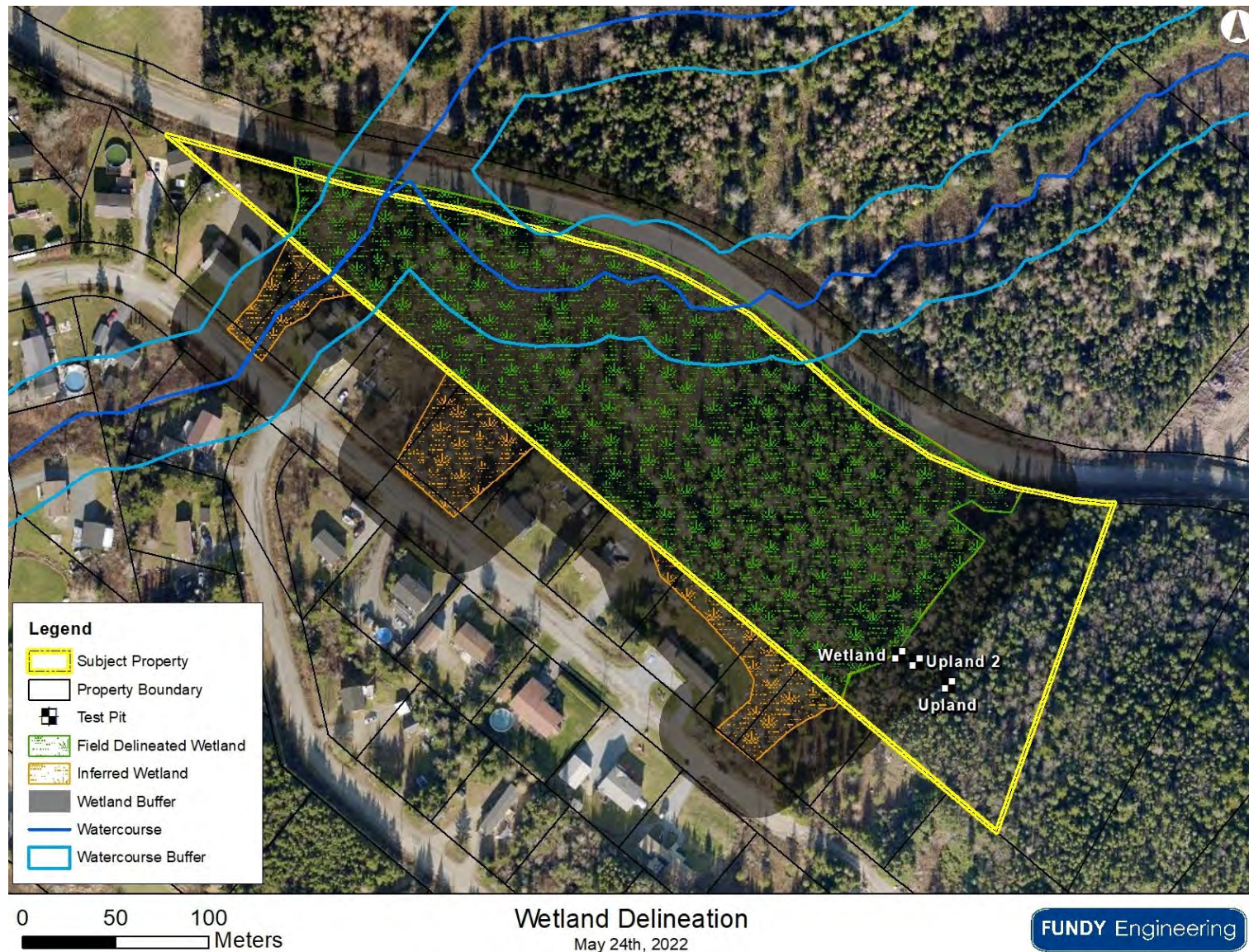


Figure 9. Aerial photograph showing the wetland delineated at the project site at 28 Base Road in Garnett Settlement, New Brunswick on 24 May 2022.

5.0 FUNCTIONAL ASSESSMENT

5.1 WESP-AC MODEL SELECTION

The WESP-AC Model, “WESP-AC Nontidal Calculator SingleSite_23July2018_protected” was used for the wetland functional assessment described herein [NBDELG, 2018]. The Nontidal, versus the Tidal, model was chosen because there is no connection between the delineated wetland and tidal waters. The supplementary data contained in SuppInfo_Nontidal_WESP-AC were also used for the assessment.

5.2 WESP-AC MODEL RESULTS

The complete WESP-AC Model results are included in Appendix VI. A summary of the functional assessment is provided in Table 5. The wetland functions are grouped as follows:

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

For a summary of what those functions mean, please refer to Table 2.

Table 5. Summary of the functional assessment results for the wetland delineated at 28 Base Road in Garnett Settlement, New Brunswick.

Grouped Function	Normalized Function Score*	Function Rating	Benefits Normalized Score*	Benefits Rating
Hydrologic	4.06	Moderate	5.16	Moderate
Water quality support	3.64	Moderate	9.48	Higher
Aquatic support	7.32	Higher	5.53	Higher
Aquatic habitat	4.06	Moderate	5.47	Moderate
Transition habitat	8.16	Higher	4.08	Moderate
Wetland condition	-	-	0.96	Lower
Wetland risk	-	-	5.00	Higher

NOTES:

*A score of 0.00 does not mean the function or benefit is absent from the wetland; instead, it means that the wetland has a capacity that is equal or less than the lowest-scoring wetland for that function or benefit among the 98 NB calibration wetlands that were assessed previously

Based on the detailed WFA contained in Appendix VI, the following five functions received a “higher” rating:

- water cooling;
- phosphorous retention;
- organic nutrient export;
- songbird, raptor, and mammal habitat; and
- pollinator habitat.

For a summary of what those functions mean, please refer to Table 2 and the sections below.

5.2.1 Water Cooling

This wetland is located near the headwaters of an unnamed watercourse that flows into Black River, which is known to support fish and other aquatic life. The delineated wetland is in a low-lying area that is heavily shaded. Its location adjacent to elevated areas makes it a prime location for cool groundwater inputs. The water flowing in to the wetland through the connected unnamed watercourses likely reduces in temperature as they flow through based on cool groundwater inputs and the heavily forested canopy. Therefore, this wetland is believed to be an important contributor to maintaining cooler temperatures for supporting fish and other aquatic life.

5.2.2 Phosphorous Retention

Phosphorous is commonly adsorbed to suspended solids contained in flowing water, such as surface water runoff in ditches and streamflow, and contained dissolved in precipitation. Wetlands play an important function of retaining phosphorous for long periods (*i.e.*, > one growing season), which is important for reducing impacts to rare plants, aquatic food chains, and valued species. This wetland would likely perform an important role of retaining phosphorus introduced to it from surface water runoff and precipitation and as a result mitigate phosphorous loads to downstream receiving waters such as Black River.

5.2.3 Organic Nutrient Export

Wetlands have the ability to produce and export organic nutrients, such as carbon, nitrogen, phosphorous, silicon, and iron, that subsequently support food chains in downstream receiving waters. This wetland has an unnamed outflow watercourse that discharges to Black River. Therefore, this wetland likely supports food chains within Black River by supplying essential nutrients, either particulate or dissolved.

5.2.4 Songbird, Raptor, and Mammal Habitat

Many mammals, such as bear, moose, and beaver, as well as several species of songbirds and raptors depend on wetland habitats. This is because wetlands generally have a high productivity of vegetation and invertebrates, which are fed on by those species. This wetland likely helps maintain regional biodiversity as it has the capacity to support or contribute to a diversity of native songbirds, especially those dependent on wetlands.

5.2.5 Pollinator Habitat

Pollinators, such as bees, wasps, butterflies, moths, flies, and beetles, require wetlands to maintain regional biodiversity and food chains. This wetland likely has the capacity to support or contribute to a diversity of pollinators linked to the diversity of native, hydrophytic, vascular plant species, and communities it supports.

5.2.6 Overall Condition Risk Assessment

Figure 10 shows where the wetland scores on the condition risk assessment matrix. The condition of the wetland is considered very low, but the risk to the wetland is very high.

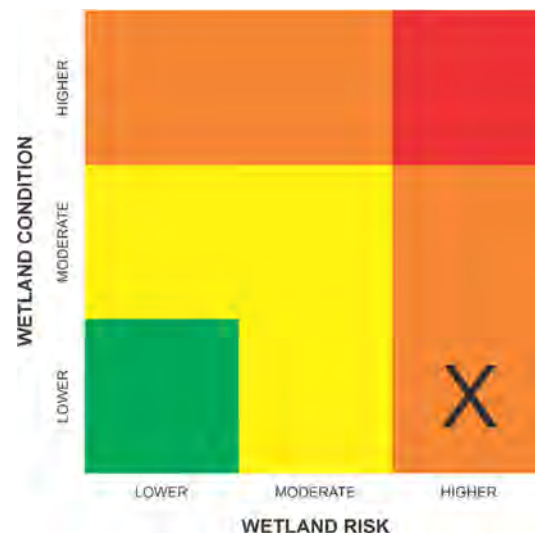


Figure 10. Condition risk assessment for the wetland delineated at 28 Base Road in Garnett Settlement, New Brunswick.

6.0 SUMMARY

Mr. Philip Hutchings is proposing to develop a church, roadway access, a parking lot, and garden plots on a portion of a property at 28 Base Road in Garnett Settlement, New Brunswick. Fundy Engineering was contracted to complete a watercourse and wetland delineation and wetland functional assessment on PID 55214803 to confirm the size of the wetland(s) in order for NBDELG representatives to determine next steps.

Mapping within the NBDELG databases showed the presence of an unnamed watercourse on the property, but no wetlands. A field visit was conducted on 24 May 2022 to ground-truth environmental features. Results of the field assessment showed that there is an additional unnamed watercourse on the property and that the watercourse supports fish, such as brook trout. Results further showed that about 79 % or 2.2 ha of the overall property is occupied by a forested wetland.

The functional assessment completed using WESP-AC for nontidal wetlands yielded five functions with normalized scores higher than reference wetlands: water cooling; phosphorous retention; organic nutrient export; songbird, raptor, and mammal habitat; and pollinator habitat. The condition of the wetland is considered low, but the risk to the wetland is high.

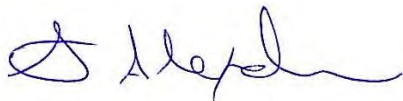
Based on the size of the wetland (*i.e.*, > 2 ha), potential impacts to the wetland must be approved by undergoing an EIA review and then subsequently obtaining a WAWA permit. Due to the presence of fish, if any impacts to the onsite watercourses and or their 30 m buffer are required, representatives with the DFO must be consulted to determine if a Fisheries Authorization is required.

6.1 CLOSING

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

Respectfully Submitted,

FUNDY ENGINEERING & CONSULTING LTD.



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

7.0 GLOSSARY

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

n: see sample size.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8.0 REFERENCES

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9.0 REPORT DISCLAIMERS AND DISCLOSURES

The sole purpose of this report and the associated services performed by Fundy Engineering & Consulting Ltd. was to complete a watercourse and wetland delineation and wetland functional assessment on PID 55214803 at 28 Base Road in Garnett Settlement, New Brunswick. The scope of services was defined by the New Brunswick Department of Environment and Local Government's Manual for Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC): Non-Tidal Wetlands [NBDELG, 2018].

The observations made and facts presented in this report are based on a desktop assessment and field assessment conducted during May 2022. Site conditions at the time of visitation / sampling only are reflected in this document. Certain data presented are based on the statements, recollections, and observations of various individuals and where this is the case, sources are indicated. No independent confirmation of this information was made.

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

9.1 PROJECT TEAM

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

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

Qualifications at a glance



- *Ph.D.*, University of New Brunswick, 2006
- *B.Sc. (Honours)*, St. Francis Xavier University, 2000
- *Environmental Engineering Diploma (Honours)*, Sault College, 1998
- *Professional Geoscientist*, APEGNB, APGNS
- *Environmental Professional*, CECAB
- *Management Certificate*, Harvard Business, 2012

SPECIALTY AREAS: environmental impact assessments, hydrogeology and hydrology, environmental permitting, monitoring, and compliance, fisheries and wildlife, communications and public awareness, environmental research, environmental sustainability, and green initiatives

Profile

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

handling and continuous cooking digester plant and the pulp dryer modernization project at the Reversing Falls Mill; environmental impact assessment, permitting, monitoring, and compliance for the Lake Utopia Paper effluent treatment upgrade; a white paper on considerations for responsible gas development of the Frederick Brook Shale in New Brunswick; a brochure on wastewater treatment options for natural gas development; environmental permitting for replacing the monobuoy and portions of its anchor chains at the Canaport™ Crude Receiving Terminal; development of high-yield groundwater supplies for aquaculture facilities in southwestern NB, including Acadian Sturgeon & Caviar Inc. at Carters Point and Quoddy Savour Seafood Ltd. in Pennfield; environmental impact assessments for several utility-scale green energy projects; and assisting with a due diligence technical investigation of a globally integrated aquaculture and seafood business to support an investment decision by the Public Sector Pension Board. Matt is the Deputy Mayor of Rothesay where he also Chair's the Works and Utilities Committee, is Vice Chair of the Finance Committee, and is Past Chair of the Kennebecasis Regional Joint Board of Police Commissioners. He also serves as a Director for Geoscientists Canada on the APEGNB Provincial Council and as a peer reviewer for the Journal of Hydrology.

Angela Dick, B.Sc. ENR *fluent en français*
Intermediate GIS Analyst / Environmental Technologist

Qualifications at a glance



- *B.Sc. ENR, University of New Brunswick, 2019*
- *Certified Outdoor Educator, Canadian Wildlife Federation*
- *Certified Backpack Electrofisher*
- *Certified in CABIN sampling, Rapid Geomorphic Assessments, and Rapid Stream Assessments*

SPECIALTY AREAS: ArcGIS, data management, project management, environmental field sampling, flora surveys, habitat assessment, and fish sampling

Profile

Angela came to Fundy Engineering after working for Fort Folly Habitat Recovery for two years where she focused on helping restore traditionally important species, such as the inner Bay of Fundy Atlantic salmon, and their habitats. She holds a Bachelor of Science in Environment and Natural Resources from the University of New Brunswick. Angela works with our environmental team to tell data stories with maps. She has been actively involved in the development of a fish ladder on Bean Brook in east Saint John, the environmental treatment facility for the Reversing Falls Mill, and several environmental assessments throughout New Brunswick.

Appendix I:
NBDELG Letter

May 17, 2022

Phil Hutchings


RE: WAWA Application 63374 for construction of church and parking lot in wetland; EIA Registration Required.

Mr. Hutchings:

The Environmental Impact Assessment (EIA) Branch of the Department of Environment and Local Government (ELG) has reviewed the information submitted in association with your Wetland and Watercourse Alteration (WAWA) Permit Application (WAWA File #63374). It is my understanding that the proposed project involves construction of a new church building and parking lot on PID 55214803 in Garnett Settlement area. Much of this property lies within a wetland greater than 2 ha in size, and it is estimated that the proposed project would result in approximately 7000 m² of wetland impact (infilling).

Based on the information provided, **the proposed project requires EIA Registration and review** under the *Environmental Impact Assessment Regulation – Clean Environment Act*, Schedule A paragraph (v):

“all enterprises, activities, projects, structures, works or programs affecting two hectares or more of bog, marsh, swamp or other wetland”.

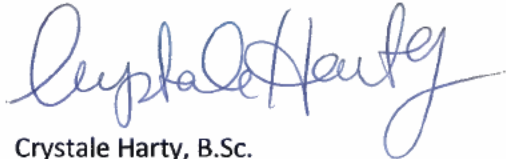
Please be aware no work can proceed on the project until it has been registered for an EIA and a *Certificate of Determination (CoD)* signed by the Minister of Environment and Climate Change has been issued. Information regarding the EIA review process can be found in our *Guide to Environmental Impact Assessment in New Brunswick*, available here:

<https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/GuideEnvironmentallImpactAssessment.pdf>.



If you require further information, please do not hesitate to contact me at 506-444-5382 or crystale.harty@gnb.ca.

Sincerely,

A handwritten signature in blue ink that reads "Crystale Harty". The signature is fluid and cursive, with the first name "Crystale" written in a larger, more prominent script than the last name "Harty".

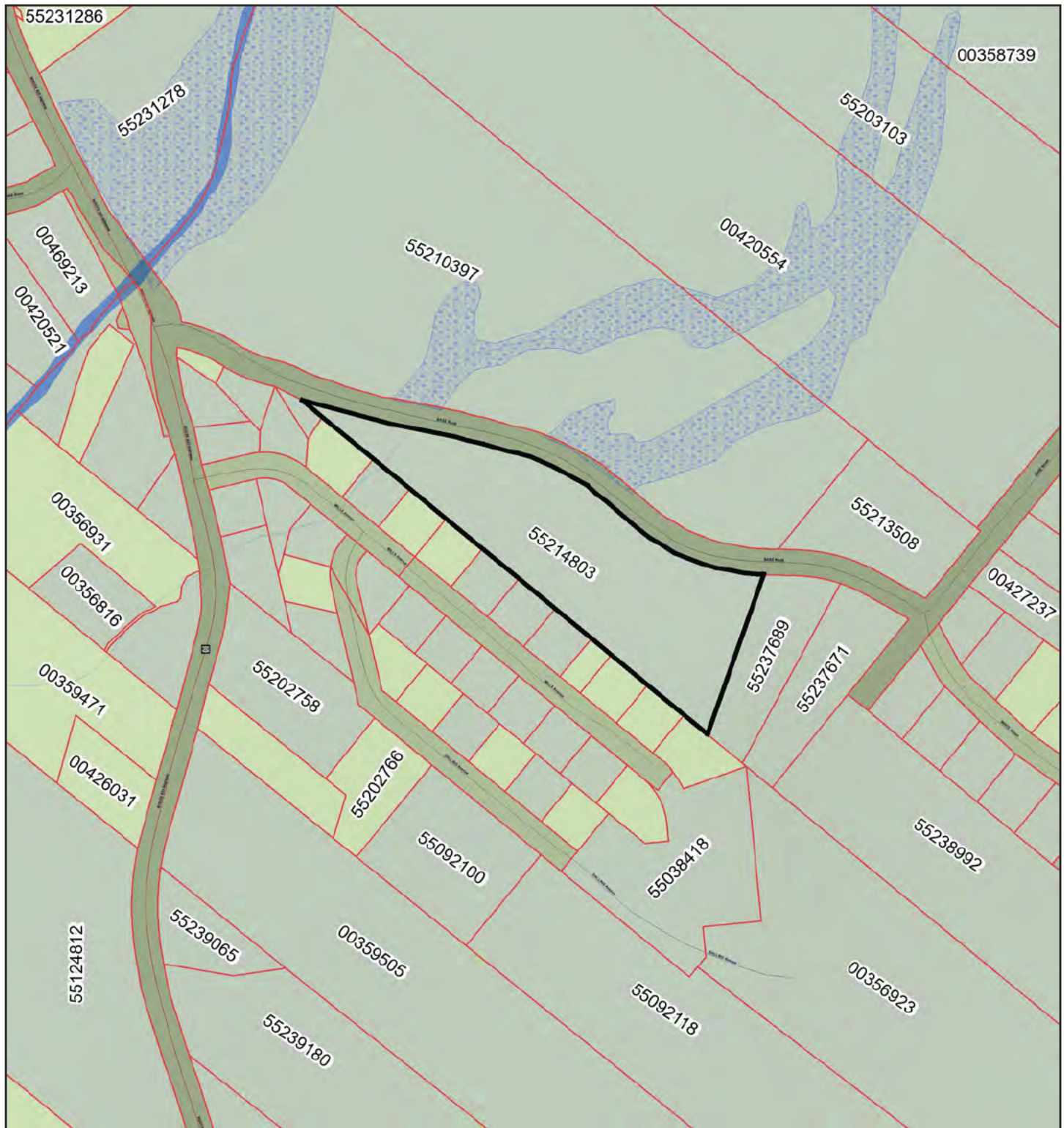
Crystale Harty, B.Sc.

Director, Environmental Impact Assessment Branch, ELG

- c. Justin Chase—EIA Specialist, ELG
- Courtney Stadler—Wetland Biologist, ELG

Appendix II:

Service New Brunswick Property Information



Scale/Échelle 1:4300

Date: 2022/05/03 15:56:20



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

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

PID:	55214803	County:	Saint John
Status:	Active	Active Date/Time:	2012-01-06 14:16:27
Land Related Description:	Land	Management Unit:	NB1113
Area:	2.79	Area Unit:	Hectares
Date Last Updated:	2022-03-23 10:39:07	Harmonization Status:	Harmonized
Land Titles Status:	Land Titles	Land Titles Date/Time:	2012-01-06 09:43:53
Date of Last CRO:	2022-03-23 10:43:02	Manner of Tenure:	Joint Tenants
Land Gazette Information:	NO		
Description of Tenure:			

Public Comments:

Parcel Interest Holders

Owner	Qualifier	Interest Type
Hutchings, Jamie Patricia		Owner
Hutchings, Philip James		Owner

Assessment Reference

PAN	PAN Type	Taxing Authority Code	Taxing Authority
6772736		553	L.S.D. OF/D.S.L. DE SIMONDS

Parcel Locations

Civic Number	Street Name	Street Type	Street Direction	Place Name
	Base	Road		Garnett Settlement

County Parish

County	Parish
Saint John	Simonds

Documents

Number	Registration Date	Book	Page	Code	Description
42423682	2022-03-17			1100	Deed/Transfer
41415275	2021-06-16			1100	Deed/Transfer
34786062	2015-04-28			6110	Discharge of Mortgage
31032981	2012-01-06			1100	Deed/Transfer
30797469	2011-11-02			5100	Mortgage

Plans

Number	Suffix	Registration Date	Code	Description	Lot Information	Orientation
40496029		2020-09-24	9050	Subdivision & Amalgamations		Provincial Grid

Parcel Relations

Related PID	Type Of Relation	Lot Information
55210397	Parent	
55237671	Infant	Lot 2020-1
55237689	Infant	Lot 2020-2
55238992	Infant	

PAN:	6772736	Status:	OPEN
Location:	BASE RD	County:	Saint John
Property Description:	VACANT LAND	Tax Class:	Fully Taxable
Property Type Code:	701	Property Type Name:	Timberland
Taxing Authority Code:	553	Neighbourhood Code:	02
Taxing Authority Description:	L.S.D. OF/D.S.L. DE SIMONDS	Neighbourhood Description:	GAR SETT/THRU TO FAIRFIELD RHS-REI 2001
Sequence Number:	A102B	Sub Unit:	00
Harmonization:	COMPLETED (One to one match of parcels)	Farm Land Identification Program:	No

Assessed Owner

Owner(s)	Mailing Address	Postal Code	Owner Type
HUTCHINGS,JAMIE PATRICIA & PHILIP JAMES HUTCHINGS	[REDACTED]	[REDACTED]	Fee Simple, Joint Tenancy

Assessments

Year	Assessment	Levy
2022	\$ 10,900.00	\$ 174.86

Sales Price Information

Sale Price	Sale Date
\$ 55,000.00	2022-03-17
\$ 1.00	2012-01-06

PID(s)**PID**

55214803

Appendix III:
Wetland Delineation Data Forms

WETLAND DELINEATION DATA FORM – NEW BRUNSWICK

Project/Site: 15807 Municipality/County: GARNETT SETT Sampling Date: 24 MAY 2022
 Applicant/Owner: PHILIP HUTCHINGS Sampling Point: WETLAND
 Investigator(s): MATT ALEXANDER Affiliation: FUNDY ENGINEERING
 Landform (hillslope, terrace, etc.): LOWLAND Local relief (concave, convex, none): CONCAVE
 Slope (%): 0 Lat: 45° 18' 13.58" Long: 65° 50' 36.38" Datum: _____
 Soil Map Unit Name/Type: _____ Wetland Type: FORESTED WETLAND
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No _____ Hydric Soil Present? Yes <input checked="" type="checkbox"/> No _____ Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No _____	Is the Sampled Area within a Wetland? Yes <input checked="" type="checkbox"/> No _____ If yes, optional Wetland Site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.) <u>POINT SELECTED IN UNDISTURBED AREA OF PROPERTY</u>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>5x5</u>)	Absolute % Cover	Dominant Species?	Indicator Status																	
1. <u>ABIES BALSAMEA</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>2</u> (A) Total Number of Dominant Species Across All Strata: <u>3</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>67</u> (A/B)																
2. <u>PICEA MARIANA</u>	<u>20</u>	<u>Y</u>	<u>FACW</u>																	
3. <u>BETULA Papyrifera</u>	<u>10</u>	<u>N</u>	<u>FACU</u>																	
4. _____				Prevalence Index worksheet: <table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">Total % Cover of:</td> <td style="width:50%;">Multiply by:</td> </tr> <tr> <td>OBL species <u>0</u></td> <td>x 1 = <u>0</u></td> </tr> <tr> <td>FACW species <u>20</u></td> <td>x 2 = <u>40</u></td> </tr> <tr> <td>FAC species <u>45</u></td> <td>x 3 = <u>135</u></td> </tr> <tr> <td>FACU species <u>10</u></td> <td>x 4 = <u>40</u></td> </tr> <tr> <td>UPL species <u>0</u></td> <td>x 5 = <u>0</u></td> </tr> <tr> <td>Column Totals: <u>75</u> (A)</td> <td><u>215</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A = <u>2.9</u></td> </tr> </table>	Total % Cover of:	Multiply by:	OBL species <u>0</u>	x 1 = <u>0</u>	FACW species <u>20</u>	x 2 = <u>40</u>	FAC species <u>45</u>	x 3 = <u>135</u>	FACU species <u>10</u>	x 4 = <u>40</u>	UPL species <u>0</u>	x 5 = <u>0</u>	Column Totals: <u>75</u> (A)	<u>215</u> (B)	Prevalence Index = B/A = <u>2.9</u>	
Total % Cover of:	Multiply by:																			
OBL species <u>0</u>	x 1 = <u>0</u>																			
FACW species <u>20</u>	x 2 = <u>40</u>																			
FAC species <u>45</u>	x 3 = <u>135</u>																			
FACU species <u>10</u>	x 4 = <u>40</u>																			
UPL species <u>0</u>	x 5 = <u>0</u>																			
Column Totals: <u>75</u> (A)	<u>215</u> (B)																			
Prevalence Index = B/A = <u>2.9</u>																				
<u>70</u> = Total Cover																				
Sapling/Shrub Stratum (Plot size: <u>5x5</u>)																				
1. <u>ABIES BALSAMEA</u>	<u>5</u>	<u>N</u>	<u>FAC</u>																	
2. _____																				
3. _____																				
4. _____																				
5. _____																				
<u>5</u> = Total Cover																				
Herb Stratum (Plot size: <u>5x5</u>)																				
1. <u>PLEUROZIVM SCHREBERI</u>	<u>90</u>	<u>Y</u>	<u>NI</u>																	
2. _____																				
3. _____																				
4. _____																				
5. _____																				
6. _____																				
7. _____																				
8. _____																				
9. _____																				
10. _____																				
<u>90</u> = Total Cover																				
Woody Vine Stratum (Plot size: _____)																				
1. _____																				
2. _____																				
_____ = Total Cover																				
Remarks: (Include photo numbers here or on a separate sheet.)																				

Hydrophytic Vegetation Indicators:
 Rapid Test for Hydrophytic Vegetation
 Dominance Test is >50%
 Prevalence Index is ≤3.0'
 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Problematic Hydrophytic Vegetation¹ (Explain)

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

Hydrophytic Vegetation Present? Yes No _____

Adapted from U.S. Army Corps of Engineers form for North Central and North East Region (Version 2.0), and Field Indicators for Identifying Hydric Soils in New England (Version 4.0) Supplement for use in New Brunswick (2019)

SOIL

Sampling Point: WETLAND

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

Depth (cm)	Matrix		Redox Features		Type ¹	Loc ²	Texture	Remarks
	Color (moist)	%	Color (moist)	%				
0-5	ROOT							
5-30	SILTY CLAY	100%	10YR	2/1		BLACK		

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

Hydric Soil Indicators:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Stripped Matrix (S6)
<input checked="" type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Dark Surfaces (S7)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> Sandy Redox (S5)	

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> 5 c Mucky Peat or Peat (S3)
<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Very Shallow Dark Surface (F22)
<input type="checkbox"/> Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (cm): _____

Hydric Soil Present? Yes No

Remarks: _____

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required, check all that apply)	Secondary Indicators (minimum of two required)
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input checked="" type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Drainage Patterns (B10)
<input checked="" type="checkbox"/> Saturation (A3)	<input checked="" type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input checked="" type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input checked="" type="checkbox"/> Microtopographic Relief (D4)
	<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (cm): <u>5-10</u>
Water Table Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (cm): <u>10</u>
Saturation Present? (includes capillary fringe)	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Depth (cm): <u>0</u>

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DELINEATION DATA FORM – NEW BRUNSWICK

Project/Site: 15807 Municipality/County: GARNEIT SETT Sampling Date: 24 MAY 2022
 Applicant/Owner: PHILIP HUTCHINGS Sampling Point: UPLAND
 Investigator(s): MATT ALEXANDER Affiliation: FUDDY ENGINEERING
 Landform (hillslope, terrace, etc.): HILLSLOPE Local relief (concave, convex, none): CONCAVE
 Slope (%): 5 Lat: 45° 18' 13.22" Long: 65° 50' 35.52" Datum: _____
 Soil Map Unit Name/Type: _____ Wetland Type: FORESTED
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.) <p align="center"><u>POINT SELECTED IN UNDISTURBED AREA OF PROPERTY</u></p>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>5x5</u>)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet:																								
1. <u>ABIES BALCANICA</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)																								
2. <u>BETULA PAPIRIFERA</u>	<u>15</u>	<u>Y</u>	<u>FACU</u>																									
3. _____																												
4. _____																												
5. _____																												
_____ = Total Cover				Prevalence Index worksheet: <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> <th></th> </tr> </thead> <tbody> <tr> <td>OBL species <u>0</u></td> <td>x 1 =</td> <td><u>0</u></td> </tr> <tr> <td>FACW species <u>2</u></td> <td>x 2 =</td> <td><u>4</u></td> </tr> <tr> <td>FAC species <u>60</u></td> <td>x 3 =</td> <td><u>180</u></td> </tr> <tr> <td>FACU species <u>17</u></td> <td>x 4 =</td> <td><u>68</u></td> </tr> <tr> <td>UPL species <u>2</u></td> <td>x 5 =</td> <td><u>10</u></td> </tr> <tr> <td>Column Totals: <u>81</u> (A)</td> <td></td> <td><u>262</u> (B)</td> </tr> <tr> <td colspan="2">Prevalence Index = B/A =</td> <td><u>3.23</u></td> </tr> </tbody> </table>	Total % Cover of:	Multiply by:		OBL species <u>0</u>	x 1 =	<u>0</u>	FACW species <u>2</u>	x 2 =	<u>4</u>	FAC species <u>60</u>	x 3 =	<u>180</u>	FACU species <u>17</u>	x 4 =	<u>68</u>	UPL species <u>2</u>	x 5 =	<u>10</u>	Column Totals: <u>81</u> (A)		<u>262</u> (B)	Prevalence Index = B/A =		<u>3.23</u>
Total % Cover of:	Multiply by:																											
OBL species <u>0</u>	x 1 =	<u>0</u>																										
FACW species <u>2</u>	x 2 =	<u>4</u>																										
FAC species <u>60</u>	x 3 =	<u>180</u>																										
FACU species <u>17</u>	x 4 =	<u>68</u>																										
UPL species <u>2</u>	x 5 =	<u>10</u>																										
Column Totals: <u>81</u> (A)		<u>262</u> (B)																										
Prevalence Index = B/A =		<u>3.23</u>																										
1. <u>ABIES BALCANICA</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>																									
2. _____																												
3. _____																												
4. _____																												
5. _____																												
_____ = Total Cover																												
1. <u>PLEUROZIVM SCHDPERE</u>	<u>80</u>	<u>Y</u>	<u>NI</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0' <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																								
2. <u>PYROLA CHIORANTHA</u>	<u>2</u>	<u>N</u>	<u>UPL</u>																									
3. <u>OSMUNDA CINNAMOMEA</u>	<u>2</u>	<u>N</u>	<u>FACW</u>																									
4. <u>DRYOPTERIS MARGINALIS</u>	<u>2</u>	<u>N</u>	<u>FACU</u>																									
5. _____																												
6. _____																												
7. _____																												
8. _____																												
9. _____																												
10. _____																												
_____ = Total Cover																												
1. _____				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>																								
2. _____																												
_____ = Total Cover																												

Remarks: (Include photo numbers here or on a separate sheet)

Adapted from U.S. Army Corps of Engineers form for North Central and North East Region (Version 2.0), and Field Indicators for Identifying Hydric Soils in New England (Version 4.0) Supplement for use in New Brunswick (2019)

SOIL

Sampling Point: UPLAND

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

Depth (cm)	Matrix		Redox Features					Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²			
0-5	ROOT MAT								
5-25	SANDY CLAY		7.5 YR	3/3			DARK BROWN		
25-30	SANDY CLAY		5 YR	7/1			LIGHT GRAY		
30-70	SANDY CLAY		7.5 YR	3/3			DARK BROWN		

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

Hydric Soil Indicators:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Dark Surfaces (S7)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> Sandy Redox (S5)	

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> 5 c Mucky Peat or Peat (S3)
<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Very Shallow Dark Surface (F22)
<input type="checkbox"/> Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____
 Depth (cm): _____

Hydric Soil Present? Yes _____ No

Remarks: _____

HYDROLOGY

Wetland Hydrology Indicators:

<u>Primary Indicators (minimum of one is required; check all that apply)</u>		<u>Secondary Indicators (minimum of two required)</u>
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Surface Soil Cracks (B6)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Aquatic Fauna (B13)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Marl Deposits (B15)	<input type="checkbox"/> Moss Trim Lines (B16)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres on Living Roots (C3)	<input type="checkbox"/> Crayfish Burrows (C8)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> Stunted or Stressed Plants (D1)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Thin Muck Surface (C7)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		<input type="checkbox"/> Microtopographic Relief (D4)
		<input type="checkbox"/> FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth (cm): _____
Water Table Present?	Yes _____ No <input checked="" type="checkbox"/>	Depth (cm): _____
Saturation Present? (includes capillary fringe)	Yes _____ No <input checked="" type="checkbox"/>	Depth (cm): _____

Wetland Hydrology Present? Yes _____ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

WETLAND DELINEATION DATA FORM – NEW BRUNSWICK

Project/Site: 15807 Municipality/County: GARNETT SETT Sampling Date: 24 MAY 2022
 Applicant/Owner: PHILIP HUTCHINGS Sampling Point: UPLAND 2
 Investigator(s): MATT ALEXANDER Affiliation: FLUDDY ENGINEERING
 Landform (hillslope, terrace, etc.): TRANSITIONAL Local relief (concave, convex, none): CONCAVE
 Slope (%): 2 Lat: 45° 13' 13.42" Long: 65° 50' 36.09" Datum: 1
 Soil Map Unit Name/Type: _____ Wetland Type: FORESTED
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No _____ (If no, explain in Remarks.)
 Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes No _____
 Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/> Hydric Soil Present? Yes _____ No <input checked="" type="checkbox"/> Wetland Hydrology Present? Yes _____ No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? Yes _____ No <input checked="" type="checkbox"/> If yes, optional Wetland Site ID: _____
Remarks: (Explain alternative procedures here or in a separate report.) <p align="center"><u>POINT SELECTED IN UNDISTURBED AREA OF PROPERTY</u></p>	

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: <u>5 x 5</u>)	Absolute % Cover	Dominant Species?	Indicator Status	
1. <u>ABIES BALGAMEA</u>	<u>40</u>	<u>Y</u>	<u>FAC</u>	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>2</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>50</u> (A/B)
2. <u>BETULA PAPPYRIFERA</u>	<u>10</u>	<u>Y</u>	<u>FACU</u>	
3. _____				
4. _____				
5. _____				
<u>50</u> = Total Cover				Prevalence Index worksheet: Total % Cover of: _____ Multiply by: OBL species <u>0</u> x 1 = <u>0</u> FACW species <u>5</u> x 2 = <u>10</u> FAC species <u>60</u> x 3 = <u>180</u> FACU species <u>10</u> x 4 = <u>40</u> UPL species <u>0</u> x 5 = <u>0</u> Column Totals: <u>75</u> (A) <u>230</u> (B) Prevalence Index = B/A = <u>3.1</u>
1. <u>ABIES BALGAMEA</u>	<u>20</u>	<u>Y</u>	<u>FAC</u>	
2. _____				
3. _____				
4. _____				
<u>20</u> = Total Cover				
1. <u>PLEUROZIVM SCHREBERI</u>	<u>80</u>	<u>Y</u>	<u>NI</u>	Hydrophytic Vegetation Indicators: <input type="checkbox"/> Rapid Test for Hydrophytic Vegetation <input type="checkbox"/> Dominance Test is >50% <input type="checkbox"/> Prevalence Index is ≤3.0 ¹ <input type="checkbox"/> Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <u>OSMUNDA CINNAMOMEA</u>	<u>5</u>	<u>N</u>	<u>FACW</u>	
3. _____				
4. _____				
5. _____				
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
<u>85</u> = Total Cover				
1. _____				Hydrophytic Vegetation Present? Yes _____ No <input checked="" type="checkbox"/>
2. _____				
_____ = Total Cover				
Remarks: (Include photo numbers here or on a separate sheet.)				

Adapted from U.S. Army Corps of Engineers form for North Central and North East Region (Version 2.0), and Field Indicators for Identifying Hydric Soils in New England (Version 4.0) Supplement for use in New Brunswick (2019)

SOIL

Sampling Point: UPLAND 2

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

Depth (cm)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-5	ROOT							
5-15	SANDY CLAY		7.5YR	5/6			STRONG BROWN	
15-20	SANDY CLAY		5YR	7/1			LIGHT GRAY	
20-55	SANDY CLAY		7.5YR	6/1			GRAY	

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

Hydric Soil Indicators:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Stripped Matrix (S6)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Dark Surfaces (S7)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Polyvalue Below Surface (S8)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Thin Dark Surface (S9)
<input type="checkbox"/> Stratified Layers (A5)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)
<input type="checkbox"/> Sandy Redox (S5)	

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Coast Prairie Redox (A16)
<input type="checkbox"/> 5 c Mucky Peat or Peat (S3)
<input type="checkbox"/> Iron-Manganese Masses (F12)
<input type="checkbox"/> Piedmont Floodplain Soils (F19)
<input type="checkbox"/> Red Parent Material (F21)
<input type="checkbox"/> Very Shallow Dark Surface (F22)
<input type="checkbox"/> Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (cm): _____

Hydric Soil Present? Yes _____ No

Remarks: _____

HYDROLOGY

Wetland Hydrology Indicators:

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

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes _____ No Depth (cm): _____

Water Table Present? Yes No _____ Depth (cm): 45

Saturation Present? Yes No _____ Depth (cm): 30

(includes capillary fringe)

Wetland Hydrology Present? Yes _____ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: _____

Appendix IV:
Field Assessment Photographs















































Appendix V:

Delineated Wetland Boundary Coordinates

Point	Latitude	Longitude
1	45.30364	-65.8437
2	45.30371	-65.8437
3	45.30376	-65.8435
4	45.30381	-65.8434
5	45.30387	-65.8434
6	45.30405	-65.8432
7	45.30412	-65.8431
8	45.30415	-65.843
9	45.30425	-65.8432
10	45.3043	-65.8431
11	45.30426	-65.843
12	45.30426	-65.8429
13	45.30496	-65.8442
14	45.30495	-65.8443
15	45.30496	-65.8444
16	45.30502	-65.8445
17	45.30505	-65.8446
18	45.30505	-65.8448
19	45.30507	-65.8449
20	45.30502	-65.845
21	45.30502	-65.8452
22	45.30502	-65.8453
23	45.3051	-65.8455
24	45.30518	-65.8456
25	45.30526	-65.8457
26	45.30538	-65.8458
27	45.30532	-65.8459
28	45.30526	-65.846
29	45.30521	-65.846
30	45.30517	-65.846
31	45.30514	-65.8461
Wetland	45.30377	-65.8434
Upland	45.30367	-65.8432
Upland 2	45.30375	-65.8434

Appendix VI:

WESP-AC Nontidal Model Input and Output

Cover Page: Basic Description of Assessment	WESP-AC version 2
Site Name:	15807 - PID 55214803 in Garnett Settlement (28 Base Road), New Brunswick
Investigator Name:	Matt Alexander
Date of Field Assessment:	24 May 2022
Nearest Town:	Garnett Settlement, New Brunswick
Latitude (decimal degrees):	45.304572
Longitude (decimal degrees):	65.844412
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	2.5 hectares
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	85%
What percent (approx.) of the wetland were you able to visit?	85%
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?	Yes
Indicate here if you intentionally surveyed for rare plants, calciphile plants, or rare animals	Yes
Have you attended a WESP-AC training session? If so, indicate approximate month & year	Yes, September 2016
How many wetlands have you assessed previously using WESP-AC? (approx.)	60+
Comments about the site or this WESP-AC assessment (attach extra page if desired):	A portion of the wetland and buffer was recently disturbed. Observations are based on the undisturbed portion of the wetland.

Date: 24 May 2022		Site Identifier: 15807 - 28 Base Road		Investigator: Matt Alexander	
<p>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</p> <p>Google Earth Pro https://www.google.com/earth/download/gep/agree.html GeoNB http://www.snb.ca/geonb/ and http://www.snb.ca/geonb/e/apps/apps-E.asp</p> <p>For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are WS Water Storage, SFS Stream Flow Support, WC Water Cooling, SR Sediment Retention & 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.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
OF1	Province	Mark the province in which the AA is located by changing the 0 in the column next to it to a "1". Mark only one. New Brunswick Nova Scotia Prince Edward Island Newfoundland-Labrador	1 0 0 0	This determines to which province's calibration wetlands the raw score of any wetland is normalised. In the function and benefits models, it also triggers the automatic exclusion of indicators for which no spatial data exists in a particular province.	
OF2	Ponded Area Within 1 km.	The area of surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: <0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	1 0 0 0 0 0	"Adjacent" means not separated from the AA by a wide expanse (>50 m) of upland (including roads >50 m wide). Include ponded areas likely to be hidden by wetland vegetation. If surface water extends beyond 1 km, include only the part within 1 km. Do not include tidal areas. Measure the area from aerial imagery using Google Earth Pro (click on Ruler icon in toolbar, then Polygon in pop-up menu). With the GeoNB viewer, enable the Wetlands layer, then measure with the Draw & Measure tool after specifying Aerial as the Basemap. However, do not rely entirely on wetland boundaries shown in online wetlands layers. [PH, SBM, WBN]	
OF3	Ponded Water & Wetland Within 1 km.	The area of wetlands and surface water ponded during most of the growing season that is both (1) in or adjacent to the AA and (2) within 1 km is: <0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. >100 hectares.	0 0 0 1 0 0	See definition of adjacent in OF2. If the AA's wetland vegetation extends beyond 1 km, include only the part within 1 km. "Ponded" means not flowing in rivers or streams. [Sens, WBF]	
OF4	Size of Largest Nearest Vegetated Tract or Corridor	The largest vegetated patch or corridor that includes the AA's vegetation plus adjacent upland vegetation that is not lawn, row crops, heavily grazed lands, conifer plantation is: <0.01 hectare (about 10 m x 10 m). 0.01 - 0.1 hectare. 0.1 - 1 hectare. 1 to 10 hectares. 10 to 100 hectares. 100 to 1000 hectares. >1000 hectares. [This is nearly always the answer in relatively undeveloped landscapes]	0 0 0 0 0 0 1	See definition of adjacent in OF2. Use Google Earth Pro's polygon ruler (as described above). Exclude conifer plantations only if it is obvious that trees were planted in rows. [AM, PH, SBM, Sens]	
OF5	Distance to Large Vegetated Tract	The minimum distance from the edge of the AA to the edge of the closest vegetated land (but excluding row crops, lawn, conifer plantation) larger than 375 hectares (about 2 km on a side), is: <50 m, and not separated from the 375-ha vegetated area by any width of paved roads, stretches of open water, row crops, bare ground, lawn, or impervious surface. Or the AA itself contains >375 ha of vegetation. [This is often the answer in relatively undeveloped landscapes] <50 m, but completely separated from the 375-ha vegetated area by those features, and AA does not contain >375 ha of vegetation. 50-500 m, and not separated. 50-500 m, but separated by those features. 0.5 - 5 km, and not separated. 0.5 - 5 km, but separated by those features. None of the above (the closest patches or corridors which are that large are >5 km away).	1 0 0 0 0 0	To measure distance, use Google Earth Pro (Ruler > Line tool). Or use Draw & Measure tool at GeoNB. The 375-ha criterion is from the Fundy Model Forest Project. [AM, PH, POL, SBM, Sens]	
OF6	Herbaceous Uniqueness	The AA's vegetation cover is >10% herbaceous* but uplands within 5 km have <10% herbaceous cover. If so, enter "3" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 1 km have <10% herbaceous cover. If so enter "2" and continue to OF7. If not, consider: The AA's vegetation cover is >10% herbaceous* but uplands within 100 m of the wetland edge have <10% herbaceous cover. If so, enter "1". [* NOTE: Exclude lawns, row crops, heavily grazed lands, forest, shrublands. Include moss as well as grass like plants in this use of "herbaceous vegetation"]	0	For this question only, consider moss to be herbaceous vegetation. Determine the score by viewing aerial imagery in Google Earth after successively drawing or estimating the boundaries of the buffers of 5 km, 1 km, and 100 m radius focused on the center of the AA. Circles of specified radius can be drawn in Google Earth Pro by clicking on the Ruler icon, then Circle in the pop-up menu. [AMv, PHv, POLv, SBMv, WBFv, WBNv]	
OF7	Woody Uniqueness	The AA's vegetation cover is >10% woody* but uplands within 5 km have <10% woody cover. If so, enter "3" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 1 km have <10% woody cover. If so enter "2" and continue to OF8. If not, consider: The AA's vegetation is >10% woody* but uplands within 100 m of the wetland edge have <10% woody cover. If so, enter "1". [* NOTE: woody cover = trees & shrubs taller than 1 m.]	0	See above. Do not consider conifer plantations to be forest if it is obvious that trees were planted in rows. [AMv, PHv, POLv, SBMv]	
OF8	Local Vegetated Cover Percentage	Draw a 5-km radius circle measured from the center of the AA. Ignoring all permanent water in the circle, the percent of the remaining area that is wooded or unmanaged herbaceous vegetation (NOT lawn, row crops, bare or heavily grazed land, clearcuts, or conifer plantations) is: <5% of the land. 5 to 20% of the land. 20 to 60% of the land. 60 to 90% of the land. >90% of the land. SKIP to OF10.	0 0 0 1 0	In Google Earth, draw the 5 km buffer and then estimate land cover percentages, or do GIS analysis of an appropriate land cover layer. [AM, PH, POL, SBM, Sens]	
OF9	Type of Land Cover Alteration	Within the 5-km radius circle, and ignoring all permanent water, the land area that is bare or non-perennial cover is mostly: Impervious surface, e.g., paved road, parking lot, building, exposed rock. Bare previous surface, e.g., lawn, recent (<5 yrs ago) clearcut, dirt or gravel road, cropland, landslide, conifer plantation.	1 0	[AM, SBM]	
OF10	Distance by Road to Nearest Population Center	Measured along the maintained road nearest the AA, the distance to the nearest population center is: <100 m. 100 - 500 m. 0.5 - 1 km. 1 - 5 km. >5 km.	1 0 0 0 0	"Population center" means a settled area with more than about 5 regularly inhabited structures per square kilometer. In Google Earth, click on the Ruler icon, then Path, and draw and measure the route. Or use the GeoNB's Draw & Measure tool- Freehand Line to draw and measure the route to Settlements (click on Place Names in menu) or other areas not close to mapped settlements but which meet the criteria. [FAv, FRv, NRV, PH, PU, SBM, WBFv]	

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler-Line tool. Use the GeoNB's Draw Line tool. [AM, Fav, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	1	
		100 - 500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to a 1, 0= no. Change to blank if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (desp to 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 Pondered Water	The distance from the AA center to the closest (but separate) pondered water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	1	
		0.5 - 1 km, and not separated.	0	
OF14	Distance to Large Pondered Water	The distance from the AA center to the closest (but separate) non-tidal body of water that is ponded during most of the year and is larger than 8 hectares during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<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.	0	
		5-10 km.	1	
		10-40 km.	0	
OF16	Upland Edge Contact	Select one: The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water 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 25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA. 50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA. 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.		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	0	
		25-50% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		50-75% of the AA's perimeter abuts upland. The rest adjoins other wetlands or water that is mostly wider than the AA.	0	
		More than 75% of the AA's perimeter abuts upland. Any remainder adjoins other wetlands or water that is mostly wider than the AA. This will be true for most assessments done with WESP.AC.	1	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LIDAR imagery can provide finer elevational resolution useful for flood modeling. [WSV]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases, levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is no infrastructure vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	0.33	[FA, NR, Sens, SFsv, WCV, WSV]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of metals, hydrocarbons, nutrients, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow into the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF21	Degraded Water Downstream	The problem described above is downslope from the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream) This is the situation for nearly all wetlands in this region.	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): 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 lot other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCV, WSV]
		<10%.	0	
		10 to 25%.	1	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. This statement is:		[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.	2039	This layer was provided by Dr. Dan McKenney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCv, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA: <i>[Mark just the first choice that is true.]</i>		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
		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/atlantic/salmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	0	[AM, FA, FR, INV, WBF, WBN]
		Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions.	0	
		Is probably not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally.	1	
OF29	Species of Conservation Concern	Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0	
		Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented <i>[mark all applicable]</i> :		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	
OF30	Important Bird Area (IBA)	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 IBA_Canada. The AA is all or part of an officially designated IBA. Enter 1, yes, 0, no.	0	The source of this layer, which should be checked periodically for updates, is: 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 or agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA is part of or contiguous to a wetland on which public or private organizational funds were spent to preserve, create, restore, or enhance the wetland (excluding mitigation wetlands). Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank (not 0).	0	[PU]
OF35	Mitigation Investment	The AA is a part of a mitigation site used explicitly to offset impacts elsewhere. Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank.	0	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA is part of an area that has been designated by an agency or institution as a benchmark, reference, or status-trends monitoring area. Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank.	0	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8). See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	0	If GIS is available, you may use the Bedrock Geology shapefile obtainable at http://www.snb.ca/geonb1/erDC/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: '24 May 2022		Site Identifier: 15807 - 28 Base Road		Investigator: Matt Alexander	
<p>Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. DIRECTIONS: Walk for no less than 10 minutes from the wetland edge towards its core, in the part of the AA that is proposed for alteration. If no alteration is proposed, walk in a portion that appears to be most representative of the wetland overall. Walk only where it is safe and legal to do so. Conduct the assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answer these questions primarily based on your onsite observations and interpretations. Do not write in shaded parts of this data form. Answering some questions accurately may require conferring with the landowner or other knowledgeable persons, and/or reviewing aerial imagery. For most wetlands, completing this field data form will require 1-2 hours on a site. For a list of functions to which each question pertains, see the accompanying Interpretations form. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage & Delay, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.</p>					
#	Indicators	Condition Choices	Data	Definitions/Explanations	
F1	Wetland Type	<p>Follow the key below and mark the ONE row that best describes MOST of the vegetated part of the AA:</p> <p>A. Moss and/or lichen cover more than 25% of the ground. Often dominated by ericaceous shrubs (e.g., Labrador tea) or other acid-tolerant plants (e.g., bog cranberry, pitcher plant, sundew, orchids). Substrate is mostly undecomposed peat. Choose between A1 and A2 and mark the choice with a 1 in their adjoining column. Otherwise go to B below.</p> <p>A1. Surface water is usually absent or, if present, pH is typically <4.5 and conductivity is usually <100 µS/cm (<64 ppm TDS). Trees are absent or nearly so. Sedge cover is usually sparse or absent but cottongrass and/or lichen cover may be extensive, as well as cloudberry, lingonberry, sheep laurel, and a sedge (<i>Carex rariflora</i>). Wetland surface and surrounding landscape are seldom sloping and wetland often is domed (convex). Inlet and outlet channels are usually absent. If known, pH of peat is <4.0.</p> <p>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).</p> <p>B. Moss and/or lichen cover less than 25% of the ground. Soil is mineral or decomposed organic (muck). Choose between B1 and B2 and mark the choice with a 1 in their adjoining column:</p> <p>B1. Trees and shrubs taller than 1 m comprise more than 25% of the vegetated cover. Surface water is mostly absent or inundates the vegetation only seasonally (e.g., vernal pools or floodplain).</p> <p>B2. Not B1. Tree & tall shrubs comprise less than 25% of the vegetated cover. Vegetation is mostly herbaceous, e.g., cattail, bulrush, burreed, pond lily, horsetail. Surface water may be extensive and fluctuates seasonally, being either persistent or drying up partly or entirely.</p>	<p>0</p> <p>0</p> <p>1</p> <p>0</p>	<p>Ericaceous shrubs are ones in the heather family (Ericaceae). Most have leathery evergreen leaves. They include rhododendron, azalea, swamp laurel, leatherleaf, Labrador tea, and others. Most require acidic soil. Although not in the family Ericaceae, sweetgale (<i>Myrica gale</i>) should be counted also. [AM, CS, FA, FR, INV, NR, OE, PH, Sens, SFS, WBF, WBN]</p>	
<p>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.</p>					
F2	Wetland Types - Adjoining or Subordinate	<p>If the AA is smaller than 1 ha, mark all other types that occupy more than 1% of the vegetated AA. If the AA is larger than 1 ha, mark all other types which are within or adjacent to the AA and occupy more than 1 ha, as visible from the AA or as interpreted from aerial imagery. Do not mark again the type marked in F1.</p> <p>A1.</p> <p>A2.</p> <p>B1.</p> <p>B2.</p>	<p>0</p> <p>0</p> <p>0</p> <p>0</p>	<p>1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, INV, SBM, WBF]</p>	
F3	Woody Height & Form Diversity	<p>Following EACH row below, indicate with a number code the percentage of the living vegetation in the AA which is occupied by that feature (6 if >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%.</p> <p>coniferous trees (may include lamarack) taller than 3 m.</p> <p>deciduous trees taller than 3 m.</p> <p>coniferous or ericaceous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>deciduous shrubs or trees 1-3 m tall not directly below the canopy of trees.</p> <p>coniferous or ericaceous shrubs <1 m tall not directly below the canopy of taller vegetation.</p> <p>deciduous shrubs or trees <1 m tall (e.g., deciduous seedlings) not directly below the canopy of taller vegetation.</p>	<p>4</p> <p>2</p> <p>2</p> <p>2</p> <p>1</p> <p>1</p>	<p>Deciduous shrubs in this region usually include buttonbush, Labrador tea, bayberry (<i>Morella</i>), huckleberry, cranberry, cloudberry, sweetgale, alder, willow, birch, ash, dogwood, and a few others. If you assigned a code of 3 or higher to any of the first four choices and the ground cover beneath the trees/shrubs is <25% moss, then question F1 might be "B1". [CS, INV, NR, PH, POL, SBM, Sens]</p>	
<p>Note: If none of top 4 rows in F3 was marked 2 or greater, SKIP to F9 (N fixers).</p>					
F4	Dominance of Most Abundant Shrub Species	<p>Determine which two woody plant species comprise the greatest portion of the low (<3 m) woody cover. Then choose one:</p> <p>those species together comprise > 50% of such cover.</p> <p>those species together do not comprise > 50% of such cover.</p>	<p>1</p> <p>0</p>	<p>[PH, POL, SBM, Sens]</p>	
F5	Woody Diameter Classes	<p>Mark ALL the types that comprise >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.</p> <p>coniferous, 1-9 cm diameter and >1 m tall.</p> <p>broad-leaved deciduous 1-9 cm diameter and >1 m tall.</p> <p>coniferous, 10-19 cm diameter.</p> <p>broad-leaved deciduous 10-19 cm diameter.</p> <p>coniferous, 20-40 cm diameter.</p> <p>broad-leaved deciduous 20-40 cm diameter.</p> <p>coniferous, >40 cm diameter.</p> <p>broad-leaved deciduous >40 cm diameter.</p>	<p>0</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>0</p>	<p>Estimate the diameters at chest height. If small-diameter trees are 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]</p>	
F6	Height Class Interspersion	<p>Follow the key below and mark the ONE row that best describes MOST of the AA:</p> <p>A. Neither the vegetation taller than 1 m nor the vegetation shorter than that comprise >70% of the vegetated part of the AA. They each comprise 30-70%. Choose between A1 and A2 and mark the choice with a 1 in the adjoining column. Otherwise go to B below.</p> <p>A1. The two height classes are mostly scattered and intermixed throughout the AA.</p> <p>A2. Not A1. The two height classes are mostly in separate zones or bands, or in proportionately large clumps.</p> <p>B. Either the vegetation shorter than 1 m comprises >70% of the vegetated part of the AA, or the vegetation taller than that does. One size class might even be totally absent. Choose between B1 and B2 and mark the choice with a 1 in the adjoining column:</p> <p>B1. The less prevalent height class is mostly scattered and intermixed within the prevalent one.</p> <p>B2. Not B1. The less prevalent height class is mostly located apart from the prevalent one, in separate zones or clumps, or is completely absent.</p>	<p>1</p> <p>0</p> <p>0</p> <p>0</p>	<p>[AM, INV, NR, PH, SBM, Sens]</p>	
F7	Large Snags (Dead Standing Trees)	<p>The number of large snags (diameter >20 cm) in the AA plus adjacent upland area within 10 m of the wetland edge is:</p> <p>None, or fewer than 8/ hectare which exceed this diameter.</p> <p>Several (>8/hectare) and a pond, lake, or slow-flowing water wider than 10 m is within 1 km.</p> <p>Several (>8/hectare) but above not true.</p>	<p>0</p> <p>1</p> <p>0</p>	<p>Snags are dead standing trees that often (not always) lack bark and foliage. Include only ones that are at least 2 m tall. [POL, SBM, WBN]</p>	
F8	Downed Wood	<p>The number of downed wood pieces longer than 2 m and with diameter >10 cm, and not persistently submerged, is:</p> <p>Few or none that meet these criteria.</p> <p>Several (>5 if AA is >5 hectares, less for smaller AAs) meet these criteria.</p>	<p>0</p> <p>1</p>	<p>Exclude temporary "burn piles." [AM, INV, POL, SBM]</p>	

F9	N Fixers	The percentage of the AA's vegetated cover that contains nitrogen-fixing plants (e.g., alder, sweetgale, clover, lupine, alfalfa, other legumes) is:		Do not include N-fixing algae or lichens. [FA, FR, INV, NRv, OE, PH, SBM, Sens]
		<1% or none.	0	
		1-25% of the vegetated cover, in the AA or along its water edge (whichever has more).	1	
		25-50% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		50-75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
		>75% of the vegetated cover, in the AA or along its water edge (whichever has more).	0	
F10	Sphagnum Moss Extent	The cover of 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% <i>bare ground</i>) is visible between erect stems or under canopy anywhere in the vegetated AA. Ground is extensively blanketed by dense thatch, moss, lichens, graminoids with great stem densities, or plants with ground-hugging foliage.	1	
		Slightly bare ground (5-20% bare between plants) is visible in places, but those areas comprise less than 5% of the unfllooded parts of the AA.	0	
		Much bare ground (20-50% bare between plants) is visible in places, and those areas comprise more than 5% of the unfllooded parts of the AA.	0	
		Other conditions.	0	
		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 gr t and do not make a "ribbon" longer than 2 cm when moistened, rolled, squeezed, and extended between thumb and forefinger.	0	
		Fines: includes silt, clay, silt, soils that make a ribbon longer than 2 cm when moistened, rolled, squeezed, and extended between thumb and forefinger.	1	
		Deep Peat: to 40 cm depth or greater.	0	
		Shallow Peat or organic <40 cm deep.	0	
		Coarse: includes sand, loamy sand, gravel, cobble, soils that do not make a ribbon when moistened, rolled, squeezed, and extended between thumb and forefinger.	0	
F15	Shorebird Feeding Habitats	During any 2 consecutive weeks of the growing season, the extent of mudflats, bare unshaded saturated areas not covered by thatch, and unshaded waters shallower than 6 cm is: [Include also any area that is adjacent to the AA.]		This addresses needs of many but not all migratory sandpipers, plovers, and related species. [WBF]
		None, or <100 sq. m.	1	
		100-1000 sq. m.	0	
		1000 - 10,000 sq. m.	0	
		>10,000 sq. m.	0	
F16	Herbaceous % of Vegetated Wetland	In aerial ("ducks eye") view, the maximum annual cover of herbaceous vegetation (all non-woody plants except moss) is:		[AM, WBF, WBN]
		<5% of the vegetated part of the AA or <0.01 hectare (whichever is less). Mark "1" here and SKIP to F20 (Invasive Plant Cover).	0	
		5-25% of the vegetated part of the AA.	1	
		25-50% of the vegetated part of the AA.	0	
		50-95% of the vegetated part of the AA.	0	
		>95% of the vegetated part of the AA.	0	
F17	Forb Cover	Within parts of the AA having herbaceous cover (excluding SAV), the areal cover of forbs reaches an annual maximum of:		Forbs are flowering plants. Do not include grasses, sedges, cattail, other graminoids, ferns, horsetails, or others that lack showy flowers. [POL]
		<5% of the herbaceous part of the AA.	1	
		5-25% of the herbaceous part of the AA.	0	
		25-50% of the herbaceous part of the AA.	0	
		50-95% of the herbaceous part of the AA.	0	
		>95% of the herbaceous part of the AA.	0	
F18	Sedge Cover	Sedges (<i>Carex</i> spp.) and cottongrass (<i>Eriophorum</i> spp.) occupy:		[CS]
		<5% of the vegetated area, or none.	0	
		5-50% of the vegetated area.	1	
		50-95% of the vegetated area.	0	
		>95% of the vegetated area.	0	
F19	Dominance of Most Abundant Herbaceous Species	Determine which two herbaceous species comprise the greatest portion of the herbaceous cover (excluding mosses and floating-leaved aquatic plants). Then choose one of the following:		For this question, include ferns as well as graminoids and forbs. [EC, INV, PH, POL, Sens]
		those species together comprise > 50% of the areal cover of herbaceous plants at any time during the year.	1	
		those species together do not comprise > 50% of the areal cover of herbaceous plants at any time during the year.	0	
F20	Invasive Plant Cover	How extensive is the cover of invasive plant species in the AA? For species, see Plants_invasive worksheet in the accompanying SupplInfo file.		[EC, PH, POL, Sens]
		invasive species appear to be absent in the AA, or are present only in trace amount (a few individuals).	0	
		invasive species are present in more than trace amounts, but comprise <5% of herbaceous cover (or woody cover, if the invasives are woody).	0	
		invasive species comprise 5-20% of the herb cover (or woody cover, if the invasives are woody).	1	
		invasive species comprise 20-50% of the herb cover (or woody cover, if the invasives are woody).	0	
		invasive species comprise >50% of the herb cover (or woody cover, if the invasives are woody).	0	
F21	Invasive Cover Along Upland Edge	Along the wetland-upland boundary, the percent of the upland edge (within 3 m upslope from the wetland) that is occupied by invasive plant species is:		If a plant cannot be identified to species (e.g., winter conditions) but its genus contains an exotic species, assume the unidentified plant to also be exotic. If vegetation is so senesced that exotic species cannot be identified, answer "none". [PH, STR]
		none of the upland edge (invasives apparently absent), or AA has no upland edge.	0	
		some (but <5%) of the upland edge.	0	
		5-50% of the upland edge.	1	
		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.		[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 <u>never</u> 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.	1
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:	If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0
		1-20% of the AA.	1
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA. True for many fringe wetlands.	0
F26	% of Summertime Water that is Shaded	At mid-day during the warmest time of year, the area of surface water <u>within</u> the AA that is shaded by vegetation and other features that are <u>within</u> the AA at that time is:	[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0
		5-25% of the water is shaded.	0
		25-50% of the water is shaded.	0
		50-75% of the water is shaded.	0
		>75% of the water is shaded.	1
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:	Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0
		1-20% of the AA, or <1% but >0.01 ha.	1
		20-50% of the AA.	0
		50-95% of the AA.	0
		>95% of the AA.	0
F28	Annual Water Fluctuation Range	The annual fluctuation in surface water level within most of the parts of the AA that contain surface water at least temporarily is:	Look for flood marks (see above). Because the annual range of water levels is difficult to estimate without multiple visits, consider asking the land owner or neighbors about it. [AM, CS, INV, NR, OE, PH, PR, SR, WBN, WS]
		<10 cm change (stable or nearly so).	0
		10 cm - 50 cm change.	1
		0.5 - 1 m change.	0
		1-2 m change.	0
		>2 m change.	0
Is the AA plus adjacent ponded water smaller than 0.01 hectare (about 10m x 10m, or 1m x 100 m)? If so, enter "1" in column D and SKIP TO F42 (Connection).			0
F29	Predominant Depth Class	During most of the time when surface water is present during the growing season, its depth, averaged over the entire inundated part of the AA, is:	If a boat is unavailable, estimate this by considering wetland size and local topography. Or if timing and safety allow, depths may be measured by drilling through winter ice. This question is asking about the spatial median depth that occurs during most of that time, even if inundation is only seasonal or temporary. If inundation in most but not all of the wetland is brief, the answer will be based on the depth of the most persistently inundated part of the wetland. Include surface water in channels and ditches as well as ponded areas. [CS, FA, FR, INV, OE, PH, PR, Sens, SFS, SR, WBF, WBN, WC]
		<10 cm deep (but >0).	0
		10 - 50 cm deep.	1
		0.5 - 1 m deep.	0
		1 - 2 m deep.	0
		>2 m deep. True for many fringe wetlands.	0
F30	Depth Classes - Evenness of Proportions	When present, surface water in most of the AA usually consists of (select one):	Estimate these proportions by considering the gradient and microtopography of the site. [FR, INV, WBF, WBN]
		One depth class that comprises >90% of the AA's inundated area (use the classes in the question above).	0
		One depth class that comprises 50-90% of the AA's inundated area.	0
		Neither of above. There are 3 or more depth classes and none occupy >50%.	1
F31	% of Water That is Ponded (not Flowing)	During most times when surface water is present, the percentage that is (1) ponded (stagnant, or flows so slowly that fine sediment is not held in suspension) AND (2) is likely to be deeper than 0.5 m in some places, is:	Nearly all wetlands with surface water have some ponded water. [AM, CS, INV, NR, OE, PR, Sens, SR, WBF, WBN, WC, WS]
		<5% of the water, or it occupies <100 sq.m cumulatively. Nearly all the surface water is flowing. SKIP to F34.	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).	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:	[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0
		5-30% of the ponded water.	0
		30-70% of the ponded water.	0
		70-99% of the ponded water.	0
		100% of the ponded water.	0
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area <u>in</u> 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.	1
		>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.	1
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail (<i>Typha</i> spp.), common reed (<i>Phragmites</i>), or tall (>1m) bulrush is:	Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0
		1-25% of the emergent vegetation.	1
		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.	1	
		Clumped. More than 70% of such vegetation is in bands along the wetland perimeter or is clumped at one or a few sides of the surface water area.	0	
F38	Persistent Deepwater Area	If the deepest patch of surface water (flowing or ponded) in or directly adjacent to the AA is mostly deeper than 0.5 m for >2 weeks during the growing season, enter "1" and continue. If not, enter "0" and SKIP to F42.(Connection).	0	
F39	Non-vegetated Aquatic Cover	During most of the growing season and in waters deeper than 0.5 m, the cover for fish, aquatic invertebrates, and/or amphibians that is provided NOT by living vegetation, but by accumulations of dead wood and undercut banks is:		For this question, consider only the wood that is at or above the water surface. Estimates of underwater wood based only on observations from terrestrial viewpoints are unreliable so should not be attempted. [AM, FA, FR, INV]
		Little or none.	0	
		Intermediate.	0	
		Extensive.	0	
F40	Isolated Island	The AA contains (or is part of) an island or beaver lodge within a lake, pond, or river, and is isolated from the shore by water depths >1 m on all sides during an average June. The island may be solid, or it may be a floating vegetation mat that is sufficiently large and dense to support a waterbird nest.	0	[WBN]
F41	Floating Algae & Duckweed	At some time of the year, mats of algae and/or duckweed are likely to cover >50% of the AA's otherwise-unshaded water surface, or blanket >50% of the underwater substrate. If true, enter "1" in next column. If untrue or uncertain, enter "0".	0	[EC, PR, WBF]
F42	Channel Connection & Outflow Duration	The most persistent surface water connection (outlet channel or pipe, ditch, or overbank water exchange) between the AA and a downslope stream network is: <u>Note:</u> 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	
		No surface water flows out of the wetland except possibly during extreme events (<once per 10 years). Or, water flows only into a wetland ditch, or lake that lacks an outlet. SKIP to F47 (pH Measurement).	0	
F43	Outflow Confinement	During major runoff events, in the places where surface water exits the AA or connected waters nearby, the water:		"Major runoff events" would include biennial high water caused by storms and/or rapid snowmelt. [CS, NR, OE, PR, Sens, SR, STR, WS]
		Mostly passes through a pipe, culvert, narrowly breached dike, berm, beaver dam, or other partial obstruction (other than natural topography) that does not appear to drain the wetland artificially during most of the growing season.	1	
		Leaves through natural exits (channels or diffuse outflow), not mainly through artificial or temporary features.	0	
		Is exported more quickly than usual due to ditches or pipes within the AA or connected to its outlet, or within 10 m of the AA's edge, which drain the wetland artificially, or water is pumped out of the AA.	0	
F44	Tributary Channel	At least once annually, surface water from a tributary channel that is >100 m long moves into the AA. Or, surface water from a larger permanent water body adjacent to the AA spills into the AA. If it enters only via a pipe, that pipe must be fed by a mapped stream or lake further upslope. If no, SKIP to F47 (pH Measurement).	1	If inlet tributaries cannot be searched for due to inaccessibility of part of the AA, follow suggestions in F42 above. [NRv, PH, PRv, SRv]
F45	Input Water Temperature	Based on lack of shade, water source characteristics, or actual temperature measurements, the inflow is likely to be warmer than surface water in the AA during part of most years. Enter 1 = yes, 0 = no.	0	[WCV]
F46	Throughflow Resistance	During its travel through the AA at the time of peak annual flow, water arriving in channels: [select only the ONE encountered by most of the incoming water].		[FA, FR, INV, NR, OE, PR, SR, WS]
		Does not bump into many plant stems as it travels through the AA. Nearly all the water continues to travel in unvegetated (often incised) channels that have minimal contact with wetland vegetation, or through a zone of open water such as an instream pond or lake.	0	
		Bumps into herbaceous vegetation but mostly remains in fairly straight channels.	1	
		Bumps into herbaceous vegetation and mostly spreads throughout, or is in widely meandering, multi-branched, or braided channels.	0	
		Bumps into tree trunks and/or shrub stems but mostly remains in fairly straight channels.	0	
Bumps into tree trunks and/or shrub stems and follows a fairly indirect path from entrance to exit (meandering, multi-branched, or braided).	0			
F47	pH Measurement	The pH in most of the AA's surface water:		Preferably, measure this in larger areas of ponded surface water within the AA, or in streams that have passed through (not along) most of the AA. Unless surface water is completely absent, do not dig holes or make depressions in peat in order to provide water for this measurement. Avoid measuring near roads or in puddles formed only by recent rain. [AM, FA, FR, NR, WBF, PH, PR, Sens, WBF, WBN]
		Was measured, and is: [Enter the reading in the column to the right.]		
		Was not measured but surface water is present and is darkly tea-coloured. Or if no surface water, then mosses and plants that indicate peatland (e.g., Labrador tea) are prevalent. Enter "1".	0	
		Neither of above. Enter "1".	1	
F48	TDS and/or Conductivity	The TDS (total dissolved solids) or conductivity of the AA's surface water is: (select the first true row with information):		See above for measurement guidance. [FR, INV, NRv, PH, PRv, Sens]
		TDS is: [Enter the reading in ppm or mg/L in the column to the right, if measured, or answer next row.]		
		Conductivity is: [Enter the reading in µS/cm in the column to the right.]		
		Was not measured, but plants that indicate saline conditions cover much of the vegetated AA. Enter "1".	0	
		Neither of above.	1	
F49	Beaver Probability	Use of the AA by beaver during the past 5 years is (select most applicable ONE):		[FA, FR, PH, SBM, Sens, WBF, WBN]
		Evident from direct observation or presence of gnawed limbs, dams, tracks, dens, lodges, or extensive stands of water-killed trees (snags).	0	
		Likely based on known occurrence in the region and proximity to suitable habitat, which may include: (a) a persistent freshwater wetland, pond, or lake, or a perennial low or mid-gradient (<10%) channel, and (b) a corridor or multiple stands of hardwood trees and shrubs in vegetated areas near surface water.	0	
		Unlikely because site characteristics above are deficient, and/or this is a settled area or other area where beaver are routinely removed.	1	
F50	Groundwater Strength of Evidence	Select first applicable choice:		Adhere to these criteria strictly -- do not use personal judgment based on fen conditions, pH, or other evidence. Consult topographic maps to detect breaks in slope described here. Rust deposits associated with groundwater seeps may be most noticeable as orange discoloration in ice formations along streams during early winter. [AM, CS, FA, FR, INV, NR, OE, PH, PRv, SFS, WC, WS]
		Springs are known to be present within the AA, or if groundwater levels have been monitored, that has demonstrated that groundwater primarily discharges to the wetland for longer periods during the year than periods when the wetland recharges the groundwater.	0	
		Most of the AA has a slope of >5%, or is very close to the base of a natural slope longer than 100 and much steeper than the slope of the AA, AND the pH of surface water, if known, is >5.5.	0	
		Neither of above is true, although some groundwater may discharge to or flow through the AA. Or groundwater influx is unknown.	1	
F51	Internal Gradient	The gradient along most of the flow path within the AA is:		This is not the same as the shoreline slope. It is the elevational difference between the AA's inlet and outlet, divided by the flow-distance between them and converted to percent. If available, use a clinometer to measure this. Free clinometer apps can be downloaded to smartphones. If the wetland is large (longer than ~1 km), this may be estimated using Google Earth to determine the minimum and maximum elevation within the AA, then dividing by length and multiplying by 100. [CS, NR, OE, PR, SR, WBF, WBN, WS]
		<2% or the AA has no surface water outlet (not even seasonally).	1	
		2-5%	0	
		6-10%	0	
		>10%	0	
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%.	1	
		30 to 60%.	0	
		60 to 90%.	0	
		>90%, or all the area within 30 m of the AA edge is other wetlands. SKIP to F55.	0	

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	1	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	0	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage of the wetland that is visible from the best vantage point on public roads, public parking lots, public buildings, or public maintained trails that intersect, adjoin, or are within 100 m of the AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	0	
		>50%.	1	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible 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.	1	
		Within or near the AA, there is an interpretive center, trails with interpretive signs or brochures, and/or regular guided interpretive tours.	0	
F60	Unvisited Core Area	The percentage of the AA almost never visited by humans during an average growing season probably comprises: [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.	1	
		50-95%, with or without inhabited building nearby.	0	
		>95% of the AA with or without inhabited building nearby.	0	
F61	Frequently Visited Area	The part of the AA visited by humans almost daily for several weeks during an average growing season probably comprises: [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	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	1	
		100-500 m. away.	0	
		>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.		[PH, PR]

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

				Data
S1	Aberrant Timing of Water Inputs			
	<i>In the last column, place a check mark next to any item that is likely to have caused the timing of water inputs (but not necessarily their volume) to shift by hours, days, or weeks, becoming either more muted (smaller or less frequent peaks spread over longer times more temporal homogeneity of flow or water levels) or more flashy (larger or more frequent spikes but over shorter times). [FA, FR, INV, PH, STR]</i>			
	Stormwater from impervious surfaces that drains directly to the wetland.			1
	Water subsidies from wastewater effluent, septic system leakage, snow storage areas, or irrigation.			
	Regular removal of surface or groundwater for irrigation or other consumptive use.			
	Flow regulation in tributaries or water level regulation in adjoining water body, or other control structure at water entry points that regulates inflow to the wetland.			
	A dam, dike, levee, weir, berm, or fill -- within or downgradient from the wetland -- that interferes with surface or subsurface flow in/out of the AA (e.g., road fill, wellpads, pipelines).			
	Excavation within the wetland, e.g., dugout, artificial pond, dead-end ditch.			
	Artificial drains or ditches in or near the wetland.			
	Accelerated downcutting or channelization of an adjacent or internal channel (incised below the historical water table level).			
	Logging within the wetland.			
	Subsidence or compaction of the wetland's substrate as a result of machinery, livestock, fire, drainage, or off road vehicles.			
	Straightening, ditching, dredging, and/or lining of tributary channels.			
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items had no measurable effect on the timing of water conditions in any part of the AA, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
		Severe (3 points)	Medium (2 points)	Mild (1 point)
	Spatial extent of timing shift within the wetland:	>95% of wetland.	5-95% of wetland.	<5% of wetland.
	When most of the timing shift began:	<3 yrs ago.	3-9 yrs ago.	10-100 yrs ago.
	<i>Score the following 2 rows only if the altered inputs began within past 10 years, and only for the part of the wetland that experiences those.</i>			
	Input timing now vs. previously:	Shift of weeks.	Shift of days.	Shift of hours or minutes.
	Flashiness or muting:	Became very flashy or controlled.	Intermediate.	Became mildly flashy or controlled.
				Sum= 4
				Stressor subscore= 0.33
S2	Accelerated Inputs of Contaminants and/or Salts			
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of contaminants or salts to the AA. [AM, FA, PH, POL, STR]</i>			
	Stormwater or wastewater effluent (including failing septic systems), landfills, industrial facilities.			
	Metals & chemical wastes from mining, shooting ranges, snow storage areas, oil/ gas extraction, other sources (download many locations from National Pollutant Release Inventory and view KMZ overlay in Google Earth. 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.			
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly higher levels of contaminants and/or salts, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
		Severe (3 points)	Medium (2 points)	Mild (1 point)
	Usual toxicity of most toxic contaminants:	Industrial effluent, mining waste, unmanaged landfill.	Cropland, managed landfill, pipeline or transmission rights-of-way.	Low density residential.
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.
				Sum= 0
				Stressor subscore= 0.00
S3	Accelerated Inputs of Nutrients			
	<i>In the last column, place a check mark next to any item -- occurring in either the wetland or its CA -- that is likely to have accelerated the inputs of nutrients to the wetland. [NRv, PRv, STR]</i>			
	Stormwater or wastewater effluent (including failing septic systems), landfills.			1
	Fertilizers applied to lawns, ag lands, or other areas in the CA.			
	Livestock, dogs.			
	Artificial drainage of upslope lands.			
	<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not cumulatively expose the AA to significantly more nutrients, then leave the "0s" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>			
		Severe (3 points)	Medium (2 points)	Mild (1 point)
	Type of loading:	High density of unmaintained septic, some types of industrial sources.	Moderate density septic, cropland, secondary wastewater treatment plant.	Livestock, pets, low density residential.
	Frequency & duration of input:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.
	AA proximity to main sources (actual or potential):	0 - 15 m.	15-100 m. or in groundwater.	In more distant part of contributing area.
				Sum= 4
				Stressor subscore= 0.44

S4 Excessive Sediment Loading from Contributing Area				
<i>In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRV, STR]</i>				
Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
Erosion from construction, in-channel machinery in the CA.				
Erosion from off-road vehicles in the CA.				
Erosion from livestock or foot traffic in the CA.				
Stormwater or wastewater effluent.				
Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				
Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
Other human-related disturbances within the CA.				
<i>If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	1
Recentness of significant soil disturbance in the CA:	Current & ongoing.	1-12 months ago.	>1 yr ago.	3
Duration of sediment inputs to the wetland:	Frequent and year-round.	Frequent but mostly seasonal.	Infrequent & during high runoff events mainly.	2
AA proximity to actual or potential sources:	0 - 15 m.	15-100 m.	In more distant part of contributing area.	2
* 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= 8
				Stressor subscore= 0.67
S5 Soil or Sediment Alteration Within the Assessment Area				
<i>In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]</i>				
Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				
Leveling or other grading not to the natural contour.				
Tillage, plowing (but excluding disking for enhancement of native plants).				
Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
Excavation.				
Ditch cleaning or dredging in or adjacent to the wetland.				
Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
<i>If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.</i>				
	Severe (3 points)	Medium (2 points)	Mild (1 point)	
Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	1
Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	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: 15807 - 28 Base Road

Date: 24 May 2022

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.304572 and 65 844412

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)	1.47	Lower	5.16	Moderate	2.86	5.20
Stream Flow Support (SFS)	4.06	Moderate	5.14	Moderate	2.17	2.99
Water Cooling (WC)	8.90	Higher	5.90	Higher	5.93	3.55
Sediment Retention & Stabilisation (SR)	2.77	Moderate	8.75	Higher	5.05	5.31
Phosphorus Retention (PR)	4.25	Higher	8.16	Higher	5.92	7.71
Nitrate Removal & Retention (NR)	2.09	Lower	10.00	Higher	5.12	10.00
Carbon Sequestration (CS)	4.52	Moderate			6.51	
Organic Nutrient Export (OE)	6.10	Higher			5.57	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	4.72	Moderate	6.92	Higher	2.81	4.91
Aquatic Invertebrate Habitat (INV)	3.93	Moderate	4.43	Moderate	5.26	3.64
Amphibian & Turtle Habitat (AM)	3.92	Moderate	4.07	Moderate	5.37	4.56
Waterbird Feeding Habitat (WBF)	4.85	Moderate	6.67	Moderate	3.86	6.67
Waterbird Nesting Habitat (WBN)	2.88	Moderate	2.50	Moderate	2.46	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	8.82	Higher	2.50	Lower	7.31	2.50
Pollinator Habitat (POL)	8.70	Higher	0.00	Lower	7.00	0.00
Native Plant Habitat (PH)	5.01	Moderate	5.50	Moderate	5.11	4.77
Public Use & Recognition (PU)			2.73	Moderate		2.28
Wetland Sensitivity (Sens)			0.00	Lower		2.11
Wetland Ecological Condition (EC)			0.96	Lower		4.79
Wetland Stressors (STR) (higher score means more stress)			10.00	Higher		6.84
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	4.06	Moderate	5.16	Moderate	2.86	5.20
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.64	Moderate	9.48	Higher	6.08	8.84
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.32	Higher	5.53	Higher	5.33	3.51
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.06	Moderate	5.47	Moderate	4.14	5.20
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.16	Higher	4.08	Moderate	6.89	3.60
WETLAND CONDITION (EC)			0.96	Lower		4.79
WETLAND RISK (average of Sensitivity & Stressors)			5.00	Higher		4.48

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

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Appendix III:
Atlantic Canada Conservation Data Centre Reports

DATA REPORT 7294: Garnett Settlement, NB

Prepared 24 June 2022

by J. Churchill, Data Manager

CONTENTS OF REPORT

1.0 Preface

1.1 Data List

1.2 Restrictions

1.3 Additional Information

Map 1: Buffered Study Area

2.0 Rare and Endangered Species

2.1 Flora

2.2 Fauna

Map 2: Flora and Fauna

3.0 Special Areas

3.1 Managed Areas

3.2 Significant Areas

Map 3: Special Areas

4.0 Rare Species Lists

4.1 Fauna

4.2 Flora

4.3 Location Sensitive Species

4.4 Source Bibliography

5.0 Rare Species within 100 km

5.1 Source Bibliography



Map 1. A 100 km buffer around the study area

1.0 PREFACE

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

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

1.1 DATA LIST

Included datasets:

Filename

GarnettSeNB_7294ob.xls

GarnettSeNB_7294ob100km.xls

GarnettSeNB_7294ff_py xls

Contents

Rare or legally-protected Flora and Fauna in your study area

A list of Rare and legally protected Flora and Fauna within 100 km of your study area

Rare Freshwater Fish in your study area (DFO database)

1.2 RESTRICTIONS

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

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

1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

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

Plants, Lichens, Ranking Methods, All other Inquiries	Sean Blaney	Senior Scientist / Executive Director	(506) 364-2658	sean.blaney@accdc.ca
Animals (Fauna)	John Klymko	Zoologist	(506) 364-2660	john.klymko@accdc.ca
Data Management, GIS	James Churchill	Conservation Data Analyst / Field Biologist		james.churchill@accdc.ca
Billing	Jean Breau	Financial Manager / Executive Assistant	(506) 364-2657	jean.breau@accdc.ca

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

New Brunswick. For information about rare taxa, protected areas, game animals, deer yards, old growth forests, archeological sites, fish habitat etc., or to determine if location-sensitive species (section 4.3) occur near your study site, please contact Hubert Askanas, Energy and Resource Development: (506) 453-5873.

Nova Scotia. For information about Species at Risk or general questions about Nova Scotia location-sensitive species please contact the Biodiversity Program at biodiversity@novascotia.ca. For questions about protected areas, game animals, deer yards, old growth forests, archeological sites, fish habitat etc., or to determine if location-sensitive species (section 4.3) occur near your study site please contact a Regional Biologist:

DIGB, ANNA, KING	Emma Vost	(902) 670-8187	Emma.Vost@novascotia.ca
SHEL, YARM	Sian Wilson	(902) 930-2978	Sian.Wilson@novascotia.ca
QUEE, LUNE	Peter Kydd	(902) 523-0969	Peter.Kydd@novascotia.ca
HALI, HANT	Shavonne Meyer	(902) 893-0816	Shavonne.Meyer@novascotia.ca
Central Region	Jolene Laverty	(902) 324-8953	Jolene.Laverty@novascotia.ca
COLC, CUMB	Kimberly George	(902) 890-1046	Kimberly.George@novascotia.ca
ANTI, GUYS	Harrison Moore	(902) 497-4119	Harrison.Moore@novascotia.ca
INVE, VICT	Maureen Cameron-MacMillan	(902) 295-2554	Maureen.Cameron-MacMillan@novascotia.ca
CAPE, RICH, PICT	Elizabeth Walsh	(902) 563-3370	Elizabeth.Walsh@novascotia.ca

Prince Edward Island. For information about rare taxa, protected areas, game animals, fish habitat etc., please contact Garry Gregory, PEI Department of Environment, Energy and Climate Action: (902) 569-7595.

2.0 RARE AND ENDANGERED SPECIES

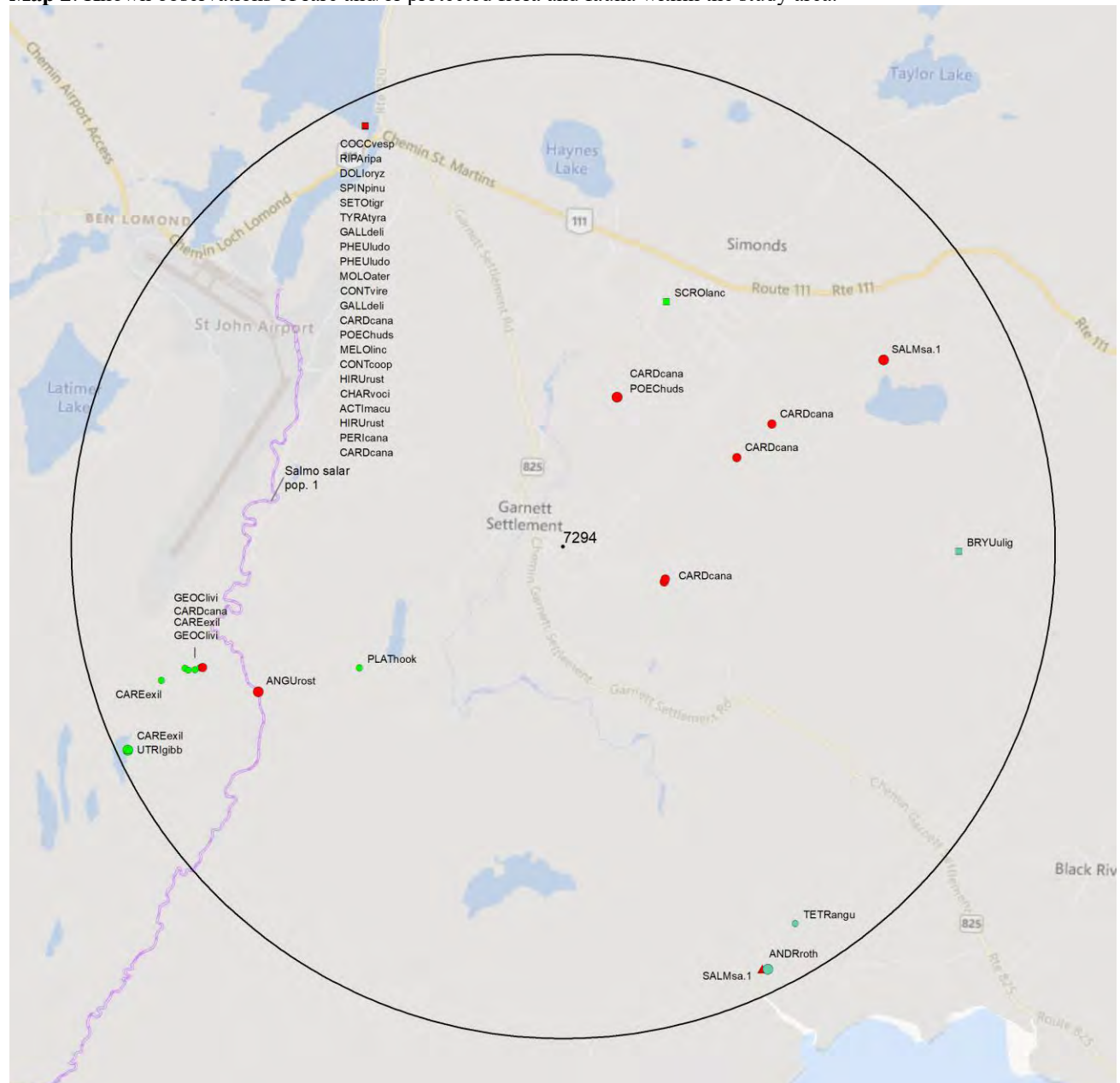
2.1 FLORA

The study area contains 9 records of 5 vascular, 3 records of 3 nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

The study area contains 42 records of 20 vertebrate, no records of invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if 'location-sensitive' species occur near your study site.

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



- RESOLUTION**
- 4.7 within 50s of kilometers
 - 4.0 within 10s of kilometers
 - 3.7 within 5s of kilometers
 - △ 3.0 within kilometers
 - △ 2.7 within 500s of meters
 - ◇ 2.0 within 100s of meters
 - ◇ 1.7 within 10s of meters

- HIGHER TAXONII**
- vertebrate fauna
 - invertebrate fauna
 - vascular flora
 - nonvascular flora

3.0 SPECIAL AREAS

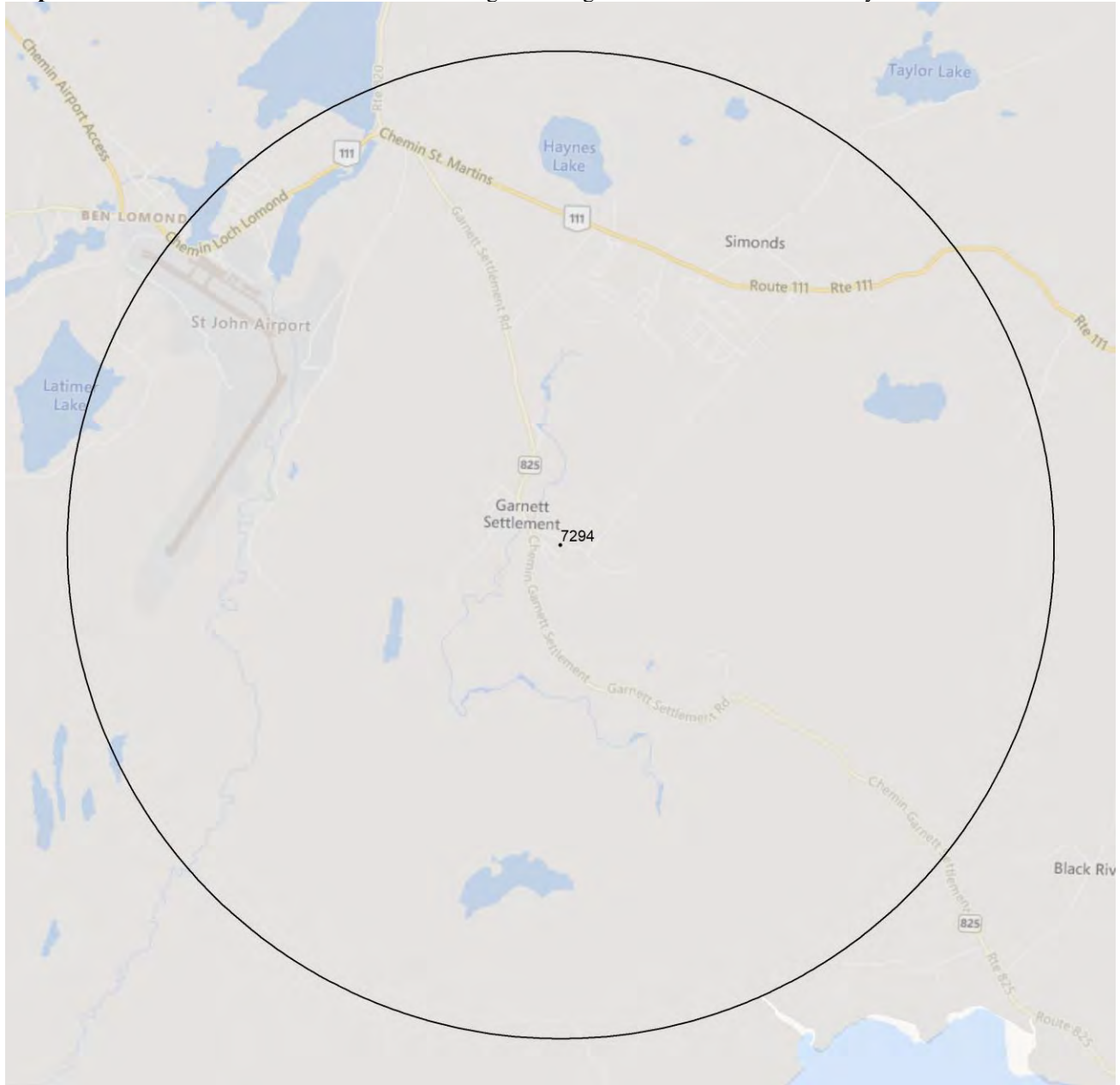
3.1 MANAGED AREAS

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

3.2 SIGNIFICANT AREAS

The GIS scan identified no biologically significant sites in the vicinity of the study area (Map 3).

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



 Managed Area  Significant Area

4.0 RARE SPECIES LISTS

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

4.1 FLORA

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B,S5M	2	4.7 \pm 7.0
N	<i>Andreaea rothii</i>	Dusky Rock Moss				S2?	1	4.8 \pm 0.0
N	<i>Ptychostomum cernuum</i>	Swamp Bryum				S2S3	1	4.0 \pm 4.0
N	<i>Tetraplodon angustatus</i>	Toothed-leaved Nitrogen Moss				S3S4	1	4.5 \pm 0.0
P	<i>Scrophularia lanceolata</i>	Lance-leaved Figwort				S2	1	2.7 \pm 5.0
P	<i>Platanthera hookeri</i>	Hooker's Orchid				S3?	1	2.4 \pm 0.0
P	<i>Utricularia gibba</i>	Humped Bladderwort				S3S4	1	4.9 \pm 0.0
P	<i>Geocaulon lividum</i>	Northern Comandra				S3S4	2	3.9 \pm 0.0
P	<i>Carex exilis</i>	Coastal Sedge				S3S4	4	3.9 \pm 0.0

4.2 FAUNA

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	<i>Salmo salar pop. 1</i>	Atlantic Salmon - Inner Bay of Fundy population	Endangered	Endangered	Endangered	S2	2	3.8 \pm 0.0
A	<i>Riparia riparia</i>	Bank Swallow	Threatened	Threatened		S2B	1	4.7 \pm 7.0
A	<i>Anguilla rostrata</i>	American Eel	Threatened		Threatened	S4N	1	3.4 \pm 0.0
A	<i>Hirundo rustica</i>	Barn Swallow	Special Concern	Threatened	Threatened	S2B	3	4.7 \pm 7.0
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S3B	1	4.7 \pm 7.0
A	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S3B	3	4.7 \pm 7.0
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Special Concern	Threatened	Threatened	S3B	1	4.7 \pm 7.0
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Special Concern	Special Concern		S3B,S3S4N,SUM	1	4.7 \pm 7.0
A	<i>Cardellina canadensis</i>	Canada Warbler	Special Concern	Threatened	Threatened	S3S4B	12	1.1 \pm 0.0
A	<i>Spinus pinus</i>	Pine Siskin				S3	1	4.7 \pm 7.0
A	<i>Charadrius vociferus</i>	Killdeer				S3B	1	4.7 \pm 7.0
A	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak				S3B	2	4.7 \pm 7.0
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B	1	4.7 \pm 7.0
A	<i>Setophaga tigrina</i>	Cape May Warbler				S3B,S4S5M	1	4.7 \pm 7.0
A	<i>Perisoreus canadensis</i>	Canada Jay				S3S4	3	4.7 \pm 7.0
A	<i>Poecile hudsonicus</i>	Boreal Chickadee				S3S4	3	1.6 \pm 0.0
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B	1	4.7 \pm 7.0
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B,S4M	1	4.7 \pm 7.0
A	<i>Melospiza lincolnii</i>	Lincoln's Sparrow				S3S4B,S4M	1	4.7 \pm 7.0

4.3 LOCATION SENSITIVE SPECIES

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

New Brunswick

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

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

4.4 SOURCE BIBLIOGRAPHY

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

# recs	CITATION
22	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs.
14	Stantec. 2014. Energy East Pipeline Corridor Species Occurrence Data. Stantec Inc., 4934 records.
11	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
2	Blaney, C.S.; Spicer, C.D.; Popma, T.M.; Hanel, C. 2002. Fieldwork 2002. Atlantic Canada Conservation Data Centre. Sackville NB, 2252 recs.
1	Bagnell, B.A. 2001. New Brunswick Bryophyte Occurrences. B&B Botanical, Sussex, 478 recs.
1	Belland, R.J. Maritime moss records from various herbarium databases. 2014.
1	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.
1	Conservation Council of New Brunswick Inc. 2007. Pers.comm. to R. Lautenschlager.
1	Mazerolle, D.M. 2017. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre.
1	Tims, J. & Craig, N. 1995. Environmentally Significant Areas in New Brunswick (NBESA). NB Dept of Environment & Nature Trust of New Brunswick Inc, 6042 recs. https://doi.org/10.1037/arc0000014 .

5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 42270 records of 160 vertebrate and 1822 records of 75 invertebrate fauna; 7832 records of 325 vascular, 2724 records of 237 nonvascular flora (attached: *ob100km.xls).

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

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	<i>Myotis lucifugus</i>	Little Brown Myotis	Endangered	Endangered	Endangered	S1	268	9.7 \pm 1.0	NB
A	<i>Myotis septentrionalis</i>	Northern Myotis	Endangered	Endangered	Endangered	S1	47	14.4 \pm 1.0	NB
A	<i>Perimyotis subflavus</i>	Tricolored Bat	Endangered	Endangered	Endangered	S1	59	22.7 \pm 0.0	NB
A	<i>Eubalaena glacialis</i>	North Atlantic Right Whale	Endangered	Endangered	Endangered	S1	5	73.6 \pm 50.0	NS NB
A	<i>Osmerus mordax</i> pop. 2	Rainbow Smelt - Lake Utopia Large-bodied population	Endangered	Threatened	Threatened	S1	2	75.2 \pm 10.0	
A	<i>Charadrius melodus melodus</i>	Piping Plover melodus subspecies	Endangered	Endangered	Endangered	S1B	30	14.5 \pm 0.0	NB
A	<i>Sterna dougallii</i>	Roseate Tern	Endangered	Endangered	Endangered	S1B	4	67.1 \pm 0.0	NB
A	<i>Dermodochelys coriacea</i> pop. 2	Leatherback Sea Turtle - Atlantic population	Endangered	Endangered	Endangered	S1S2N	4	14.1 \pm 50.0	NB
A	<i>Salmo salar</i> pop. 1	Atlantic Salmon - Inner Bay of Fundy popula ion	Endangered	Endangered	Endangered	S2	579	3.8 \pm 0.0	NB
A	<i>Salmo salar</i> pop. 7	Atlantic Salmon - Outer Bay of Fundy popula ion	Endangered		Endangered	SNR	721	19.9 \pm 0.0	NB
A	<i>Rangifer tarandus</i> pop. 2	Caribou - Atlantic-Gasp -sie population	Endangered	Endangered	Extirpated	SX	3	12.1 \pm 5.0	NB
A	<i>Sturnella magna</i>	Eastern Meadowlark	Threatened	Threatened	Threatened	S1B	33	25.2 \pm 7.0	NB
A	<i>Asio flammeus</i>	Short-eared Owl	Threatened	Special Concern	Special Concern	S1S2B	23	52.5 \pm 0.0	NB
A	<i>Ixobrychus exilis</i>	Least Bittern	Threatened	Threatened	Threatened	S1S2B	38	13.6 \pm 0.0	NB
A	<i>Hylocichla mustelina</i>	Wood Thrush	Threatened	Threatened	Threatened	S1S2B	137	9.1 \pm 7.0	NB
A	<i>Hydrobates leucorhous</i>	Leach's Storm-Petrel	Threatened			S1S2B	27	33.1 \pm 0.0	NB
A	<i>Antrostomus vociferus</i>	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S2B	77	14.6 \pm 7.0	NB
A	<i>Catharus bicknelli</i>	Bicknell's Thrush	Threatened	Threatened	Threatened	S2B	20	25.1 \pm 1.0	NB
A	<i>Riparia riparia</i>	Bank Swallow	Threatened	Threatened		S2B	1023	4.7 \pm 7.0	NB
A	<i>Glyptemys insculpta</i>	Wood Turtle	Threatened	Threatened	Threatened	S2S3	1828	8.7 \pm 0.0	NB
A	<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	1062	8.7 \pm 0.0	NB
A	<i>Acipenser oxyrinchus</i>	Atlantic Sturgeon	Threatened		Threatened	S3B,S3N	2	22.8 \pm 0.0	NB
A	<i>Tringa flavipes</i>	Lesser Yellowlegs	Threatened			S3M	556	14.2 \pm 0.0	NB
A	<i>Limosa haemastica</i>	Hudsonian Godwit	Threatened			S3M	77	23.6 \pm 0.0	NB
A	<i>Anguilla rostrata</i>	American Eel	Threatened		Threatened	S4N	2470	3.4 \pm 0.0	NB
A	<i>Coturnicops noveboracensis</i>	Yellow Rail	Special Concern	Special Concern	Special Concern	S1?B,SUM	3	57.9 \pm 7.0	NB
A	<i>Histrionicus histrionicus</i> pop. 1	Harlequin Duck - Eastern population	Special Concern	Special Concern	Endangered	S1B,S1S2N,S2M	134	47.3 \pm 17.0	NB
A	<i>Hirundo rustica</i>	Barn Swallow	Special Concern	Threatened	Threatened	S2B	1431	4.7 \pm 7.0	NB
A	<i>Balaenoptera physalus</i>	Fin Whale	Special Concern	Special Concern		S2S3	19	9.7 \pm 0.0	NB
A	<i>Euphagus carolinus</i>	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S2S3B,S3M	156	7.7 \pm 2.0	NB
A	<i>Bucephala islandica</i>	Barrow's Goldeneye	Special Concern	Special Concern	Special Concern	S2S3N,S3M	52	14.8 \pm 0.0	NB
A	<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	Special Concern	Special Concern	Special Concern	S3	11	16.4 \pm 0.0	NB
A	<i>Chelydra serpentina</i>	Snapping Turtle	Special Concern	Special Concern	Special Concern	S3	126	5.3 \pm 0.0	NB
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S3B	1045	4.7 \pm 7.0	NB
A	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S3B	528	4.7 \pm 7.0	NB
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Special Concern	Threatened	Threatened	S3B	1787	4.7 \pm 7.0	NB
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Special Concern	Special Concern		S3B,S3S4N,SUM	362	4.7 \pm 7.0	NB
A	<i>Chordeiles minor</i>	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	402	6.1 \pm 7.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	<i>Phalaropus lobatus</i>	Red-necked Phalarope	Special Concern	Special Concern		S3M	134	20.6 ± 0.0	NB
A	<i>Podiceps auritus</i>	Horned Grebe	Special Concern	Special Concern	Special Concern	S3N	165	10.2 ± 4.0	NB
A	<i>Cardellina canadensis</i>	Canada Warbler	Special Concern	Threatened	Threatened	S3S4B	899	1.1 ± 0.0	NB
A	<i>Phocoena phocoena</i>	Harbour Porpoise	Special Concern		Spec.Concern	S4	215	12.8 ± 0.0	NB
A	<i>Chrysemys picta picta</i>	Eastern Painted Turtle	Special Concern	Special Concern		S4	170	25.4 ± 1.0	NB
A	<i>Anarhichas lupus</i>	Atlantic Wolffish	Special Concern	Special Concern	Special Concern	SNR	1	99.2 ± 0.0	NB
A	<i>Hemidactylium scutatum</i>	Four-toed Salamander	Not At Risk			S1?	14	63.0 ± 0.0	NS
A	<i>Fulica americana</i>	American Coot	Not At Risk			S1B	21	18.0 ± 0.0	NB
A	<i>Falco peregrinus pop. 1</i>	Peregrine Falcon - anatum/tundrius	Not At Risk	Special Concern	Endangered	S1B,S3M	505	10.4 ± 16.0	NB
A	<i>Falco peregrinus</i>	Peregrine Falcon	Not At Risk	Special Concern		S1B,S3M	1	97.2 ± 0.0	NB
A	<i>Bubo scandiacus</i>	Snowy Owl	Not At Risk			S1N,S2S3M	18	15.9 ± 0.0	NB
A	<i>Accipiter cooperii</i>	Cooper's Hawk	Not At Risk			S1S2B	18	18.5 ± 7.0	NB
A	<i>Buteo lineatus</i>	Red-shouldered Hawk	Not At Risk			S1S2B	46	18.2 ± 0.0	NB
A	<i>Aegolius funereus</i>	Boreal Owl	Not At Risk			S1S2B,SUM	3	9.8 ± 7.0	NB
A	<i>Sorex dispar</i>	Long-tailed Shrew	Not At Risk			S2	4	37.0 ± 1.0	NB
A	<i>Chlidonias niger</i>	Black Tern	Not At Risk			S2B	343	26.7 ± 7.0	NB
A	<i>Podiceps grisegena</i>	Red-necked Grebe	Not At Risk			S2N,S3M	299	13.2 ± 0.0	NB
A	<i>Globicephala melas</i>	Long-finned Pilot Whale	Not At Risk			S2S3	3	12.3 ± 0.0	NB
A	<i>Desmognathus fuscus pop. 2</i>	Northern Dusky Salamander - Quebec / New Brunswick population	Not At Risk			S3	48	27.2 ± 1.0	NB
A	<i>Megaptera novaeangliae</i>	Humpback Whale	Not At Risk			S3	25	79.3 ± 0.0	NS
A	<i>Sterna hirundo</i>	Common Tern	Not At Risk			S3B,SUM	215	7.6 ± 0.0	NB
A	<i>Lagenorhynchus acutus</i>	Atlantic White-sided Dolphin	Not At Risk			S3S4	2	14.8 ± 1.0	NB
A	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Not At Risk		Endangered	S4	1376	4.7 ± 7.0	NB
A	<i>Lynx canadensis</i>	Canada Lynx	Not At Risk		Endangered	S4	15	5.3 ± 1.0	NB
A	<i>Canis lupus</i>	Grey Wolf	Not At Risk		Extirpated	SX	3	16.7 ± 1.0	NB
A	<i>Puma concolor pop. 1</i>	Cougar - Eastern population	Data Deficient		Endangered	SU	104	16.3 ± 1.0	NB
A	<i>Calidris canutus rufa</i>	Red Knot rufa subspecies - Tierra del Fuego / Patagonia wintering population	E,SC	Endangered	Endangered	S2M	223	16.1 ± 0.0	NB
A	<i>Morone saxatilis</i>	Striped Bass	E,SC			S3S4B,S3S4N	6	17.5 ± 10.0	NB
A	<i>Odobenus rosmarus pop. 5</i>	Atlantic Walrus - Nova Scotia - Newfoundland - Gulf of St Lawrence population	X			SX	1	66.2 ± 5.0	NS
A	<i>Thryothorus ludovicianus</i>	Carolina Wren				S1	35	13.8 ± 0.0	NB
A	<i>Salvelinus alpinus</i>	Arctic Char				S1	3	53.0 ± 0.0	NB
A	<i>Vireo flavifrons</i>	Yellow-throated Vireo				S1?B	16	19.4 ± 1.0	NB
A	<i>Tringa melanoleuca</i>	Greater Yellowlegs				S1?B,S4S5M	929	14.2 ± 0.0	NB
A	<i>Aythya americana</i>	Redhead				S1B	8	16.5 ± 0.0	NB
A	<i>Gallinula galeata</i>	Common Gallinule				S1B	43	14.2 ± 1.0	NB
A	<i>Grus canadensis</i>	Sandhill Crane				S1B	12	24.4 ± 7.0	NB
A	<i>Bartramia longicauda</i>	Upland Sandpiper				S1B	47	44.5 ± 0.0	NB
A	<i>Phalaropus tricolor</i>	Wilson's Phalarope				S1B	52	14.2 ± 0.0	NB
A	<i>Leucophaeus atricilla</i>	Laughing Gull				S1B	49	10.4 ± 16.0	NB
A	<i>Rissa tridactyla</i>	Black-legged Kittiwake				S1B	55	56.7 ± 0.0	NB
A	<i>Uria aalge</i>	Common Murre				S1B	88	26.5 ± 15.0	NB
A	<i>Alca torda</i>	Razorbill				S1B	64	23.8 ± 0.0	NB
A	<i>Fratercula arctica</i>	Atlantic Puffin				S1B	107	26.5 ± 15.0	NB
A	<i>Progne subis</i>	Purple Martin				S1B	215	14.4 ± 7.0	NB
A	<i>Histrionicus histrionicus</i>	Harlequin Duck				S1B,S1S2N,S2M	1	97.1 ± 0.0	NB
A	<i>Aythya marila</i>	Greater Scaup				S1B,S2N,S4M	43	14.2 ± 0.0	NB
A	<i>Oxyura jamaicensis</i>	Ruddy Duck				S1B,S2S3M	52	14.2 ± 0.0	NB
A	<i>Aythya affinis</i>	Lesser Scaup				S1B,S4M	203	13.9 ± 0.0	NB
A	<i>Eremophila alpestris</i>	Horned Lark				S1B,S4N,S5M	38	20.3 ± 5.0	NB
A	<i>Sterna paradisaea</i>	Arctic Tern				S1B,SUM	62	19.9 ± 0.0	NB
A	<i>Chroicocephalus ridibundus</i>	Black-headed Gull				S1N,S2M	35	16.2 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	<i>Branta bernicla</i>	Brant				S1N,S2S3M	145	22.3 ± 0.0	NB
A	<i>Calidris alba</i>	Sanderling				S1N,S3S4M	451	10.4 ± 16.0	NB
A	<i>Butorides virescens</i>	Green Heron				S1S2B	28	13.6 ± 0.0	NB
A	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron				S1S2B	36	13.8 ± 0.0	NB
A	<i>Empidonax traillii</i>	Willow Flycatcher				S1S2B	143	10.4 ± 5.0	NB
A	<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow				S1S2B	19	27.9 ± 7.0	NB
A	<i>Troglodytes aedon</i>	House Wren				S1S2B	25	18.3 ± 7.0	NB
A	<i>Calidris bairdii</i>	Baird's Sandpiper				S1S2M	75	14.2 ± 0.0	NB
A	<i>Melanitta americana</i>	American Scoter				S1S2N,S3M	329	10.2 ± 4.0	NB
A	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow				S2B	581	9.1 ± 7.0	NB
A	<i>Cistothorus palustris</i>	Marsh Wren				S2B	407	7.6 ± 0.0	NB
A	<i>Mimus polyglottos</i>	Northern Mockingbird				S2B	132	9.3 ± 7.0	NB
A	<i>Pooecetes gramineus</i>	Vesper Sparrow				S2B	98	9.3 ± 7.0	NB
A	<i>Mareca strepera</i>	Gadwall				S2B,S3M	165	7.6 ± 0.0	NB
A	<i>Tringa solitaria</i>	Solitary Sandpiper				S2B,S4S5M	165	7.2 ± 0.0	NB
A	<i>Pinicola enucleator</i>	Pine Grosbeak				S2B,S4S5N,S4S5M	52	13.3 ± 0.0	NB
A	<i>Phalacrocorax carbo</i>	Great Cormorant				S2N	157	19.6 ± 1.0	NB
A	<i>Somateria spectabilis</i>	King Eider				S2N	18	24.3 ± 0.0	NB
A	<i>Larus hyperboreus</i>	Glaucous Gull				S2N	143	16.3 ± 0.0	NB
A	<i>Melanitta perspicillata</i>	Surf Scoter				S2N,S4M	88	23.6 ± 8.0	NB
A	<i>Melanitta deglandi</i>	White-winged Scoter				S2N,S4M	39	55.4 ± 17.0	NB
A	<i>Asio otus</i>	Long-eared Owl				S2S3	18	23.4 ± 7.0	NB
A	<i>Picoides dorsalis</i>	American Three-toed Woodpecker				S2S3	8	65.6 ± 0.0	NB
A	<i>Toxostoma rufum</i>	Brown Thrasher				S2S3B	79	23.4 ± 7.0	NB
A	<i>Icterus galbula</i>	Baltimore Oriole				S2S3B	233	14.4 ± 7.0	NB
A	<i>Somateria mollissima</i>	Common Eider				S2S3B,S2S3N,S4M	1151	5.4 ± 0.0	NB
A	<i>Larus delawarensis</i>	Ring-billed Gull				S2S3B,S4N,S5M	337	14.5 ± 0.0	NB
A	<i>Pluvialis dominica</i>	American Golden-Plover				S2S3M	199	15.1 ± 0.0	NB
A	<i>Calcarius lapponicus</i>	Lapland Longspur				S2S3N,SUM	29	14.9 ± 1.0	NB
A	<i>Larus marinus</i>	Great Black-backed Gull				S3	548	7.6 ± 0.0	NB
A	<i>Picoides arcticus</i>	Black-backed Woodpecker				S3	59	31.4 ± 7.0	NB
A	<i>Loxia curvirostra</i>	Red Crossbill				S3	179	6.3 ± 0.0	NB
A	<i>Spinus pinus</i>	Pine Siskin				S3	449	4.7 ± 7.0	NB
A	<i>Prosopium cylindraceum</i>	Round Whitefish				S3	1	78.4 ± 0.0	NB
A	<i>Salvelinus namaycush</i>	Lake Trout				S3	4	37.5 ± 0.0	NB
A	<i>Sorex maritimensis</i>	Maritime Shrew				S3	1	66.8 ± 0.0	NS
A	<i>Spatula clypeata</i>	Northern Shoveler				S3B	172	13.9 ± 0.0	NB
A	<i>Charadrius vociferus</i>	Killdeer				S3B	833	4.7 ± 7.0	NB
A	<i>Tringa semipalmata</i>	Willet				S3B	141	20.0 ± 8.0	NB
A	<i>Cephus grylle</i>	Black Guillemot				S3B	434	20.3 ± 20.0	NB
A	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo				S3B	187	6.1 ± 7.0	NB
A	<i>Myiarchus crinitus</i>	Great Crested Flycatcher				S3B	355	5.9 ± 0.0	NB
A	<i>Piranga olivacea</i>	Scarlet Tanager				S3B	109	12.3 ± 0.0	NB
A	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak				S3B	924	4.7 ± 7.0	NB
A	<i>Passerina cyanea</i>	Indigo Bunting				S3B	114	13.7 ± 0.0	NB
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B	320	4.7 ± 7.0	NB
A	<i>Setophaga tigrina</i>	Cape May Warbler				S3B,S4S5M	152	4.7 ± 7.0	NB
A	<i>Mergus serrator</i>	Red-breasted Merganser				S3B,S4S5N,S5M	306	15.0 ± 0.0	NB
A	<i>Anas acuta</i>	Northern Pintail				S3B,S5M	64	23.4 ± 7.0	NB
A	<i>Anser caerulescens</i>	Snow Goose				S3M	5	23.3 ± 1.0	NB
A	<i>Numenius phaeopus hudsonicus</i>	Whimbrel				S3M	151	14.5 ± 0.0	NB
A	<i>Arenaria interpres</i>	Ruddy Turnstone				S3M	416	14.2 ± 0.0	NB
A	<i>Calidris pusilla</i>	Semipalmated Sandpiper				S3M	1304	10.4 ± 16.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	<i>Calidris melanotos</i>	Pectoral Sandpiper				S3M	288	15.1 ± 0.0	NB
A	<i>Limnodromus griseus</i>	Short-billed Dowitcher				S3M	599	14.2 ± 0.0	NB
A	<i>Phalaropus fulicarius</i>	Red Phalarope				S3M	65	33.1 ± 0.0	NB
A	<i>Bucephala albeola</i>	Bufflehead				S3N	761	10.4 ± 16.0	NB
A	<i>Calidris maritima</i>	Purple Sandpiper				S3N	216	13.3 ± 0.0	NB
A	<i>Uria lomvia</i>	Thick-billed Murre				S3N,S3M	45	26.5 ± 15.0	NB
A	<i>Perisoreus canadensis</i>	Canada Jay				S3S4	421	4.7 ± 7.0	NB
A	<i>Poecile hudsonicus</i>	Boreal Chickadee				S3S4	339	1.6 ± 0.0	NB
A	<i>Eptesicus fuscus</i>	Big Brown Bat				S3S4	46	16.7 ± 1.0	NB
A	<i>Synaptomys cooperi</i>	Southern Bog Lemming				S3S4	95	25.4 ± 1.0	NB
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B	662	4.7 ± 7.0	NB
A	<i>Vireo gilvus</i>	Warbling Vireo				S3S4B	261	10.4 ± 5.0	NB
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B,S4M	919	4.7 ± 7.0	NB
A	<i>Melospiza lincolni</i>	Lincoln's Sparrow				S3S4B,S4M	378	4.7 ± 7.0	NB
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B,S5M	1033	4.7 ± 7.0	NB
A	<i>Setophaga striata</i>	Blackpoll Warbler				S3S4B,S5M	78	18.5 ± 7.0	NB
A	<i>Pluvialis squatarola</i>	Black-bellied Plover				S3S4M	758	14.2 ± 0.0	NB
A	<i>Morus bassanus</i>	Northern Gannet				SHB	543	13.2 ± 0.0	NB
	<i>Quercus macrocarpa</i> - Acer	Bur Oak - Red Maple /							NB
C	<i>rubrum</i> / <i>Onoclea sensibilis</i> -	Sensitive Fern - Northern				S2	1	69.0 ± 0.0	
	<i>Carex arcta</i> Forest	Clustered Sedge Forest							NB
C	<i>Acer saccharinum</i> / <i>Onoclea</i>	Silver Maple / Sensitive Fern				S3	1	70.7 ± 0.0	
	<i>sensibilis</i> - <i>Lysimachia</i>	- Swamp Yellow Loosestrife							NB
	<i>terrestris</i> Forest	Forest							
C	<i>Acer saccharum</i> - <i>Fraxinus</i>	Sugar Maple - White Ash /				S3S4	1	17.0 ± 0.0	
	<i>americana</i> / <i>Polystichum</i>	Christmas Fern Forest							
	<i>acrostichoides</i> Forest								
I	<i>Bombus bohemicus</i>	Ashton Cuckoo Bumble Bee	Endangered	Endangered		S1	18	14.5 ± 5.0	NB
I	<i>Danaus plexippus</i>	Monarch	Endangered	Special Concern	Special Concern	S2S3?B	405	12.6 ± 0.0	NB
I	<i>Bombus affinis</i>	Rusty-patched Bumble Bee	Endangered	Endangered		SH	1	96.2 ± 5.0	NB
I	<i>Bombus suckleyi</i>	Suckley's Cuckoo Bumble Bee	Threatened			SH	1	12.4 ± 5.0	NB
I	<i>Gomphurus ventricosus</i>	Skillet Clubtail	Special Concern	Endangered	Endangered	S2	96	56.2 ± 0.0	NB
I	<i>Cicindela marginipennis</i>	Cobblestone Tiger Beetle	Special Concern	Endangered	Endangered	S2S3	185	65.1 ± 0.0	NB
I	<i>Ophiogomphus howei</i>	Pygmy Snaketail	Special Concern	Special Concern	Special Concern	S2S3	13	75.2 ± 0.0	NB
I	<i>Alasmidonta varicosa</i>	Brook Floater	Special Concern	Special Concern	Special Concern	S3	3	89.4 ± 1.0	NB
I	<i>Lampsilis cariosa</i>	Yellow Lampmussel	Special Concern	Special Concern	Special Concern	S3	92	30.3 ± 0.0	NB
I	<i>Bombus terricola</i>	Yellow-banded Bumble Bee	Special Concern	Special Concern		S4	183	18.4 ± 5.0	NB
I	<i>Coccinella transversoguttata</i>	Transverse Lady Beetle	Special Concern			SH	17	16.1 ± 1.0	NB
I	<i>richardsoni</i>								
I	<i>Appalachina sayana sayana</i>	Spike-lip Crater Snail	Not At Risk			S3?	2	13.9 ± 1.0	NB
I	<i>Conotrachelus juglandis</i>	Butternut Curculio				S1	3	91.8 ± 0.0	NB
I	<i>Haematopota rara</i>	Shy Cleg				S1	1	95.7 ± 1.0	NB
I	<i>Tharsalea dorcas</i>	Dorcas Copper				S1	1	94.1 ± 0.0	NB
I	<i>Erora laeta</i>	Early Hairstreak				S1	3	73.0 ± 2.0	NS
I	<i>Polites origenes</i>	Crossline Skipper				S1?	6	50.1 ± 0.0	NB
I	<i>Icaricia saepiolus</i>	Greenish Blue				S1S2	6	72.9 ± 0.0	NB
I	<i>Pachydiplax longipennis</i>	Blue Dasher				S1S2	3	58.9 ± 0.0	NB
I	<i>Encyclops caeruleus</i>	Cerulean Long-horned Beetle				S2	1	96.6 ± 0.0	NB
I	<i>Scaphinotus viduus</i>	Bereft Snail-eating Beetle				S2	2	37.8 ± 0.0	NB
I	<i>Brachyleptura circumdata</i>	Dark-shouldered Long- horned Bee le				S2	6	73.7 ± 0.0	NB
I	<i>Satyrium calanus</i>	Banded Hairstreak				S2	26	36.1 ± 0.0	NB
I	<i>Satyrium calanus falacer</i>	Falacer Hairstreak				S2	1	93.4 ± 1.0	NB
I	<i>Strymon melinus</i>	Gray Hairstreak				S2	10	39.3 ± 0.0	NB
I	<i>Ophiogomphus colubrinus</i>	Boreal Snaketail				S2S3	35	51.8 ± 1.0	NB
I	<i>Sphaeroderus nitidicollis</i>	Polished Snail-eating Beetle				S3	1	73.7 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
	<i>Lepturosis biforis</i>	Two-spotted Long-horned Beetle				S3	1	16.1 ± 1.0	NB
	<i>Orthosoma brunneum</i>	Moist Long-horned Beetle				S3	3	68.5 ± 0.0	NS
	<i>Elaphrus americanus</i>	Boreal Elaphrus Beetle				S3	2	80.1 ± 0.0	NB
	<i>Semanotus terminatus</i>	Light Long-horned Bee le				S3	1	90.2 ± 0.0	NB
	<i>Desmocerus palliatus</i>	Elderberry Borer				S3	9	5.1 ± 0.0	NB
	<i>Agonum excavatum</i>	Excavated Harp Ground Beetle				S3	1	80.1 ± 0.0	NB
	<i>Clivina americana</i>	America Pedunculate Ground Beetle				S3	1	80.1 ± 0.0	NB
	<i>Harpalus fulvilabris</i>	Fulvia Harpaline Beetle				S3	1	96.4 ± 0.0	NB
	<i>Olisthopus parmatus</i>	Tawny-bordered Harp Ground Beetle				S3	1	73.7 ± 0.0	NB
	<i>Tachys scitulus</i>	Handsome Riverbank Ground Beetle				S3	1	80.1 ± 0.0	NB
	<i>Carabus serratus</i>	Serrated Ground Beetle				S3	1	84.0 ± 0.0	NB
	<i>Coccinella hieroglyphica kirbyi</i>	a Ladybird Beetle				S3	1	16.1 ± 1.0	NB
	<i>Hippodamia parenthesis</i>	Parenthesis Lady Beetle				S3	7	16.1 ± 1.0	NB
	<i>Stenocorus vittiger</i>	Shrub Long-horned Beetle				S3	1	80.1 ± 0.0	NB
	<i>Gnathacmaeops pratensis</i>	Meadow Flower Longhorn Beetle				S3	5	16.1 ± 1.0	NB
	<i>Pogonocherus mixtus</i>	Mixed-spotted Flatface Sawyer				S3	1	16.1 ± 1.0	NB
	<i>Badister neopulchellus</i>	Red-black Spotted Beetle				S3	1	80.1 ± 0.0	NB
	<i>Calathus gregarius</i>	Gregarious Harp Ground Beetle				S3	1	71.6 ± 1.0	NB
	<i>Gonotropis dorsalis</i>	Birch Fungus Weevil				S3	1	90.1 ± 0.0	NB
	<i>Naemia seriata</i>	Seaside Lady Beetle				S3	9	34.5 ± 0.0	NB
	<i>Beckerus appressus</i>	Compressed Click Bee le				S3	1	67.6 ± 0.0	NB
	<i>Saperda lateralis</i>	Red-edged Long-horned Beetle				S3	2	32.4 ± 0.0	NB
	<i>Trachysida aspera</i>	Rough Flower Longhorn Beetle				S3	1	90.3 ± 0.0	NB
	<i>Epargyreus clarus</i>	Silver-spotted Skipper				S3	9	27.1 ± 0.0	NB
	<i>Hesperia sassacus</i>	Indian Skipper				S3	14	50.1 ± 1.0	NB
	<i>Euphyes bimacula</i>	Two-spotted Skipper				S3	12	36.6 ± 0.0	NB
	<i>Satyrnum acadica</i>	Acadian Hairstreak				S3	13	16.1 ± 5.0	NB
	<i>Plebejus idas</i>	Northern Blue				S3	8	54.2 ± 0.0	NB
	<i>Plebejus idas empetri</i>	Crowberry Blue				S3	37	27.7 ± 2.0	NB
	<i>Argynnis aphrodite</i>	Aphrodite Fritillary				S3	32	16.1 ± 5.0	NB
	<i>Boloria bellona</i>	Meadow Fritillary				S3	51	43.6 ± 0.0	NB
	<i>Nymphalis l-album</i>	Compton Tortoiseshell				S3	32	16.1 ± 5.0	NB
	<i>Gomphurus vastus</i>	Cobra Clubtail				S3	122	35.0 ± 0.0	NB
	<i>Celithemis martha</i>	Martha's Pennant				S3	9	27.2 ± 0.0	NB
	<i>Ladona exusta</i>	White Corporal				S3	8	61.5 ± 0.0	NB
	<i>Enallagma pictum</i>	Scarlet Bluet				S3	3	27.2 ± 0.0	NB
	<i>Ischnura kellycotti</i>	Lilypad Forktail				S3	8	44.3 ± 0.0	NB
	<i>Arigomphus furcifer</i>	Lilypad Clubtail				S3	22	61.5 ± 0.0	NB
	<i>Alasmidonta undulata</i>	Triangle Floater				S3	46	15.5 ± 0.0	NB
	<i>Atlanticoncha ochracea</i>	Tidewater Mucket				S3	146	24.8 ± 0.0	NB
	<i>Striatura ferrea</i>	Black Striate Snail				S3	1	94.9 ± 1.0	NB
	<i>Neohelix albolabris</i>	Whitlip Snail				S3	2	47.9 ± 0.0	NB
	<i>Spurwinkia salsa</i>	Saltmarsh Hydrobe				S3	34	14.8 ± 0.0	NB
	<i>Pantala hymenaea</i>	Spot-Winged Glider				S3B	8	28.4 ± 1.0	NB
	<i>Bombus griseocollis</i>	Brown-belted Bumble Bee				S3S4	2	48.1 ± 5.0	NB
	<i>Lanthus vernalis</i>	Southern Pygmy Clubtail				S3S4	1	80.4 ± 0.0	NB
	<i>Somatochlora forcipata</i>	Forcipate Emerald				S3S4	18	67.7 ± 0.0	NB

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I	<i>Somatoclora tenebrosa</i>	Clamp-Tipped Emerald				S3S4	10	70.6 ± 0.0	NB
N	<i>Erioderma mollissimum</i>	Graceful Felt Lichen	Endangered	Endangered	Endangered	SH	2	67.2 ± 1.0	NB
N	<i>Erioderma pedicellatum</i> (Atlantic pop.)	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered	SH	3	73.3 ± 0.0	NS
N	<i>Pannaria lurida</i>	Wrinkled Shingle Lichen	Threatened	Threatened		S1?	18	62.2 ± 0.0	NS
N	<i>Anzia colpodes</i>	Black-foam Lichen	Threatened	Threatened		S1S2	18	55.2 ± 0.0	NB
N	<i>Fuscopannaria leucosticta</i>	White-rimmed Shingle Lichen	Threatened			S2	9	14.2 ± 0.0	NB
N	<i>Peltigera hydrothyria</i>	Eastern Waterfan	Threatened	Threatened		S2S3	726	62.7 ± 0.0	NB
N	<i>Pectenota plumbea</i>	Blue Felt Lichen	Special Concern	Special Concern	Special Concern	S1	419	13.1 ± 0.0	NB
N	<i>Pseudevernia cladonia</i>	Ghost Antler Lichen	Not At Risk			S2S3	30	7.5 ± 0.0	NB
N	<i>Imbriobryum muehlenbeckii</i>	Muehlenbeck's Bryum Moss				S1	1	25.4 ± 1.0	NB
N	<i>Dicranoweisia crispula</i>	Mountain Thatch Moss				S1	1	75.5 ± 0.0	NB
N	<i>Didymodon rigidulus</i> var. <i>gracilis</i>	a moss				S1	1	70.2 ± 1.0	NB
N	<i>Sphagnum macrophyllum</i>	Sphagnum				S1	5	31.9 ± 0.0	NB
N	<i>Coscinodon cribrosus</i>	Sieve-Toothed Moss				S1	1	19.1 ± 0.0	NB
N	<i>Syntrichia ruralis</i>	a Moss				S1	1	54.6 ± 0.0	NB
N	<i>Sticta fuliginosa</i>	Peppered Moon Lichen				S1	13	65.7 ± 0.0	NS
N	<i>Cladonia straminea</i>	Reptilian Pixie-cup Lichen				S1	5	64.8 ± 1.0	NB
N	<i>Coccocarpia palmicola</i>	Salted Shell Lichen				S1	10	77.1 ± 0.0	NS
N	<i>Peltigera collina</i>	Tree Pelt Lichen				S1	3	85.7 ± 0.0	NS
N	<i>Peltigera malacea</i>	Veinless Pelt Lichen				S1	2	67.1 ± 1.0	NB
N	<i>Bryoria bicolor</i>	Electrified Horsehair Lichen				S1	1	67.1 ± 1.0	NB
N	<i>Hygrobiella laxifolia</i>	Lax Notchwort				S1?	1	64.9 ± 1.0	NB
N	<i>Atrichum angustatum</i>	Lesser Smoo hcap Moss				S1?	1	88.8 ± 3.0	NS
N	<i>Bartramia ithyphylla</i>	Straight-leaved Apple Moss				S1?	2	64.9 ± 0.0	NB
N	<i>Ptychostomum pallens</i>	Pale Bryum				S1?	1	91.9 ± 0.0	NS
N	<i>Pseudocalliergon trifarium</i>	Three-ranked Spear Moss				S1?	1	29.0 ± 0.0	NB
N	<i>Dichelyma falcatum</i>	a Moss				S1?	2	40.3 ± 1.0	NB
N	<i>Dicranum bonjeanii</i>	Bonjean's Broom Moss				S1?	1	95.4 ± 1.0	NB
N	<i>Dicranum condensatum</i>	Condensed Broom Moss				S1?	2	75.4 ± 0.0	NB
N	<i>Entodon brevisetus</i>	a Moss				S1?	1	86.0 ± 10.0	NB
N	<i>Oxyrrhynchium hians</i>	Light Beaked Moss				S1?	4	50.7 ± 0.0	NB
N	<i>Homomallium adnatum</i>	Adnate Hairy-gray Moss				S1?	3	86.0 ± 10.0	NB
N	<i>Plagiothecium latebricola</i>	Alder Silk Moss				S1?	2	23.5 ± 0.0	NB
N	<i>Niphotrichum ericoides</i>	Dense Rock Moss				S1?	1	100.0 ± 3.0	NB
N	<i>Rhytidium rugosum</i>	Wrinkle-leaved Moss				S1?	2	51.6 ± 0.0	NB
N	<i>Splachnum pensylvanicum</i>	Southern Dung Moss				S1?	1	89.5 ± 1.0	NB
N	<i>Platylomella lescurii</i>	a Moss				S1?	1	97.2 ± 1.0	NB
N	<i>Enchylium tenax</i>	Soil Tarpaper Lichen				S1?	1	66.1 ± 0.0	NS
N	<i>Ephebe hispidula</i>	Dryside Rockshag Lichen				S1?	1	65.9 ± 0.0	NS
N	<i>Ephebe perspinulosa</i>	Thread Lichen				S1?	1	68.2 ± 0.0	NS
N	<i>Euopsis granatina</i>	Lesser Rockbud Lichen				S1?	1	62.8 ± 1.0	NS
N	<i>Heterodermia squamulosa</i>	Scaly Fringe Lichen				S1?	14	36.0 ± 0.0	NB
N	<i>Pertusaria propinqua</i>	a Lichen				S1?	2	67.1 ± 1.0	NB
N	<i>Pilophorus fibula</i>	New England Matchstick Lichen				S1?	1	63.0 ± 0.0	NB
N	<i>Rhizocarpon umbilicatum</i>	a Lichen				S1?	2	63.6 ± 1.0	NB
N	<i>Spilonema revertens</i>	Rock Hairball Lichen				S1?	4	64.4 ± 0.0	NS
N	<i>Peltigera venosa</i>	Fan Pelt Lichen				S1?	2	16.1 ± 0.0	NB
N	<i>Cladonia oricola</i>	Cladonia Lichen				S1?	2	39.6 ± 0.0	NB
N	<i>Odontoschisma francisci</i>	Holt's Notchwort				S1S2	4	70.2 ± 1.0	NB
N	<i>Harpanthus flotovianus</i>	Great Mountain Flapwort				S1S2	2	67.7 ± 1.0	NB
N	<i>Pallavicinia lyellii</i>	Lyell's Ribbonwort				S1S2	4	10.7 ± 1.0	NB
N	<i>Radula tenax</i>	Tenacious Scalewort				S1S2	1	75.4 ± 0.0	NB
N	<i>Reboulia hemisphaerica</i>	Purple-margined Liverwort				S1S2	1	70.1 ± 0.0	NB
N	<i>Solenostoma obovatum</i>	Egg Flapwort				S1S2	2	17.6 ± 0.0	NB

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N	<i>Brachythecium acuminatum</i>	Acuminate Ragged Moss			S1S2		7	58.8 ± 100.0	NB
N	<i>Ptychostomum salinum</i>	Saltmarsh Bryum			S1S2		2	56.8 ± 1.0	NB
N	<i>Pseudocampyllum radicale</i>	Long-stalked Fine Wet Moss			S1S2		2	96.7 ± 1.0	NB
N	<i>Tortula obtusifolia</i>	a Moss			S1S2		1	25.9 ± 0.0	NB
N	<i>Distichium inclinatum</i>	Inclined Iris Moss			S1S2		5	70.0 ± 0.0	NB
N	<i>Ditrichum pallidum</i>	Pale Cow-hair Moss			S1S2		2	58.1 ± 3.0	NS
N	<i>Drummondia prorepens</i>	a Moss			S1S2		1	77.9 ± 0.0	NS
N	<i>Sphagnum platyphyllum</i>	Flat-leaved Peat Moss			S1S2		1	69.1 ± 0.0	NS
N	<i>Timmia norvegica</i>	a moss			S1S2		3	39.9 ± 0.0	NB
N	<i>Timmia norvegica</i> var. <i>excurrens</i>	a moss			S1S2		1	70.0 ± 0.0	NB
N	<i>Tomentypnum falcifolium</i>	Sickle-leaved Golden Moss			S1S2		1	47.6 ± 1.0	NB
N	<i>Tortella humilis</i>	Small Crisp Moss			S1S2		7	66.2 ± 0.0	NB
N	<i>Pseudotaxiphyllum distichaceum</i>	a Moss			S1S2		3	56.8 ± 1.0	NB
N	<i>Hamatocaulis vernicosus</i>	a Moss			S1S2		3	6.7 ± 100.0	NB
N	<i>Haplocladium microphyllum</i>	Tiny-leaved Haplocladium Moss			S1S2		1	58.1 ± 3.0	NS
N	<i>Umbilicaria vellea</i>	Grizzled Rocktripe Lichen			S1S2		1	70.3 ± 1.0	NB
N	<i>Pilophorus cereolus</i>	Powdered Matchstick Lichen			S1S2		3	63.0 ± 0.0	NB
N	<i>Peltigera scabrosa</i>	Greater Toad Pelt Lichen			S1S2		4	77.1 ± 1.0	NB
N	<i>Calypogeia neesiana</i>	Nees' Pouchwort			S1S3		1	16.4 ± 1.0	NB
N	<i>Fuscocephaloziopsis connivens</i>	Forcipated Pincerwort			S1S3		1	13.7 ± 0.0	NB
N	<i>Cephaloziella elachista</i>	Spurred Threadwort			S1S3		1	29.0 ± 5.0	NB
N	<i>Porella pinnata</i>	Pinnate Scalewort			S1S3		1	23.6 ± 1.0	NB
N	<i>Tritomania scitula</i>	Mountain Notchwort			S1S3		1	78.1 ± 1.0	NB
N	<i>Amphidium mougeotii</i>	a Moss			S2		13	18.1 ± 1.0	NB
N	<i>Anomodon viticulosus</i>	a Moss			S2		8	14.9 ± 1.0	NB
N	<i>Cirriphyllum piliferum</i>	Hair-pointed Moss			S2		4	52.8 ± 0.0	NB
N	<i>Dicranella palustris</i>	Drooping-Leaved Fork Moss			S2		10	40.0 ± 100.0	NB
N	<i>Didymodon ferrugineus</i>	Rusty Beard Moss			S2		2	14.6 ± 1.0	NB
N	<i>Ditrichum flexicaule</i>	Flexible Cow-hair Moss			S2		1	18.1 ± 1.0	NB
N	<i>Anomodon tristis</i>	a Moss			S2		4	71.8 ± 10.0	NB
N	<i>Hygrohypnum bestii</i>	Best's Brook Moss			S2		6	59.0 ± 0.0	NB
N	<i>Hypnum pratense</i>	Meadow Plait Moss			S2		2	25.6 ± 0.0	NB
N	<i>Isoetecium myosuroides</i>	Slender Mouse-tail Moss			S2		6	18.1 ± 1.0	NB
N	<i>Meesia triquetra</i>	Three-ranked Cold Moss			S2		2	58.8 ± 100.0	NB
N	<i>Physcomitrium immersum</i>	a Moss			S2		6	23.6 ± 1.0	NB
N	<i>Platydictya jungermannioides</i>	False Willow Moss			S2		4	58.6 ± 0.0	NB
N	<i>Pohlia elongata</i>	Long-necked Nodding Moss			S2		10	66.2 ± 0.0	NB
N	<i>Seligeria calcarea</i>	Chalk Brittle Moss			S2		3	18.1 ± 1.0	NB
N	<i>Seligeria recurvata</i>	a Moss			S2		2	96.6 ± 1.0	NB
N	<i>Sphagnum lindbergii</i>	Lindberg's Peat Moss			S2		8	9.3 ± 0.0	NB
N	<i>Sphagnum flexuosum</i>	Flexuous Peatmoss			S2		2	73.7 ± 0.0	NB
N	<i>Tayloria serrata</i>	Serrate Trumpet Moss			S2		8	14.0 ± 1.0	NB
N	<i>Tetradontium brownianum</i>	Little Georgia			S2		7	69.6 ± 1.0	NB
N	<i>Tetraplodon mnioides</i>	Entire-leaved Nitrogen Moss			S2		3	50.8 ± 0.0	NB
N	<i>Thamnobryum alleghaniense</i>	a Moss			S2		21	39.8 ± 0.0	NB
N	<i>Tortula mucronifolia</i>	Mucronate Screw Moss			S2		1	19.5 ± 0.0	NB
N	<i>Ulota phyllantha</i>	a Moss			S2		7	56.8 ± 1.0	NB
N	<i>Anomobryum julaceum</i>	Slender Silver Moss			S2		5	32.7 ± 0.0	NB
N	<i>Usnea ceratina</i>	Warty Beard Lichen			S2		2	76.6 ± 0.0	NS
N	<i>Cladonia macrophylla</i>	Fig-leaved Lichen			S2		3	73.8 ± 1.0	NB
N	<i>Leptogium corticola</i>	Blistered Jellyskin Lichen			S2		35	78.6 ± 0.0	NS
N	<i>Leptogium milligranum</i>	Stretched Jellyskin Lichen			S2		5	55.7 ± 0.0	NB
N	<i>Nephroma laevigatum</i>	Mustard Kidney Lichen			S2		18	64.8 ± 0.0	NS

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N	<i>Peltigera lepidophora</i>	Scaly Pelt Lichen				S2	4	16.1 ± 0.0	NB
N	<i>Andreaea rothii</i>	Dusky Rock Moss				S2?	6	4.8 ± 0.0	NB
N	<i>Anomodon minor</i>	Blunt-leaved Anomodon Moss				S2?	1	89.2 ± 1.0	NB
N	<i>Ptychostomum pallescens</i>	Tall Clustered Bryum				S2?	2	19.2 ± 1.0	NB
N	<i>Dichelyma capillaceum</i>	Hairlike Dichelyma Moss				S2?	1	86.5 ± 3.0	NB
N	<i>Dicranum spurium</i>	Spurred Broom Moss				S2?	8	42.3 ± 0.0	NB
N	<i>Hygrohypnum montanum</i>	a Moss				S2?	2	47.9 ± 1.0	NB
N	<i>Schistostega pennata</i>	Luminous Moss				S2?	3	40.0 ± 100.0	NB
N	<i>Seligeria diversifolia</i>	a Moss				S2?	2	32.7 ± 0.0	NB
N	<i>Sphagnum angermanicum</i>	a Peatmoss				S2?	3	45.2 ± 10.0	NB
N	<i>Trichodon cylindricus</i>	Cylindric Hairy-tee h Moss				S2?	2	86.3 ± 3.0	NS
N	<i>Plagiomnium rostratum</i>	Long-beaked Leafy Moss				S2?	7	39.7 ± 0.0	NB
N	<i>Ramalina labiosorediata</i>	Chalky Ramalina Lichen				S2?	1	73.4 ± 1.0	NB
N	<i>Collema leptaleum</i>	Crumpled Bat's Wing Lichen				S2?	4	55.6 ± 0.0	NB
N	<i>Imshaugia placodioides</i>	Eyed Starburst Lichen				S2?	1	84.9 ± 0.0	NS
N	<i>Nephroma arcticum</i>	Arctic Kidney Lichen				S2?	1	68.0 ± 1.0	NB
N	<i>Ptychostomum cernuum</i>	Swamp Bryum				S2S3	3	4.0 ± 4.0	NB
N	<i>Buxbaumia aphylla</i>	Brown Shield Moss				S2S3	4	98.8 ± 3.0	NS
N	<i>Calliergonella cuspidata</i>	Common Large Wetland Moss				S2S3	17	13.2 ± 0.0	NB
N	<i>Drepanocladus polygamus</i>	Polygamous Hook Moss				S2S3	1	68.8 ± 0.0	NB
N	<i>Palustriella falcata</i>	Curled Hook Moss				S2S3	3	18.1 ± 1.0	NB
N	<i>Didymodon rigidulus</i>	Rigid Screw Moss				S2S3	10	22.0 ± 0.0	NB
N	<i>Ephemerum serratum</i>	a Moss				S2S3	4	54.2 ± 0.0	NB
N	<i>Fissidens bushii</i>	Bush's Pocket Moss				S2S3	7	22.0 ± 0.0	NB
N	<i>Hypnum cupressiforme</i> var. <i>filiforme</i>	a Moss				S2S3	1	68.4 ± 0.0	NS
N	<i>Isopterygiopsis pulchella</i>	Neat Silk Moss				S2S3	8	69.3 ± 0.0	NB
N	<i>Neckera complanata</i>	a Moss				S2S3	8	18.1 ± 1.0	NB
N	<i>Orthotrichum elegans</i>	Showy Bristle Moss				S2S3	2	84.3 ± 0.0	NB
N	<i>Pohlia prolifera</i>	Cottony Nodding Moss				S2S3	4	69.7 ± 1.0	NB
N	<i>Codriophorus fascicularis</i>	Clustered Rock Moss				S2S3	4	65.1 ± 0.0	NB
N	<i>Bucklandiella affinis</i>	Lesser Rock Moss				S2S3	12	65.1 ± 0.0	NB
N	<i>Saelenium glaucescens</i>	Blue Dew Moss				S2S3	2	75.5 ± 0.0	NB
N	<i>Scorpidium scorpioides</i>	Hooked Scorpion Moss				S2S3	4	13.2 ± 0.0	NB
N	<i>Seligeria campylopora</i>	a Moss				S2S3	1	6.7 ± 100.0	NB
N	<i>Sphagnum centrale</i>	Central Peat Moss				S2S3	7	66.2 ± 0.0	NB
N	<i>Sphagnum subfulvum</i>	a Peatmoss				S2S3	4	47.6 ± 1.0	NB
N	<i>Taxiphillum deplanatum</i>	Imbricate Yew-leaved Moss				S2S3	3	56.8 ± 1.0	NB
N	<i>Zygodon viridissimus</i>	a Moss				S2S3	6	70.8 ± 0.0	NS
N	<i>Schistidium agassizii</i>	Elf Bloom Moss				S2S3	6	65.2 ± 0.0	NB
N	<i>Loeskeobryum brevirostre</i>	a Moss				S2S3	18	18.1 ± 1.0	NB
N	<i>Cyrtomnium hymenophylloides</i>	Short-pointed Lantern Moss				S2S3	7	51.7 ± 0.0	NB
N	<i>Sphaerophorus globosus</i>	Northern Coral Lichen				S2S3	22	16.1 ± 0.0	NB
N	<i>Cladonia acuminata</i>	Scantly Clad Pixie Lichen				S2S3	2	67.2 ± 1.0	NB
N	<i>Cladonia ramulosa</i>	Bran Lichen				S2S3	4	71.7 ± 1.0	NB
N	<i>Cladonia sulphurina</i>	Greater Sulphur-cup Lichen				S2S3	5	68.5 ± 0.0	NB
N	<i>Parmellopsis ambigua</i>	Green Starburst Lichen				S2S3	1	64.8 ± 1.0	NB
N	<i>Polychidium muscicola</i>	Eyed Mossthorns Woollybear Lichen				S2S3	11	34.4 ± 0.0	NB
N	<i>Cynodontium tenellum</i>	Delicate Dogtooth Moss				S3	1	56.8 ± 1.0	NB
N	<i>Hypnum curvifolium</i>	Curved-leaved Plait Moss				S3	17	62.6 ± 3.0	NS
N	<i>Tortella fragilis</i>	Fragile Twisted Moss				S3	1	70.0 ± 0.0	NB
N	<i>Schistidium maritimum</i>	a Moss				S3	10	56.8 ± 1.0	NB
N	<i>Hymenostylium recurvirostrum</i>	Curve-beak Beardless Moss				S3	10	62.9 ± 0.0	NS

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
N	<i>Collema nigrescens</i>	Blistered Tarpaper Lichen				S3	2	73.6 ± 3.0	NS
N	<i>Solorina saccata</i>	Woodland Owl Lichen				S3	8	50.3 ± 0.0	NB
N	<i>Ahtiana aurescens</i>	Eastern Candlewax Lichen				S3	3	90.0 ± 0.0	NS
N	<i>Normandina pulchella</i>	Rimmed Elf-ear Lichen				S3	25	65.9 ± 1.0	NB
N	<i>Cladonia farinacea</i>	Farinose Pixie Lichen				S3	5	73.4 ± 1.0	NB
N	<i>Cladonia strepsilis</i>	Olive Cladonia Lichen				S3	7	25.7 ± 0.0	NB
N	<i>Hypotrachyna catawbiensis</i>	Powder-tipped Antler Lichen				S3	30	69.4 ± 0.0	NB
N	<i>Scytinium lichenoides</i>	Tattered Jellyskin Lichen				S3	16	15.5 ± 0.0	NB
N	<i>Nephroma bellum</i>	Naked Kidney Lichen				S3	3	67.6 ± 1.0	NB
N	<i>Peltigera degenii</i>	Lustrous Pelt Lichen				S3	13	67.8 ± 1.0	NB
N	<i>Leptogium laceroides</i>	Short-bearded Jellyskin Lichen				S3	10	71.8 ± 2.0	NS
N	<i>Peltigera membranacea</i>	Membranous Pelt Lichen				S3	49	15.9 ± 0.0	NB
N	<i>Cladonia carneola</i>	Crowned Pixie-cup Lichen				S3	2	73.8 ± 1.0	NB
N	<i>Cladonia deformis</i>	Lesser Sulphur-cup Lichen				S3	9	64.8 ± 1.0	NB
N	<i>Aulacomnium androgynum</i>	Little Groove Moss				S3?	14	18.1 ± 1.0	NB
N	<i>Ptychostomum inclinatum</i>	Blunt-tooth Thread Moss				S3?	2	58.1 ± 3.0	NS
N	<i>Dicranella rufescens</i>	Red Forklet Moss				S3?	3	70.0 ± 0.0	NB
N	<i>Rhytidiadelphus loreus</i>	Lanky Moss				S3?	4	63.1 ± 0.0	NS
N	<i>Sphagnum lescurii</i>	a Peatmoss				S3?	9	13.4 ± 0.0	NB
N	<i>Sphagnum inundatum</i>	a Sphagnum				S3?	2	31.4 ± 0.0	NB
N	<i>Rostania occultata</i>	Crusted Tarpaper Lichen				S3?	5	70.0 ± 0.0	NS
N	<i>Cystocoleus ebeneus</i>	Rockgossamer Lichen				S3?	1	62.8 ± 0.0	NS
N	<i>Scytinium subtile</i>	Appressed Jellyskin Lichen				S3?	8	42.7 ± 0.0	NB
N	<i>Peltigera neckeri</i>	Black-saddle Pelt Lichen				S3?	1	66.8 ± 5.0	NB
N	<i>Stereocaulon subcoralloides</i>	Coralloid Foam Lichen				S3?	1	73.4 ± 1.0	NB
N	<i>Anomodon rugelii</i>	Rugel's Anomodon Moss				S3S4	5	68.3 ± 0.0	NS
N	<i>Barbula convoluta</i>	Lesser Bird's-claw Beard Moss				S3S4	1	66.6 ± 0.0	NS
N	<i>Brachytheciastrum velutinum</i>	Velvet Ragged Moss				S3S4	9	67.4 ± 1.0	NB
N	<i>Calliergon giganteum</i>	Giant Spear Moss				S3S4	2	68.8 ± 0.0	NS
N	<i>Dicranella cerviculata</i>	a Moss				S3S4	6	56.8 ± 1.0	NB
N	<i>Dicranella varia</i>	a Moss				S3S4	1	86.3 ± 3.0	NS
N	<i>Dicranum majus</i>	Greater Broom Moss				S3S4	25	50.8 ± 0.0	NB
N	<i>Dicranum leioneuron</i>	a Dicranum Moss				S3S4	1	70.6 ± 0.0	NB
N	<i>Encalypta ciliata</i>	Fringed Extinguisher Moss				S3S4	1	70.3 ± 0.0	NB
N	<i>Fissidens bryoides</i>	Lesser Pocket Moss				S3S4	4	16.4 ± 5.0	NB
N	<i>Elodium blandowii</i>	Blandow's Bog Moss				S3S4	2	20.2 ± 0.0	NB
N	<i>Heterocladium dimorphum</i>	Dimorphous Tangle Moss				S3S4	6	74.3 ± 0.0	NB
N	<i>Isopterygiopsis muelleriana</i>	a Moss				S3S4	23	18.1 ± 1.0	NB
N	<i>Myurella julacea</i>	Small Mouse-tail Moss				S3S4	4	18.1 ± 1.0	NB
N	<i>Orthotrichum speciosum</i>	Showy Bristle Moss				S3S4	3	69.9 ± 0.0	NS
N	<i>Physcomitrium pyriforme</i>	Pear-shaped Urn Moss				S3S4	10	52.5 ± 0.0	NB
N	<i>Pogonatum dentatum</i>	Mountain Hair Moss				S3S4	5	56.8 ± 1.0	NB
N	<i>Sphagnum compactum</i>	Compact Peat Moss				S3S4	1	86.7 ± 0.0	NS
N	<i>Sphagnum torreyanum</i>	a Peatmoss				S3S4	7	32.3 ± 0.0	NB
N	<i>Sphagnum austinii</i>	Austin's Peat Moss				S3S4	2	32.7 ± 1.0	NB
N	<i>Sphagnum contortum</i>	Twisted Peat Moss				S3S4	2	13.5 ± 0.0	NB
N	<i>Sphagnum quinquefarium</i>	Five-ranked Peat Moss				S3S4	5	18.1 ± 1.0	NB
N	<i>Splachnum rubrum</i>	Red Collar Moss				S3S4	1	10.2 ± 1.0	NB
N	<i>Tetraphis geniculata</i>	Geniculate Four-tooth Moss				S3S4	14	28.2 ± 0.0	NB
N	<i>Tetraplodon angustatus</i>	Toothed-leaved Nitrogen Moss				S3S4	4	4.5 ± 0.0	NB
N	<i>Weissia controversa</i>	Green-Cushioned Weissia				S3S4	5	17.8 ± 1.0	NB
N	<i>Abietinella abietina</i>	Wiry Fern Moss				S3S4	2	70.0 ± 0.0	NB
N	<i>Trichostomum tenuirostre</i>	Acid-Soil Moss				S3S4	9	22.0 ± 0.0	NB
N	<i>Pannaria rubiginosa</i>	Brown-eyed Shingle Lichen				S3S4	28	42.7 ± 0.0	NB
N	<i>Pseudocyphellaria holarctica</i>	Yellow Specklebelly Lichen				S3S4	85	33.4 ± 0.0	NB

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N	<i>Ramalina thrausta</i>	Angelhair Ramalina Lichen				S3S4	12	63.6 ± 1.0	NB
N	<i>Xylogymnia vittata</i>	Slender Monk's Hood Lichen				S3S4	29	63.6 ± 1.0	NB
N	<i>Scytinium teretiusculum</i>	Curly Jellyskin Lichen				S3S4	9	49.4 ± 0.0	NB
N	<i>Montanelia panniformis</i>	Shingled Camouflage Lichen				S3S4	5	67.1 ± 1.0	NB
N	<i>Cladonia terrae-novae</i>	Newfoundland Reindeer Lichen				S3S4	5	39.6 ± 0.0	NB
N	<i>Cladonia floerkeana</i>	Gritty Bri ish Soldiers Lichen				S3S4	5	25.7 ± 0.0	NB
N	<i>Xylopsora friesii</i>	a Lichen				S3S4	1	70.3 ± 1.0	NB
N	<i>Nephroma parile</i>	Powdery Kidney Lichen				S3S4	40	16.2 ± 0.0	NB
N	<i>Nephroma resupinatum</i>	a lichen				S3S4	1	69.8 ± 0.0	NS
N	<i>Protopannaria pezizoides</i>	Brown-gray Moss-shingle Lichen				S3S4	38	15.9 ± 0.0	NB
N	<i>Parmelia fertilis</i>	Fertile Shield Lichen				S3S4	2	21.6 ± 0.0	NB
N	<i>Usnea strigosa</i>	Bushy Beard Lichen				S3S4	26	14.0 ± 0.0	NB
N	<i>Stereocaulon condensatum</i>	Granular Soil Foam Lichen				S3S4	10	63.3 ± 0.0	NB
N	<i>Stereocaulon paschale</i>	Easter Foam Lichen				S3S4	1	66.3 ± 1.0	NS
N	<i>Pannaria conoplea</i>	Mealy-rimmed Shingle Lichen				S3S4	62	69.8 ± 0.0	NB
N	<i>Physcia tenella</i>	Fringed Rosette Lichen				S3S4	2	16.0 ± 0.0	NB
N	<i>Anaptychia palmulata</i>	Shaggy Fringed Lichen				S3S4	59	34.0 ± 0.0	NB
N	<i>Peltigera neopolydactyla</i>	Undulating Pelt Lichen				S3S4	12	64.8 ± 1.0	NB
N	<i>Cladonia cariosa</i>	Lesser Ribbed Pixie Lichen				S3S4	3	75.3 ± 1.0	NB
N	<i>Hypocenomyce scalaris</i>	Common Clam Lichen				S3S4	1	73.4 ± 1.0	NB
N	<i>Grimmia anodon</i>	Toothless Grimmiid Moss				SH	2	17.6 ± 10.0	NB
N	<i>Leucodon brachypus</i>	a Moss				SH	10	65.8 ± 3.0	NS
N	<i>Thelia hirtella</i>	a Moss				SH	2	58.8 ± 100.0	NB
N	<i>Cyrtlo-hypnum minutulum</i>	Tiny Cedar Moss				SH	3	82.9 ± 10.0	NB
P	<i>Juglans cinerea</i>	Butternut	Endangered	Endangered	Endangered	S1	119	19.0 ± 0.0	NB
P	<i>Polemonium vanbruntiae</i>	Van Brunt's Jacob's-ladder	Threatened	Threatened	Threatened	S1	74	51.7 ± 0.0	NB
P	<i>Fraxinus nigra</i>	Black Ash	Threatened			S3S4	210	16.0 ± 0.0	NB
P	<i>Isoetes prototypus</i>	Prototype Quillwort	Special Concern	Special Concern	Endangered	S1	8	38.6 ± 0.0	NB
P	<i>Symphyotrichum anticostense</i>	Anticosti Aster	Special Concern	Special Concern	Endangered	S3	2	22.0 ± 0.0	NB
P	<i>Cryptotaenia canadensis</i>	Canada Honewort				S1	1	53.8 ± 1.0	NB
P	<i>Antennaria parlinii ssp. fallax</i>	Parlin's Pussytoes				S1	5	52.8 ± 1.0	NB
P	<i>Antennaria howellii ssp. petaloidea</i>	Pussy-Toes				S1	2	18.4 ± 5.0	NB
P	<i>Bidens discoidea</i>	Swamp Beggarticks				S1	4	74.0 ± 0.0	NB
P	<i>Pseudognaphalium obtusifolium</i>	Eastern Cudweed				S1	8	78.6 ± 0.0	NS
P	<i>Hieracium paniculatum</i>	Panicled Hawkweed				S1	18	39.8 ± 0.0	NB
P	<i>Barbarea orthoceras</i>	American Yellow Rocket				S1	1	49.9 ± 1.0	NB
P	<i>Cardamine parviflora</i>	Small-flowered Bittercress				S1	19	28.6 ± 0.0	NB
P	<i>Cardamine concatenata</i>	Cut-leaved Toothwort				S1	2	87.8 ± 0.0	NB
P	<i>Draba arabisans</i>	Rock Whitlow-Grass				S1	29	17.2 ± 0.0	NB
P	<i>Draba glabella</i>	Rock Whitlow-Grass				S1	14	17.2 ± 0.0	NB
P	<i>Mononeuria groenlandica</i>	Greenland Stitchwort				S1	5	39.8 ± 0.0	NB
P	<i>Chenopodiastrium simplex</i>	Maple-leaved Goosefoot				S1	9	56.2 ± 1.0	NB
P	<i>Blitum capitatum</i>	Strawberry-Blite				S1	4	16.6 ± 1.0	NB
P	<i>Suaeda rolandii</i>	Roland's Sea-Blite				S1	3	77.1 ± 0.0	NB
P	<i>Hypericum virginicum</i>	Virginia St. John's-wort				S1	6	27.2 ± 0.0	NB
P	<i>Corema conradii</i>	Broom Crowberry				S1	35	18.9 ± 10.0	NB
P	<i>Vaccinium boreale</i>	Northern Blueberry				S1	2	56.1 ± 0.0	NB
P	<i>Vaccinium corymbosum</i>	Highbush Blueberry				S1	1	76.9 ± 1.0	NS
P	<i>Euphorbia polygonifolia</i>	Seaside Spurge				S1	1	96.7 ± 0.0	NB
P	<i>Hylodesmum glutinosum</i>	Large Tick-trefoil				S1	15	78.9 ± 0.0	NS
P	<i>Lespedeza capitata</i>	Round-headed Bush-clover				S1	11	69.8 ± 0.0	NB
P	<i>Bartonia virginica</i>	Yellow Bartonia				S1	1	96.2 ± 0.0	NS

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P	<i>Gentiana rubricaulis</i>	Purple-stemmed Gentian				S1	3	71.5 ± 0.0	NB
P	<i>Lomatogonium rotatum</i>	Marsh Felwort				S1	3	80.7 ± 0.0	NB
P	<i>Proserpinaca pectinata</i>	Comb-leaved Mermaidweed				S1	2	58.4 ± 0.0	NB
P	<i>Pycnanthemum virginianum</i>	Virginia Mountain Mint				S1	4	32.7 ± 0.0	NB
P	<i>Decodon verticillatus</i>	Swamp Loosestrife				S1	5	94.9 ± 0.0	NS
P	<i>Polygonum douglasii</i>	Douglas Knotweed				S1	1	54.2 ± 0.0	NB
P	<i>Lysimachia quadrifolia</i>	Whorled Yellow Loosestrife				S1	14	27.9 ± 1.0	NB
P	<i>Primula laurentiana</i>	Laurentian Primrose				S1	63	62.5 ± 2.0	NS
P	<i>Crataegus jonesiae</i>	Jones' Hawthorn				S1	4	94.2 ± 1.0	NB
P	<i>Potentilla canadensis</i>	Canada Cinquefoil				S1	2	80.0 ± 0.0	NB
P	<i>Rubus flagellaris</i>	Northern Dewberry				S1	7	24.7 ± 1.0	NB
P	<i>Galium brevipes</i>	Limestone Swamp Bedstraw				S1	2	22.0 ± 0.0	NB
P	<i>Saxifraga paniculata</i> ssp. <i>laestadii</i>	Laestadius' Saxifrage				S1	47	17.3 ± 10.0	NB
P	<i>Agalinis tenuifolia</i>	Slender Agalinis				S1	9	90.3 ± 0.0	NB
P	<i>Gratiola lutea</i>	Golden Hedge-hyssop				S1	7	37.1 ± 0.0	NB
P	<i>Pedicularis canadensis</i>	Canada Lousewort				S1	2	80.0 ± 0.0	NB
P	<i>Viola sagittata</i> var. <i>ovata</i>	Arrow-Leaved Violet				S1	40	61.3 ± 0.0	NS
P	<i>Carex atlantica</i> ssp. <i>atlantica</i>	Atlantic Sedge				S1	4	51.1 ± 0.0	NB
P	<i>Carex backii</i>	Rocky Mountain Sedge				S1	4	53.8 ± 0.0	NB
P	<i>Carex merritt-fernaldii</i>	Merritt Fernald's Sedge				S1	3	85.9 ± 0.0	NB
P	<i>Carex salina</i>	Saltmarsh Sedge				S1	2	20.9 ± 1.0	NB
P	<i>Carex scirpoidea</i>	Scirpuslike Sedge				S1	6	49.6 ± 0.0	NB
P	<i>Carex sterilis</i>	Sterile Sedge				S1	1	90.7 ± 2.0	NB
P	<i>Carex grisea</i>	Inflated Narrow-leaved Sedge				S1	12	30.8 ± 0.0	NB
P	<i>Carex saxatilis</i>	Russet Sedge				S1	14	15.6 ± 0.0	NB
P	<i>Cyperus diandrus</i>	Low Flatsedge				S1	4	90.3 ± 1.0	NB
P	<i>Eleocharis flavescens</i> var. <i>olivacea</i>	Bright-green Spikerush				S1	1	95.4 ± 0.0	NS
P	<i>Scirpus pendulus</i>	Hanging Bulrush				S1	6	62.4 ± 0.0	NB
P	<i>Sisyrinchium angustifolium</i>	Narrow-leaved Blue-eyed-grass				S1	13	17.9 ± 1.0	NB
P	<i>Juncus greenii</i>	Greene's Rush				S1	1	67.7 ± 0.0	NB
P	<i>Juncus subtilis</i>	Creeping Rush				S1	1	47.6 ± 5.0	NB
P	<i>Allium canadense</i>	Canada Garlic				S1	1	33.2 ± 0.0	NB
P	<i>Goodyera pubescens</i>	Downy Rattlesnake-Plantain				S1	49	65.1 ± 0.0	NB
P	<i>Malaxis monophyllos</i> var. <i>brachypoda</i>	North American White Adder's-mouth				S1	1	67.1 ± 0.0	NS
P	<i>Platanthera flava</i> var. <i>herbiola</i>	Pale Green Orchid				S1	26	71.2 ± 0.0	NB
P	<i>Platanthera macrophylla</i>	Large Round-Leaved Orchid				S1	13	37.7 ± 0.0	NB
P	<i>Bromus pubescens</i>	Hairy Wood Brome Grass				S1	6	68.8 ± 0.0	NB
P	<i>Cinna arundinacea</i>	Sweet Wood Reed Grass				S1	37	38.4 ± 0.0	NB
P	<i>Danthonia compressa</i>	Flattened Oat Grass				S1	27	54.1 ± 1.0	NB
P	<i>Dichanthelium dichotomum</i>	Forked Panic Grass				S1	1	24.4 ± 1.0	NB
P	<i>Glyceria obtusa</i>	Atlantic Manna Grass				S1	5	61.7 ± 0.0	NB
P	<i>Potamogeton friesii</i>	Fries' Pondweed				S1	6	27.7 ± 5.0	NB
P	<i>Potamogeton nodosus</i>	Long-leaved Pondweed				S1	8	63.1 ± 0.0	NB
P	<i>Potamogeton strictifolius</i>	Straight-leaved Pondweed				S1	2	18.8 ± 0.0	NB
P	<i>Xyris difformis</i>	Bog Yellow-eyed-grass				S1	8	27.1 ± 0.0	NB
P	<i>Asplenium ruta-muraria</i> var. <i>cryptolepis</i>	Wallrue Spleenwort				S1	4	17.2 ± 0.0	NB
P	<i>Cystopteris laurentiana</i>	Laurentian Bladder Fern				S1	1	51.2 ± 1.0	NB
P	<i>Dryopteris filix-mas</i> ssp. <i>brittonii</i>	Britton's Male Fern				S1	2	98.0 ± 1.0	NB
P	<i>Huperzia selago</i>	Northern Firmoss				S1	1	66.3 ± 1.0	NS
P	<i>Sceptridium oneidense</i>	Blunt-lobed Moonwort				S1	4	69.3 ± 0.0	NB

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P	<i>Selaginella rupestris</i>	Rock Spikemoss				S1	38	51.5 ± 1.0	NB
P	<i>Cuscuta campestris</i>	Field Dodder				S1?	3	68.3 ± 5.0	NB
P	<i>Polygonum aviculare</i> ssp. <i>neglectum</i>	Narrow-leaved Knotweed				S1?	4	94.1 ± 0.0	NB
P	<i>Alisma subcordatum</i>	Southern Water Plantain				S1?	3	21.8 ± 0.0	NB
P	<i>Carex laxiflora</i>	Loose-Flowered Sedge				S1?	3	64.1 ± 5.0	NS
P	<i>Wolffia columbiana</i>	Columbian Watermeal				S1?	7	71.8 ± 0.0	NB
P	<i>Euphrasia farlowii</i>	Farlow's Eyebright				S1S2	1	90.2 ± 1.0	NB
P	<i>Spiranthes ochroleuca</i>	Yellow Ladies'-tresses				S1S2	7	66.2 ± 0.0	NB
P	<i>Potamogeton bicipulatus</i>	Snailseed Pondweed				S1S2	5	48.5 ± 0.0	NB
P	<i>Eriophorum russeolum</i> ssp. <i>albidum</i>	Smooth-fruited Russet Cottongrass				S1S3	1	98.3 ± 0.0	NB
P	<i>Spiranthes cernua</i>	Nodding Ladies'-Tresses				S1S3	25	60.7 ± 0.0	NB
P	<i>Spiranthes arcisepala</i>	Appalachian Ladies'-tresses				S1S3	12	40.0 ± 0.0	NB
P	<i>Neottia bifolia</i>	Southern Twayblade			Endangered	S2	15	68.6 ± 0.0	NS
P	<i>Sanicula trifoliata</i>	Large-Fruited Sanicle				S2	1	26.4 ± 5.0	NB
P	<i>Sanicula odorata</i>	Clustered Sanicle				S2	1	98.8 ± 2.0	NS
P	<i>Hieracium robinsonii</i>	Robinson's Hawkweed				S2	14	64.8 ± 0.0	NB
P	<i>Atriplex glabruscula</i> var. <i>franktonii</i>	Frankton's Saltbush				S2	7	24.0 ± 1.0	NB
P	<i>Hypericum x dissimulatum</i>	Disguised St. John's-wort				S2	4	73.7 ± 1.0	NB
P	<i>Viburnum dentatum</i>	Southern Arrow-Wood				S2	2	67.6 ± 1.0	NS
P	<i>Viburnum dentatum</i> var. <i>lucidum</i>	Northern Arrow-Wood				S2	2	79.3 ± 0.0	NB
P	<i>Astragalus eucosmus</i>	Elegant Milk-vetch				S2	3	15.6 ± 0.0	NB
P	<i>Quercus macrocarpa</i>	Bur Oak				S2	173	22.0 ± 0.0	NB
P	<i>Nuphar x rubrodisca</i>	Red-disk Yellow Pond-lily				S2	12	29.9 ± 0.0	NB
P	<i>Polygaloides paucifolia</i>	Fringed Milkwort				S2	19	68.8 ± 1.0	NB
P	<i>Persicaria amphibia</i> var. <i>emersa</i>	Long-root Smartweed				S2	59	21.6 ± 0.0	NB
P	<i>Scrophularia lanceolata</i>	Lance-leaved Figwort				S2	7	2.7 ± 5.0	NB
P	<i>Carex albicans</i> var. <i>emmonsii</i>	White-tinged Sedge				S2	9	13.9 ± 0.0	NB
P	<i>Cyperus lupulinus</i> ssp. <i>macilentus</i>	Hop Flatsedge				S2	69	65.3 ± 0.0	NB
P	<i>Calypso bulbosa</i> var. <i>americana</i>	Calypso				S2	7	12.7 ± 0.0	NB
P	<i>Coeloglossum viride</i>	Long-bracted Frog Orchid				S2	20	21.7 ± 5.0	NB
P	<i>Cypripedium parviflorum</i> var. <i>makasin</i>	Small Yellow Lady's-Slipper				S2	7	14.9 ± 1.0	NB
P	<i>Platanthera huronensis</i>	Fragrant Green Orchid				S2	4	69.2 ± 0.0	NB
P	<i>Festuca subverticillata</i>	Nodding Fescue				S2	2	72.8 ± 1.0	NS
P	<i>Puccinellia nutkaensis</i>	Alaska Alkaligrass				S2	7	24.7 ± 1.0	NB
P	<i>Diphasiastrum sitchense</i>	Sitka Ground-cedar				S2	1	95.3 ± 5.0	NB
P	<i>Schizaea pusilla</i>	Little Curlygrass Fern				S2	33	32.1 ± 0.0	NB
P	<i>Coryphopteris simulata</i>	Bog Fern				S2	10	71.0 ± 0.0	NB
P	<i>Toxicodendron radicans</i> var. <i>radicans</i>	Eastern Poison Ivy				S2?	11	30.7 ± 0.0	NB
P	<i>Symphyotrichum novi-belgii</i> var. <i>crenifolium</i>	New York Aster				S2?	8	17.5 ± 0.0	NB
P	<i>Humulus lupulus</i> var. <i>lupuloides</i>	Common Hop				S2?	3	92.8 ± 0.0	NB
P	<i>Rubus x recurvicaulis</i>	arching dewberry				S2?	5	14.0 ± 5.0	NB
P	<i>Osmorhiza longistylis</i>	Smooth Sweet Cicely				S2S3	1	98.6 ± 1.0	NS
P	<i>Symphyotrichum racemosum</i>	Small White Aster				S2S3	11	26.1 ± 0.0	NB
P	<i>Alnus serrulata</i>	Smooth Alder				S2S3	12	50.2 ± 0.0	NB
P	<i>Cuscuta cephalanthi</i>	Buttonbush Dodder				S2S3	2	18.9 ± 0.0	NB

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P	<i>Gentiana linearis</i>	Narrow-Leaved Gentian				S2S3	5	96.2 ± 5.0	NB
P	<i>Hedeoma pulegioides</i>	American False Pennyroyal				S2S3	59	20.3 ± 1.0	NB
P	<i>Aphyllon uniflorum</i>	One-flowered Broomrape				S2S3	18	14.4 ± 1.0	NB
P	<i>Persicaria careyi</i>	Carey's Smartweed				S2S3	15	24.7 ± 5.0	NB
P	<i>Hepatica americana</i>	Round-lobed Hepatica				S2S3	9	46.4 ± 1.0	NB
P	<i>Ranunculus sceleratus</i>	Cursed Buttercup				S2S3	6	23.4 ± 0.0	NB
P	<i>Cephalanthus occidentalis</i>	Common Buttonbush				S2S3	22	61.7 ± 0.0	NB
P	<i>Galium obtusum</i>	Blunt-leaved Bedstraw				S2S3	5	22.0 ± 0.0	NB
P	<i>Euphrasia randii</i>	Rand's Eyebright				S2S3	21	35.8 ± 0.0	NB
P	<i>Dirca palustris</i>	Eastern Leatherwood				S2S3	1	72.3 ± 1.0	NB
P	<i>Viola novae-angliae</i>	New England Violet				S2S3	15	29.0 ± 0.0	NB
P	<i>Carex comosa</i>	Bearded Sedge				S2S3	10	66.9 ± 0.0	NS
P	<i>Carex rostrata</i>	Narrow-leaved Beaked Sedge				S2S3	3	25.2 ± 0.0	NB
P	<i>Carex vacillans</i>	Estuarine Sedge				S2S3	3	89.5 ± 1.0	NB
P	<i>Juncus ranarius</i>	Seaside Rush				S2S3	1	22.0 ± 0.0	NB
P	<i>Allium tricoccum</i>	Wild Leek				S2S3	93	14.6 ± 0.0	NB
P	<i>Corallorhiza maculata</i> var. <i>occidentalis</i>	Spotted Coralroot				S2S3	14	66.9 ± 1.0	NB
P	<i>Corallorhiza maculata</i> var. <i>maculata</i>	Spotted Coralroot				S2S3	8	41.3 ± 1.0	NB
P	<i>Elymus canadensis</i>	Canada Wild Rye				S2S3	3	22.0 ± 0.0	NB
P	<i>Piptatheropsis canadensis</i>	Canada Ricegrass				S2S3	2	62.7 ± 0.0	NB
P	<i>Puccinellia phryganodes</i> ssp. <i>neoarctica</i>	Creeping Alkali Grass				S2S3	10	50.9 ± 0.0	NB
P	<i>Poa glauca</i>	Glaucous Blue Grass				S2S3	18	19.2 ± 2.0	NB
P	<i>Piptatheropsis pungens</i>	Slender Ricegrass				S2S3	5	77.7 ± 0.0	NB
P	<i>Potamogeton vaseyi</i>	Vasey's Pondweed				S2S3	5	27.7 ± 1.0	NB
P	<i>Isoetes tuckermanni</i> ssp. <i>acadiensis</i>	Acadian Quillwort				S2S3	7	61.3 ± 0.0	NS
P	<i>Panax trifolius</i>	Dwarf Ginseng				S3	28	34.8 ± 0.0	NB
P	<i>Artemisia campestris</i> ssp. <i>caudata</i>	Tall Wormwood				S3	145	22.0 ± 0.0	NB
P	<i>Artemisia campestris</i>	Field Wormwood				S3	5	58.6 ± 0.0	NB
P	<i>Nabalus racemosus</i>	Glaucous Rattlesnakeroot				S3	78	15.0 ± 1.0	NB
P	<i>Tanacetum bipinnatum</i> ssp. <i>huronense</i>	Lake Huron Tansy				S3	14	14.8 ± 1.0	NB
P	<i>Pseudognaphalium macounii</i>	Macoun's Cudweed				S3	6	19.2 ± 0.0	NB
P	<i>Impatiens pallida</i>	Pale Jewelweed				S3	10	50.1 ± 0.0	NB
P	<i>Turritis glabra</i>	Tower Mustard				S3	2	22.0 ± 0.0	NB
P	<i>Arabis pycnocarpa</i>	Cream-flowered Rockcress				S3	19	18.9 ± 1.0	NB
P	<i>Cardamine maxima</i>	Large Toothwort				S3	39	16.3 ± 0.0	NB
P	<i>Boechera stricta</i>	Drummond's Rockcress				S3	20	19.6 ± 1.0	NB
P	<i>Sagina nodosa</i>	Knotted Pearlwort				S3	28	22.0 ± 0.0	NB
P	<i>Sagina nodosa</i> ssp. <i>borealis</i>	Knotted Pearlwort				S3	2	36.6 ± 0.0	NB
P	<i>Stellaria humifusa</i>	Saltmarsh Starwort				S3	16	24.3 ± 0.0	NB
P	<i>Stellaria longifolia</i>	Long-leaved Starwort				S3	10	19.3 ± 10.0	NB
P	<i>Oxybasis rubra</i>	Red Goosefoot				S3	4	17.9 ± 1.0	NB
P	<i>Hudsonia tomentosa</i>	Woolly Beach-heath				S3	4	22.0 ± 0.0	NB
P	<i>Cornus obliqua</i>	Silky Dogwood				S3	100	28.7 ± 0.0	NB
P	<i>Lonicera oblongifolia</i>	Swamp Fly Honeysuckle				S3	1	37.7 ± 6.0	NB
P	<i>Triosteum aurantiacum</i>	Orange-fruited Tinker's Weed				S3	7	89.8 ± 0.0	NB
P	<i>Viburnum lentago</i>	Nannyberry				S3	1	70.4 ± 0.0	NB
P	<i>Rhodiola rosea</i>	Roseroot				S3	130	13.3 ± 0.0	NB
P	<i>Astragalus alpinus</i>	Alpine Milk-vetch				S3	1	22.0 ± 0.0	NB
P	<i>Oxytropis campestris</i> var. <i>johannensis</i>	Field Locoweed				S3	28	17.3 ± 50.0	NB

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P	<i>Bartonia paniculata</i>	Branched Bartonia				S3	3	51.0 ± 0.0	NB
P	<i>Bartonia paniculata</i> ssp. <i>iodandra</i>	Branched Bartonia				S3	43	32.4 ± 0.0	NB
P	<i>Gentiana amarella</i> ssp. <i>acuta</i>	Northern Gentian				S3	3	18.5 ± 0.0	NB
P	<i>Geranium bicknellii</i>	Bicknell's Crane's-bill				S3	23	22.0 ± 0.0	NB
P	<i>Myriophyllum farwellii</i>	Farwell's Water Milfoil				S3	17	13.8 ± 0.0	NB
P	<i>Myriophyllum humile</i>	Low Water Milfoil				S3	16	69.4 ± 1.0	NB
P	<i>Myriophyllum quitense</i>	Andean Water Milfoil				S3	71	14.8 ± 0.0	NB
P	<i>Proserpinaca palustris</i>	Marsh Mermaidweed				S3	18	33.2 ± 0.0	NB
P	<i>Utricularia resupinata</i>	Inverted Bladderwort				S3	19	26.4 ± 1.0	NB
P	<i>Fraxinus pennsylvanica</i>	Red Ash				S3	129	14.0 ± 1.0	NB
P	<i>Rumex pallidus</i>	Seabeach Dock				S3	11	14.4 ± 0.0	NB
P	<i>Rumex occidentalis</i>	Western Dock				S3	1	91.8 ± 1.0	NB
P	<i>Podostemum ceratophyllum</i>	Horn-leaved Riverweed				S3	8	65.1 ± 0.0	NB
P	<i>Primula mistassinica</i>	Mistassini Primrose				S3	11	14.4 ± 0.0	NB
P	<i>Pyrola minor</i>	Lesser Pyrola				S3	6	36.6 ± 1.0	NB
P	<i>Clematis occidentalis</i>	Purple Clematis				S3	24	17.8 ± 0.0	NB
P	<i>Ranunculus flabellaris</i>	Yellow Water Buttercup				S3	17	45.1 ± 0.0	NB
P	<i>Amelanchier canadensis</i>	Canada Serviceberry				S3	19	15.0 ± 1.0	NB
P	<i>Crataegus scabrada</i>	Rough Hawthorn				S3	9	17.3 ± 0.0	NB
P	<i>Rubus occidentalis</i>	Black Raspberry				S3	6	25.2 ± 0.0	NB
P	<i>Salix myricoides</i>	Bayberry Willow				S3	2	84.5 ± 0.0	NB
P	<i>Salix nigra</i>	Black Willow				S3	180	15.5 ± 1.0	NB
P	<i>Salix interior</i>	Sandbar Willow				S3	16	22.0 ± 0.0	NB
P	<i>Comandra umbellata</i>	Bastard's Toadflax				S3	2	22.0 ± 0.0	NB
P	<i>Agalinis purpurea</i> var. <i>parviflora</i>	Small-flowered Purple False Foxglove				S3	8	14.9 ± 1.0	NB
P	<i>Viola adunca</i>	Hooked Violet				S3	10	22.0 ± 0.0	NB
P	<i>Symplocarpus foetidus</i>	Eastern Skunk Cabbage				S3	83	16.7 ± 0.0	NB
P	<i>Carex adusta</i>	Lesser Brown Sedge				S3	9	22.0 ± 0.0	NB
P	<i>Carex arcta</i>	Northern Clustered Sedge				S3	54	22.0 ± 0.0	NB
P	<i>Carex conoidea</i>	Field Sedge				S3	22	14.9 ± 1.0	NB
P	<i>Carex garberi</i>	Garber's Sedge				S3	4	15.2 ± 0.0	NB
P	<i>Carex granularis</i>	Limestone Meadow Sedge				S3	2	53.8 ± 5.0	NB
P	<i>Carex gynocrates</i>	Northern Bog Sedge				S3	1	54.1 ± 1.0	NB
P	<i>Carex hirtifolia</i>	Pubescent Sedge				S3	4	37.4 ± 0.0	NB
P	<i>Carex livida</i>	Livid Sedge				S3	2	12.8 ± 0.0	NB
P	<i>Carex ormostachya</i>	Necklace Spike Sedge				S3	10	61.0 ± 1.0	NB
P	<i>Carex plantaginea</i>	Plantain-Leaved Sedge				S3	3	68.3 ± 0.0	NB
P	<i>Carex prairea</i>	Prairie Sedge				S3	1	85.3 ± 5.0	NS
P	<i>Carex rosea</i>	Rosy Sedge				S3	35	15.1 ± 0.0	NB
P	<i>Carex sprengeii</i>	Longbeak Sedge				S3	2	50.0 ± 0.0	NB
P	<i>Carex tenuiflora</i>	Sparse-Flowered Sedge				S3	2	84.6 ± 10.0	NB
P	<i>Cyperus esculentus</i>	Perennial Yellow Nutsedge				S3	2	71.7 ± 0.0	NB
P	<i>Cyperus esculentus</i> var. <i>leptostachyus</i>	Perennial Yellow Nutsedge				S3	75	22.0 ± 0.0	NB
P	<i>Cyperus squarrosus</i>	Awed Flatsedge				S3	46	24.0 ± 0.0	NB
P	<i>Eriophorum gracile</i>	Slender Cottongrass				S3	9	33.9 ± 0.0	NB
P	<i>Blysmopsis rufa</i>	Red Bulrush				S3	3	22.0 ± 0.0	NB
P	<i>Elodea nuttallii</i>	Nuttall's Waterweed				S3	7	28.9 ± 0.0	NB
P	<i>Juncus vaseyi</i>	Vasey Rush				S3	6	77.8 ± 0.0	NB
P	<i>Najas gracillima</i>	Thread-Like Naiad				S3	11	62.4 ± 0.0	NB
P	<i>Cypripedium reginae</i>	Showy Lady's-Slipper				S3	8	15.1 ± 10.0	NB
P	<i>Neottia auriculata</i>	Auricled Twayblade				S3	2	24.7 ± 1.0	NB
P	<i>Platanthera grandiflora</i>	Large Purple Fringed Orchid				S3	62	10.5 ± 0.0	NB
P	<i>Platanthera orbiculata</i>	Small Round-leaved Orchid				S3	51	5.3 ± 2.0	NB
P	<i>Spiranthes lucida</i>	Shining Ladies'-Tresses				S3	14	15.5 ± 0.0	NB

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P	<i>Agrostis mertensii</i>	Northern Bent Grass				S3	1	90.2 ± 1.0	NB
P	<i>Bromus latiglumis</i>	Broad-Glumed Brome				S3	21	53.7 ± 2.0	NB
P	<i>Dichanthelium linearifolium</i>	Narrow-leaved Panic Grass				S3	13	43.2 ± 0.0	NB
P	<i>Leersia virginica</i>	White Cut Grass				S3	37	44.8 ± 0.0	NB
P	<i>Schizachyrium scoparium</i>	Little Bluestem				S3	43	29.4 ± 0.0	NB
P	<i>Zizania aquatica</i>	Southern Wild Rice				S3	2	22.0 ± 0.0	NB
P	<i>Zizania aquatica var. aquatica</i>	Eastern Wild Rice				S3	5	38.2 ± 0.0	NB
P	<i>Adiantum pedatum</i>	Northern Maidenhair Fern				S3	5	22.0 ± 0.0	NB
P	<i>Asplenium trichomanes</i>	Maidenhair Spleenwort				S3	21	13.2 ± 0.0	NB
P	<i>Anchistea virginica</i>	Virginia chain fern				S3	15	88.5 ± 0.0	NS
P	<i>Woodsia alpina</i>	Alpine Cliff Fern				S3	12	17.3 ± 0.0	NB
P	<i>Woodsia glabella</i>	Smooth Cliff Fern				S3	67	11.0 ± 1.0	NB
P	<i>Isoetes tuckermanii ssp. tuckermanii</i>	Tuckerman's Quillwort				S3	25	37.9 ± 1.0	NB
P	<i>Diphasiastrum x sabinifolium</i>	Savin-leaved Ground-cedar				S3	17	22.0 ± 0.0	NB
P	<i>Huperzia appressa</i>	Mountain Firmoss				S3	38	10.7 ± 5.0	NB
P	<i>Sceptridium dissectum</i>	Dissected Moonwort				S3	28	18.8 ± 0.0	NB
P	<i>Botrychium lanceolatum ssp. angustisegmentum</i>	Narrow Triangle Moonwort				S3	14	22.0 ± 0.0	NB
P	<i>Botrychium simplex</i>	Least Moonwort				S3	5	81.3 ± 0.0	NB
P	<i>Ophioglossum pusillum</i>	Northern Adder's-tongue				S3	10	21.8 ± 1.0	NB
P	<i>Selaginella selaginoides</i>	Low Spikemoss				S3	12	19.2 ± 6.0	NB
P	<i>Crataegus submollis</i>	Quebec Hawthorn				S3?	12	21.1 ± 1.0	NB
P	<i>Crataegus succulenta</i>	Fleshy Hawthorn				S3?	1	96.8 ± 5.0	NB
P	<i>Platanthera hookeri</i>	Hooker's Orchid				S3?	29	2.4 ± 0.0	NB
P	<i>Bidens hyperborea</i>	Estuary Beggar icks				S3S4	1	22.0 ± 0.0	NB
P	<i>Solidago altissima</i>	Tall Goldenrod				S3S4	2	14.9 ± 1.0	NB
P	<i>Symphotrichum boreale</i>	Boreal Aster				S3S4	13	12.8 ± 0.0	NB
P	<i>Betula pumila</i>	Bog Birch				S3S4	22	22.0 ± 0.0	NB
P	<i>Mertensia maritima</i>	Sea Lungwort				S3S4	44	9.8 ± 0.0	NB
P	<i>Subularia aquatica ssp. americana</i>	American Water Awlwort				S3S4	13	52.0 ± 0.0	NB
P	<i>Lobelia cardinalis</i>	Cardinal Flower				S3S4	218	22.0 ± 0.0	NB
P	<i>Callitriche hermaphroditica</i>	Northern Water-starwort				S3S4	10	21.8 ± 2.0	NB
P	<i>Viburnum edule</i>	Squashberry				S3S4	17	22.0 ± 0.0	NB
P	<i>Crassula aquatica</i>	Water Pygmyweed				S3S4	3	46.0 ± 0.0	NB
P	<i>Penthorum sedoides</i>	Ditch Stonecrop				S3S4	83	25.0 ± 0.0	NB
P	<i>Elatine americana</i>	American Waterwort				S3S4	7	20.9 ± 0.0	NB
P	<i>Hedysarum americanum</i>	Alpine Hedysarum				S3S4	3	14.2 ± 0.0	NB
P	<i>Fagus grandifolia</i>	American Beech				S3S4	327	13.6 ± 0.0	NB
P	<i>Geranium robertianum</i>	Herb Robert				S3S4	57	16.6 ± 1.0	NB
P	<i>Stachys hispida</i>	Smooth Hedge-Nettle				S3S4	4	21.7 ± 0.0	NB
P	<i>Stachys pilosa</i>	Hairy Hedge-Nettle				S3S4	6	15.8 ± 0.0	NB
P	<i>Teucrium canadense</i>	Canada Germander				S3S4	6	65.8 ± 5.0	NS
P	<i>Utricularia radiata</i>	Little Floating Bladderwort				S3S4	57	27.1 ± 0.0	NB
P	<i>Utricularia gibba</i>	Humped Bladderwort				S3S4	30	4.9 ± 0.0	NB
P	<i>Fraxinus americana</i>	White Ash				S3S4	189	15.1 ± 0.0	NB
P	<i>Epilobium strictum</i>	Downy Willowherb				S3S4	15	16.4 ± 0.0	NB
P	<i>Fallopia scandens</i>	Climbing False Buckwheat				S3S4	42	19.1 ± 0.0	NB
P	<i>Littorella americana</i>	American Shoreweed				S3S4	18	23.7 ± 0.0	NB
P	<i>Thalictrum confine</i>	Northern Meadow-rue				S3S4	76	14.7 ± 5.0	NB
P	<i>Drymocallis arguta</i>	Tall Wood Beauty				S3S4	8	14.2 ± 0.0	NB
P	<i>Rosa palustris</i>	Swamp Rose				S3S4	30	14.0 ± 5.0	NB
P	<i>Rubus pensilvanicus</i>	Pennsylvania Blackberry				S3S4	28	13.2 ± 0.0	NB
P	<i>Sanguisorba canadensis</i>	Canada Burnet				S3S4	17	71.7 ± 0.0	NB
P	<i>Galium boreale</i>	Northern Bedstraw				S3S4	8	22.0 ± 0.0	NB
P	<i>Galium labradoricum</i>	Labrador Bedstraw				S3S4	6	76.8 ± 1.0	NB

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P	<i>Salix pedicellaris</i>	Bog Willow				S3S4	56	22.0 ± 0.0	NB
P	<i>Geocaulon lividum</i>	Northern Comandra				S3S4	15	3.9 ± 0.0	NB
P	<i>Parnassia glauca</i>	Fen Grass-of-Parnassus				S3S4	1	22.0 ± 0.0	NB
P	<i>Agalinis neoscotica</i>	Nova Scotia Agalinis				S3S4	36	33.3 ± 0.0	NB
P	<i>Limosella australis</i>	Southern Mudwort				S3S4	1	100.0 ± 0.0	NB
P	<i>Ulmus americana</i>	White Elm				S3S4	161	15.0 ± 1.0	NB
P	<i>Boehmeria cylindrica</i>	Small-spike False-nettle				S3S4	56	72.3 ± 7.0	NB
P	<i>Juniperus horizontalis</i>	Creeping Juniper				S3S4	31	22.0 ± 0.0	NB
P	<i>Carex capillaris</i>	Hairlike Sedge				S3S4	24	15.1 ± 0.0	NB
P	<i>Carex eburnea</i>	Bristle-leaved Sedge				S3S4	18	31.4 ± 0.0	NB
P	<i>Carex exilis</i>	Coastal Sedge				S3S4	111	3.9 ± 0.0	NB
P	<i>Carex haydenii</i>	Hayden's Sedge				S3S4	96	25.9 ± 0.0	NB
P	<i>Carex lupulina</i>	Hop Sedge				S3S4	90	25.3 ± 5.0	NB
P	<i>Carex tenera</i>	Tender Sedge				S3S4	53	22.0 ± 0.0	NB
P	<i>Carex wiegandii</i>	Wiegand's Sedge				S3S4	146	14.7 ± 0.0	NB
P	<i>Carex recta</i>	Estuary Sedge				S3S4	12	33.4 ± 0.0	NB
P	<i>Carex atratiformis</i>	Scabrous Black Sedge				S3S4	2	19.2 ± 0.0	NB
P	<i>Cladium mariscoides</i>	Smooth Twigrush				S3S4	61	13.2 ± 0.0	NB
P	<i>Cyperus dentatus</i>	Toothed Flatsedge				S3S4	227	12.6 ± 5.0	NB
P	<i>Eleocharis quinqueflora</i>	Few-flowered Spikerush				S3S4	8	12.8 ± 0.0	NB
P	<i>Rhynchospora capitellata</i>	Small-headed Beakrush				S3S4	22	51.2 ± 0.0	NB
P	<i>Trichophorum clintonii</i>	Clinton's Clubrush				S3S4	50	15.4 ± 0.0	NB
P	<i>Bolboschoenus fluviatilis</i>	River Bulrush				S3S4	59	21.1 ± 0.0	NB
P	<i>Triglochin gaspensis</i>	Gasp Arrowgrass				S3S4	23	23.3 ± 1.0	NB
P	<i>Lilium canadense</i>	Canada Lily				S3S4	95	14.0 ± 2.0	NB
P	<i>Triantha glutinosa</i>	Sticky False-Asphodel				S3S4	4	15.3 ± 0.0	NB
P	<i>Corallorhiza maculata</i>	Spotted Coralroot				S3S4	33	16.6 ± 1.0	NB
P	<i>Liparis loeselii</i>	Loesel's Twayblade				S3S4	16	15.0 ± 0.0	NB
P	<i>Neottia cordata</i>	Heart-leaved Twayblade				S3S4	12	22.0 ± 0.0	NB
P	<i>Platanthera obtusata</i>	Blunt-leaved Orchid				S3S4	27	10.7 ± 2.0	NB
P	<i>Calamagrostis pickeringii</i>	Pickering's Reed Grass				S3S4	137	12.8 ± 0.0	NB
P	<i>Calamagrostis stricta</i>	Slim-stemmed Reed Grass				S3S4	8	20.5 ± 0.0	NB
P	<i>Eragrostis pectinacea</i>	Tufted Love Grass				S3S4	14	15.9 ± 0.0	NB
P	<i>Stuckenia filiformis</i>	Thread-leaved Pondweed				S3S4	7	10.8 ± 0.0	NB
P	<i>Potamogeton praelongus</i>	White-stemmed Pondweed				S3S4	11	10.7 ± 0.0	NB
P	<i>Potamogeton richardsonii</i>	Richardson's Pondweed				S3S4	38	19.2 ± 1.0	NB
P	<i>Xyris montana</i>	Northern Yellow-Eyed-Grass				S3S4	46	13.4 ± 0.0	NB
P	<i>Cryptogramma stelleri</i>	Steller's Rockbrake				S3S4	4	7.7 ± 1.0	NB
P	<i>Asplenium viride</i>	Green Spleenwort				S3S4	23	13.1 ± 0.0	NB
P	<i>Dryopteris fragrans</i>	Fragrant Wood Fern				S3S4	64	22.0 ± 0.0	NB
P	<i>Equisetum palustre</i>	Marsh Horsetail				S3S4	10	15.1 ± 0.0	NB
P	<i>Polypodium appalachianum</i>	Appalachian Polypody				S3S4	37	19.6 ± 1.0	NB
P	<i>Montia fontana</i>	Water Blinks				SH	3	78.3 ± 1.0	NB
P	<i>Solidago caesia</i>	Blue-stemmed Goldenrod				SX	2	16.6 ± 1.0	NB
P	<i>Carex swanii</i>	Swan's Sedge				SX	83	62.1 ± 0.0	NS

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

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12	McAlpine, D.F. 1983. Status & Conservation of Solution Caves in New Brunswick. New Brunswick Museum, Publications in Natural Science, no. 1, 28pp.
12	Mersey Tobeatic Research Institute. 2021. 2020 Monarch records from the MTRI monitoring program. Mersey Tobeatic Research Institute, 72 records.
12	Sabine, M. 2016. NB DNR staff incidental Black Ash observations. New Brunswick Department of Natural Resources.
11	Hubley, Nicole. 2022. Monarch (<i>Danaus plexippus</i>) records submitted to MTRI from the 2021 field season. Mersey Tobeatic Research Institute.
11	Kennedy, Joseph. 2010. New Brunswick Peregrine records, 2010. New Brunswick Dept Natural Resources, 16 recs (11 active).
11	Layberry, R.A. & Hall, P.W., LaFontaine, J.D. 1998. The Butterflies of Canada. University of Toronto Press. 280 pp+plates.
11	McNeil, Jeff. 2022. 2021 Turtle Records. Mersey Tobeatic Research Institute.
11	Neily, T.H. Tom Neily NS Sphagnum records (2009-2014). T.H. Neily, Atlantic Canada Conservation Data Centre. 2019.
11	Wissink, R. 2000. Rare Plants of Fundy: maps. Parks Canada, 20 recs.
10	Amirault, D.L. & Stewart, J. 2007. Piping Plover Database 1894-2006. Canadian Wildlife Service, Sackville, 3344 recs, 1228 new.
10	Belliveau, A.G. & Vail, Cole; King, Katie. 2020. New Allium tricoccum locations, Cornwallis River. Chapman, C.J. (ed.) Acadia University.
10	Blaney, C.S. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre. Sackville NB, 1042 recs.

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10	Blaney, C.S.; Mazerolle, D.M. 2011. Fieldwork 2011. Atlantic Canada Conservation Data Centre. Sackville NB.
10	Goltz, J.P. & Bishop, G. 2005. Confidential supplement to Status Report on Prototype Quillwort (<i>Isoetes prototypus</i>). Committee on the Status of Endangered Wildlife in Canada, 111 recs.
10	Noseworthy, J. 2013. Van Brunt's Jacob's-ladder observations along tributary of Dipper Harbour Ck. Nature Conservancy of Canada, 10 recs.
10	Shortt, R. UNB specimen data for various tracked species formerly considered secure. Connell Memorial Herbarium, UNB, Fredericton NB. 2019.
10	Spicer, C.D. 2001. Powerline Corridor Botanical Surveys, Charlotte & Saint John Counties. A M E C International, 1269 recs.
9	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2000.
9	Blaxley, Megan; Vinson, Neil. 2020. <i>Peltigera hydrothyria</i> records from a tributary of Lake Brook, Fundy National Park. Chapman-Lam, Colin J. (ed.) Fundy National Park, 9.
9	Doucet, D.A. & Edsall, J.; Brunelle, P.-M. 2007. Miramichi Watershed Rare Odonata Survey. New Brunswick ETF & WTF Report, 1211 recs.
9	Edsall, J. 2001. Lepidopteran records in New Brunswick, 1997-99. , Pers. comm. to K.A. Bredin. 91 recs.
9	Wisniowski, C. 2018. Op imizing wood turtle conservation in New Brunswick through collaboration, strategic planning, and landowner outreach. Nature Trust of New Brunswick, 10 records.
8	Basquill, S.P. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre, Sackville NB, 69 recs.
8	Bredin, K.A. 2001. WTF Project: Freshwater Mussel Fieldwork in Freshwater Species data. Atlantic Canada Conservation Data Centere, 101 recs.
8	Doucet, D.A. 2008. Fieldwork 2008: Odonata. ACCDC Staff, 625 recs.
8	Haughian, S.R. 2018. Description of <i>Fuscopannaria leucosticta</i> field work in 2017. New Brunswick Museum, 314 recs.
8	Hinds, H.R. 1992. Rare Vascular Plants of Fundy National Park. , 10 recs.
8	King, Amelia. 2020. Belleisle Watershed Coalition Turtle Watch Data. Belleisle Watershed Coalition.
8	NS DNR. 2017. Black Ash records from NS DNR Permanent Sample Plots (PSPs), 1965-2016. NS Dept of Natural Resources.
8	Parker, M.S.R. 2011. Hampton Wind Farm 2010: significant floral/faunal observations. , 13 recs.
8	Richardson, D., Anderson, F., Cameron, R, McMullin, T., Clayden, S. 2014. Field Work Report on Black Foam Lichen (<i>Anzia colpodes</i>). COSEWIC.
8	Webster, R.P. 2006. Survey for Suitable Salt Marshes for the Maritime Ringlet, New Populations of the Cobblestone Tiger Beetle, & New Localities of Three Rare Butterfly Species. New Brunswick WTF Report, 28 recs.
7	Chapman, C.J. 2018. Atlantic Canada Conservation Data Centre botanical fieldwork 2018. Atlantic Canada Conservation Data Centre, 11171 recs.
7	Klymko, J. Dataset of butterfly records at the New Brunswick Museum not yet accessioned by the museum. Atlantic Canada Conservation Data Centre. 2016.
7	Litvak, M.K. 2001. Shortnose Sturgeon records in four NB rivers. UNB Saint John NB. Pers. comm. to K. Bredin, 6 recs.
7	Oldham, M.J. 2000. Oldham database records from Maritime provinces. Oldham, M.J; ONHIC, 487 recs.
7	Pepper, C. 2021. Rare bird, plant and mammal observations in Nova Scotia, 2017-2021.
7	Webster, R.P. Atlantic Forestry Centre Insect Collection, Maritimes butterfly records. Natural Resources Canada. 2014.
6	Cameron, R.P. 2018. <i>Degelia plumbea</i> records. Nova Scotia Environment.
6	Chris ie, D.S. 2000. Christmas Bird Count Data, 1997-2000. Nature NB, 54 recs.
6	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014.
6	Shortt, R. Connell Herbarium Black Ash specimens. University New Brunswick, Fredericton. 2019.
6	Speers, L. 2001. Butterflies of Canada database. Agriculture & Agri-Food Canada, Biological Resources Program, Ottawa, 190 recs.
6	Staicer, C. & Bliss, S.; Achenbach, L. 2017. Occurrences of tracked breeding birds in forested wetlands. , 303 records.
6	Webster, R.P. Database of R.P. Webster butterfly collection. 2017.
5	Blaney, C.S.; Spicer, C.D. 2001. Fieldwork 2001 (checklist taxa). Atlantic Canada Conservation Data Centre. Sackville NB, 173 recs.
5	Brazner, J.; Hill, N. 2018. Plant observations along he Cornwallis River, Nova Scotia. Nova Scotia Department of Lands and Forestry.
5	Chaput, G. 2002. Atlantic Salmon: Maritime Provinces Overview for 2001. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-14. 39 recs.
5	Ferguson, D.C. 1954. The Lepidoptera of Nova Scotia. Part I, macrolepidoptera. Proceedings of the Nova Scotian Institute of Science, 23(3), 161-375.
5	Hicklin, P.W. 1999. The Maritime Shorebird Survey Newsletter. <i>Calidris</i> , No. 7. 6 recs.
5	Patrick, A.; Horne, D.; Noseworthy, J. et. al. 2017. Field data for Nova Scotia and New Brunswick, 2015 and 2017. Nature Conservancy of Canada.
4	Blaney, C.S. Miscellaneous specimens received by ACCDC (botany). Various persons. 2001-08.
4	Clayden, S.R. 2012. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 57 recs.
4	Clayden, S.R. 2020. Email to Sean Blaney regarding <i>Pilophorus cereus</i> and <i>P. fibula</i> at Fidele Lake area, Charlotte County, NB. pers. comm., 2 records.
4	Cronin, P. & Ayer, C.; Dubee, B.; Hooper, W.C.; LeBlanc, E.; Madden, A.; Pettigrew, T.; Seymour, P. 1998. Fish Species Management Plans (draft). NB DNRE Internal Report. Fredericton, 164pp.
4	Edsall, J. 2007. Personal Butterfly Collection: specimens collected in the Canadian Maritimes, 1961-2007. J. Edsall, unpubl. report, 137 recs.
4	LaPaix, R.W. 2014. Trans-Canada Energy East Pipeline Environmental Assessment, Records from 2013-14. Stantec Consulting, 5 recs.
4	Layberry, R.A. 2012. Lepidopteran records for the Maritimes, 1974-2008. Layberry Collection, 1060 recs.
4	Majka, C.G. & McCorquodale, D.B. 2006. The Coccinellidae (Coleoptera) of the Maritime Provinces of Canada: new records, biogeographic notes, and conservation concerns. <i>Zootaxa</i> . <i>Zootaxa</i> , 1154: 49–68. 7 recs.
4	Marshall, L. 1998. Atlantic Salmon: Southwest New Brunswick outer-Fundy SFA 23. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-13. 6 recs.
4	McNeil, J.A. 2020. Snapping Turtle and Eastern Painted Turtle records, 2020. Mersey Tobeatic Research Institute.
4	Moldowan, Patrick <i>Chrysemys picta</i> records from COSEWIC status report. pers. comm. 2021.
4	Neily, T.H. & Pepper, C.; Toms, B. 2020. Nova Scotia lichen database [as of 2020-05-25]. Mersey Tobeatic Research Institute, 668 recs.
4	Olsen, R. Herbarium Specimens. Nova Scotia Agricultural College, Truro. 2003.
4	Phinney, Lori; Toms, Brad; et. al. 2016. Bank Swallows (<i>Riparia riparia</i>) in Nova Scotia: inventory and assessment of colonies. Merser Tobeatic Research Institute, 25 recs.
3	Adams, J. & Herman, T.B. 1998. Thesis, Unpublished map of <i>C. insculpta</i> sightings. Acadia University, Wolfville NS, 88 recs.
3	Bateman, M.C. 2000. Waterfowl Brood Surveys Database, 1990-2000 . Canadian Wildlife Service, Sackville, unpublished data. 149 recs.
3	Benjamin, L.K. 2012. NSDNR fieldwork & consultant reports 2008-2012. Nova Scotia Dept Natural Resources, 196 recs.
3	Bishop, G. 2012. Field data from September 2012 <i>Anticosti</i> Aster collection trip. , 135 rec.
3	Blaney, C.S. 2018. Atlan ic Canada Conservation Data Centre Fieldwork 2018. Atlantic Canada Conserva ion Data Centre.

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3	Blaney, C.S.; Spicer, C.D.; Rothfels, C. 2004. Fieldwork 2004. Atlantic Canada Conservation Data Centre. Sackville NB, 1343 recs.
3	Boyer, A.W. 2000. Harlequin Duck Surveys. Canadian Wildlife Service, Sackville, unpublished data. 5 recs.
3	Cameron, R.P. 2013. 2013 rare species field data. Nova Scotia Department of Environment, 71 recs.
3	Catling, P.M. 1981. Taxonomy of autumn-flowering <i>Spiranthes</i> species of southern Nova Scotia in Can. J. Bot. , 59:1250-1273. 30 recs.
3	Churchill, J.L. 2020. Atlantic Canada Conservation Data Centre Fieldwork 2020. Atlantic Canada Conservation Data Centre, 1083 recs.
3	Clayden, S.R. 2006. <i>Pseudevernia cladonia</i> records. NB Museum. Pers. comm. to S. Blaney, Dec, 4 recs.
3	Doucet, D.A. 2007. Lepidopteran Records, 1988-2006. Doucet, 700 recs.
3	Forbes, G. 2001. Bog Lemming, Phalarope records, NB. , Pers. comm. to K.A. Bredin. 6 recs.
3	Forbes, G. 2021. <i>Chrysemys picta</i> record from Waasis, New Brunswick. pers. comm.
3	Lautenschlager, R.A. 2005. Survey for Species at Risk on the Canadian Forest Service's Acadia Research Forest near Fredericton, New Brunswick. Atlantic Canada Conservation Data Centre, 6. 3 recs.
3	Lovit, M. 2015. Rare Passamaquoddy Flora of Grand Manan. New Brunswick Museum, Florence M. Christie Grant in Botany, 32 pp.
3	Nash, Vicky. 2018. Hammond River Angling Association Wood Turtle observations. Hammond River Angling Association, 3 recs.
3	Neily, T.H. 2013. Email communication to Sean Blaney regarding <i>Listera australis</i> observations made from 2007 to 2011 in Nova Scotia. , 50.
3	Newell, R.E. 2006. Rare plant observations in Digby Neck. Pers. comm. to S. Blaney, 6 recs.
3	Phinney, L. 2019. Little Brown Myotis maternal colony counts and birdSAR, 2019. Mersey Tobeatic Research Institute.
3	Riley, J. 2020. Digby County <i>Pannaria lurida</i> observations. Pers. comm. to J.L. Churchill.
3	Wallace, S. 2022. Email to Sean Blaney regarding NB DNRED Ranger Wood Turtle sightings from 2021. NB DNRED, 5 records.
2	Amiro, Peter G. 1998. Atlantic Salmon: Inner Bay of Fundy SFA 22 & part of SFA 23. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-12. 4 recs.
2	Anon. 2017. Export of Maritimes Butterfly records. Global Biodiversity Information Facility (GBIF).
2	Bagnell, B.A. 2003. Update to New Brunswick Rare Bryophyte Occurrences. B&B Botanical, Sussex, 5 recs.
2	Basquill, S.P. 2018. Various specimens, NS DNR field work. NS Department of Natural Resources, 10.
2	Belliveau, A.G. 2020. Email to Colin Chapman on new NS locations for <i>Allium tricoccum</i> . Chapman, C.J. (ed.) Acadia University.
2	Benjamin, L.K. 2011. NSDNR fieldwork & consultant reports 1997, 2009-10. Nova Scotia Dept Natural Resources, 85 recs.
2	Bishop, G., Bagnell, B.A. 2004. Site Assessment of Musquash Harbour, Nature Conservancy of Canada Property - Preliminary Botanical Survey. B&B Botanical, 12pp.
2	Cameron, R.P. 2009. Cyanolichen database. Nova Scotia Environment & Labour, 1724 recs.
2	Clayden, S.R.; Goltz, J.P. 2018. Emails to Sean Blaney on occurrence of <i>Polygonum douglasii</i> at Big Bluff, Kings Co., New Brunswick. pers. comm., 1 record.
2	Edsall, J. 1992. Summer 1992 Report. New Brunswick Bird Info Line, 2 recs.
2	Edsall, J. 1993. Spring 1993 Report. New Brunswick Bird Info Line, 3 recs.
2	Goltz, J. 2017. Harlequin Duck observations. New Brunswick Department of Agriculture, Aquaculture and Fisheries.
2	Goltz, J.P. 2002. Botany Ramblings: 1 July to 30 September, 2002. N.B. Naturalist, 29 (3):84-92. 7 recs.
2	Hill, N.M. 1994. Status report on the Long's bulrush <i>Scirpus longii</i> in Canada. Committee on the Status of Endangered Wildlife in Canada, 7 recs.
2	Hinds, H.R. 1999. A Vascular Plant Survey of the Musquash Estuary in New Brunswick. , 12pp.
2	Manning, I. 2020. Peregrine Falcon nest site observations. pers. comm. to J. Churchill.
2	Marx, M. & Kenney, R.D. 2001. North Atlantic Right Whale Database. University of Rhode Island, 4 recs.
2	Misc. rare species records gathered by NSDNR staff or communicated to NSDNR and forwarded to ACCDC
2	NatureServe Canada. 2018. iNaturalist Maritimes Butterfly Records. iNaturalist.org and iNaturalist.ca.
2	Nova Scotia Department of Lands and Forestry. 2018. Wood Turtle observations in, or near, the Cornwallis River watershed. NS DLF, pers. comm. to AC CDC.
2	Perrin, J., Russel, J. 1912. Catalogue of Butterflies and Moths, Mostly Collected in the Neighborhood of Halifax and Digby, Nova Scotia. Proceedings and Transactions of the Nova Scotian Institute of Science, 12(3), 258-290.
2	Phillips, B. 2017. Emails to John Klymko regarding Eastern Waterfan (<i>Peltigera hydrothyria</i>) occurrences in Fundy National Park. Fundy Biosphere Reserve, 3 recs.
2	Powell, B.C. 1967. Female sexual cycles of <i>Chrysemy picta</i> & <i>Clemmys insculpta</i> in Nova Scotia. Can. Field-Nat., 81:134-139. 26 recs.
2	Proulx, V.D. 2002. <i>Selaginella rupestris</i> sight record at Centreville, Nova Scotia. Virginia D. Proulx collection, 2 recs.
2	Richardson, D., Anderson, F., Cameron, R., Pepper, C., Clayden, S. 2015. Field Work Report on the Wrinkled Shingle lichen (<i>Pannaria lurida</i>). COSEWIC.
2	Vinson, Neil. 2020. Email - additional <i>Peltigera hydrothyria</i> records, Fundy National Park. Chapman-Lam, Colin J. (ed.) Fundy National Park, 2.
2	White, S. 2019. Notable species sightings, 2018. East Coast Aquatics.
1	Allen, Cory. 2021. Email to John Klymko regarding <i>Glyptemys insculpta</i> observation. Personal communication.
1	Amirault, D.L. & McKnight, J. 2003. Piping Plover Database 1991-2003. Canadian Wildlife Service, Sackville, unpublished data. 7 recs.
1	Amirault, D.L. 1997-2000. Unpublished files. Canadian Wildlife Service, Sackville, 470 recs.
1	Anon. Dataset of butterfly records for the Maritime provinces. Museum of Comparative Zoology, Harvard University. 2017.
1	Beardmore, T. 2017. Wood turtle data: observations May 2017. Nashwaaksis Stream, NB. Natural Resources Canada, 78 records.
1	Belliveau, A. 2013. email to Sean Blaney regarding <i>Listera australis</i> observations in SW Nova Scotia. Mersey Tobeatic Research Institute, 8.
1	Belliveau, A.G. E.C. Smith Herbarium Specimen Database 2019. E.C. Smith Herbarium, Acadia University. 2019.
1	Benjamin, L.K. 2009. Boreal Felt Lichen, Mountain Avens, Orchid and other recent records. Nova Scotia Dept Natural Resources, 105 recs.
1	Berg, L. 2020. Canada Warbler observations, Birch Lake, NS. pers. comm. to J. Churchill.
1	Blaney, C.S. 1999. Fieldwork 1999. Atlantic Canada Conservation Data Centre. Sackville NB, 292 recs.
1	Bredin, K.A. 2000. NB & NS Bog Project, fieldwork. Atlantic Canada Conservation Data Centre, Sackville, 1 rec.
1	Buchanan, Jean. 2021. Email to Sean Blaney regarding Wood Turtle, Chipman, NB. pers. comm.
1	Cameron, R.P. 2009. <i>Erioderma pedicellatum</i> database, 1979-2008. Dept Environment & Labour, 103 recs.
1	Cameron, R.P. 2017. 2017 rare species field data. Nova Scotia Environment, 64 recs.

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1	Clark, R. 2021. Email to S. Blaney, re: Wood Turtle observation from near Hunters Home, Queens Co., NB., May 20 2021. Rosemarie Clark <rsmr_clrk.luvsfam@hotmail.ca>, 1 record.
1	Clayden, S.R. 2003. NS lichen ranks, local ions. Pers. comm. to C.S. Blaney. 1p, 5 recs, 5 recs.
1	Clayden, S.R. 2007. NBM Science Collections. Pers. comm. to D. Mazerolle, 1 rec.
1	Clayden, S.R. 2020. Email regarding Blue Felt Lichen (<i>Pectenaria plumbea</i>) occurrences in New Brunswick, from Stephen Clayden to Sean Blaney. pers. comm., 2 records.
1	Cook, K. 2016. Wood Turtle record. Pers. comm. to Nova Scotia Department of Lands and Forestry.
1	COSEWIC (Committee on the Status of Wildlife in Canada). 2013. COSEWIC Assessment and Status Report on the Eastern Waterflea <i>Peltigera hydrothyrina</i> in Canada. COSEWIC, 46 pp.
1	Crowell, M.J. Plant specimens from Nictaux, NS sent to Sean Blaney for identification. Jacques Whitford Limited. 2005.
1	Dadswell, M.J. 1979. Status Report on Shortnose Sturgeon (<i>Acipenser brevirostrum</i>) in Canada. Committee on the Status of Endangered Wildlife in Canada, 15 pp.
1	Daury, R.W. & Bateman, M.C. 1996. The Barrow's Goldeneye (<i>Bucephala islandica</i>) in the Atlantic Provinces and Maine. Canadian Wildlife Service, Sackville, 47pp.
1	deGooyer, K. 2018. <i>Chelydra serpentina</i> observation record. Nova Scotia Environment.
1	Dept of Fisheries & Oceans. 1999. Status of Wild Striped Bass, & Interaction between Wild & Cultured Striped Bass in the Maritime Provinces. , Science Stock Status Report D3-22. 13 recs.
1	Deseta, N. 2021. Email to John Klymko regarding <i>Riparia riparia</i> observations. Nashwaak Watershed Association Inc.
1	e-Butterfly. 2018. Selected Maritimes butterfly records from 2016 and 2017. Maxim Larrivee, Sambo Zhang (ed.) e-butterfly.org.
1	Edsall, J. 1993. Summer 1993 Report. New Brunswick Bird Info Line, 2 recs.
1	Elderkin M.F. 2007. <i>Selaginella rupestris</i> , <i>Iris prismatica</i> & <i>Lophiola aurea</i> records in NS. NS Dept of Natural Resources, Wildlife Div. Pers. comm. to C.S. Blaney, 3 recs.
1	Forbes, Graham. 2021. Email to John Klymko regarding <i>Glyptemys insculpta</i> observation. Personal communication.
1	Goltz, J.P. 2001. Botany Ramblings April 29-June 30, 2001. N.B. Naturalist, 28 (2): 51-2. 8 recs.
1	Hicklin, P.W. 1990. Shorebird Concentration Sites (unpubl. data). Canadian Wildlife Service, Sackville, 296 sites, 30 spp.
1	Hill, N. 2014. 2014 Monarch email report, Bridgetown, NS. Fern Hill Institute for Plant Conservation.
1	Hill, N.; Manning, I. 2020. Wild Leek observation, Cornwallis River, NS, floodplain. pers. comm. to J. Churchill.
1	Hill, N.M., Myra, M. 2017. Email to Sean Blaney regarding rich intervalle flora on Nictaux River. Fern Hill Institute, 3 records.
1	Hinds, H.R. 2000. Rare plants of Fundy in Rare Plants of Fundy: maps. Wissink, R. (ed.) Parks Canada, 2 recs.
1	Houghton, Andrew. 2021. Email to Sean Blaney re: nesting Snapping Turtle, NB. pers. comm.
1	Jessop, B. 2004. <i>Acipenser oxyrinchus</i> local ions. Dept of Fisheries & Oceans, Atlantic Region, Pers. comm. to K. Bredin. 1 rec.
1	Kirkland, G.L. Jr. & Schmidt, D.F. 1982. Abundance, habitat, reproduction & morphology of forest-dwelling small mammals of NS & south-eastern NB. Can. Field-Nat., 96(2): 156-162. 1 rec.
1	Kirkland, G.L. Jr., Schmidt, D.F. & Kirkland, C.J. 1979. First record of the long-tailed shrew (<i>Sorex dispar</i>) in New Brunswick. Can. Field-Nat., 93: 195-198. 1 rec.
1	Klymko, J. Université de Moncton insect collection butterfly record dataset. Atlantic Canada Conservation Data Centre. 2017.
1	Klymko, J., Sabine, D. 2015. Verification of the occurrence of <i>Bombus affinis</i> (Hymenoptera: Apidae) in New Brunswick, Canada. Journal of and Acadian Entomological Society, 11: 22-25.
1	Klymko, J.J.D.; Robinson, S.L. 2012. 2012 field data. Atlantic Canada Conservation Data Centre, 447 recs.
1	LaFlamme, C. 2008. Discovery of <i>Goodyera pubescens</i> at Springdale, NB. Amec Earth and Environmental. Pers. comm. to D.M. Mazerolle, 1 rec.
1	LaPaix, R.W.; Crowell, M.J.; MacDonald, M. 2011. Stantec rare plant records, 2010-11. Stantec Consulting, 334 recs.
1	Loo, J. & MacDougall, A. 1994. GAP analysis: Summary Report. Fundy Model Forest, 2 recs.
1	Maass, W.S.G. & Yetman, D. 2002. Assessment and status report on the boreal felt lichen (<i>Erioderma pedicellatum</i>) in Canada. Committee on the Status of Endangered Wildlife in Canada, 1 rec.
1	MacFarlane, Wayne. 2018. Skunk Cabbage observation on Long Island, Kings Co. NB. Pers. comm., 1 records.
1	MacKinnon, D.S. 2013. Email report of Peregrine Falcon nest E of St. Martins NB. NS Department of Environment and Labour, 1 record.
1	Madden, A. 1998. Wood Turtle records in northern NB. New Brunswick Dept of Natural Resources & Energy, Campbellton, Pers. comm. to S.H. Gerriets. 16 recs.
1	Majka, C. 2009. Université de Moncton Insect Collection: Carabidae, Cerambycidae, Coccinellidae. Université de Moncton, 540 recs.
1	Manning, I. 2020. Peregrine Falcon observation. Pers. comm. to J.L. Churchill.
1	Martin, Alyssa. 2021. Email to Sean Blaney regarding Wood Turtle sighting, NB. pers. comm.
1	McAlpine, D.F. & Collingwood, L. 1989. Rare Salamander Survey in Fundy National Park. Fundy National Park, Internal Documents, 1 rec.
1	McAlpine, D.F. & Cox, S.L., McCabe, D.A., Schnare, J.-L. 2004. Occurrence of the Long-tailed Shrew (<i>Sorex dispar</i>) in the Nerepis Hills NB. Northeastern Naturalist, vol 11 (4) 383-386. 1 rec.
1	McAlpine, D.F. 1983. Species Record Cards. Fundy National Park, Library, 1 rec.
1	McAlpine, D.F. 2020. Email to John Klymko about <i>Epargyreus clarus</i> record from Grand Bay, NB. Pers. comm.
1	McIntosh, W. 1904. Supplementary List of the Lepidoptera of New Brunswick. Bulletin of the Natural History Society of New Brunswick, 23: 355-357.
1	McMullin, Troy. 2021. <i>Anzia colpodes</i> observations near Kejimikujik National Park. Canadian Museum of Nature.
1	Munro, Marian C., Newell, R.E. & Hill, Nicholas M. 2014. Nova Scotia Plants. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia, First edition.
1	Nature Trust of New Brunswick. 2020. Nature Trust of New Brunswick 2020 staff observations of species occurrence data. Nature Trust of New Brunswick, 133 records.
1	NatureServe Canada. 2018. iNaturalist Butterfly Data Export. iNaturalist.org and iNaturalist.ca.
1	Neily, P.D. Plant Specimens. Nova Scotia Dept Natural Resources, Truro. 2006.
1	Neily, T.H. & Pepper, C.; Toms, B. 2013. Nova Scotia lichen location database. Mersey Tobeatic Research Institute, 1301 records.
1	Neily, T.H. & Pepper, C.; Toms, B. 2018. Nova Scotia lichen database [as of 2018-03]. Mersey Tobeatic Research Institute.
1	Nye, T. 2002. Wood Turtle observations in Westmorland, Queens Cos. , Pers. com. to S.H. Gerriets, Dec. 3. 3 recs.
1	Parker, M. 2018. East Coast Aquatics ACCDC 2018 Report. East Coast Aquatics, 12 records.
1	Poirier, Nelson. 2012. <i>Geranium robertianum</i> record for NB. Pers. comm. to S. Blaney, Sep. 6, 1 rec.
1	Porter, C.J.M. 2014. Field work data 2007-2014. Nova Scotia Nature Trust, 96 recs.
1	Robicheau, C. 2019. Atlantic Canada Conservation Data Centre Fieldwork 2019. Atlantic Canada Conservation Data Centre.
1	Sabine, D.L. & Goltz, J.P. 2006. Discovery of <i>Utricularia resupinata</i> at Little Otter Lake, CFB Gagetown. Pers. comm. to D.M. Mazerolle, 1 rec.
1	Sabine, D.L. 2004. Specimen data: Whittaker Lake & Marysville NB. Pers. comm. to C.S. Blaney, 2pp, 4 recs.
1	Sabine, D.L. 2013. Dwaine Sabine butterfly records, 2009 and earlier.

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1	Sabine, M. 2016. Black Ash records from NB DNR permanent forest sampling Plots. New Brunswick Department of Natural Resources, 39 recs.
1	Simpson, D. Collection sites for Black Ash seed lots preserved at the National Tree Seed Centre in Fredericton NB. National Tree Seed Centre, Canadian Forest Service. 2016.
1	Smith, M. 2013. Email to Sean Blaney regarding <i>Schizaea pusilla</i> at Caribou Plain Bog, Fundy NP. pers. comm., 1 rec.
1	Spicer, C.D. & Harries, H. 2001. Mount Allison Herbarium Specimens. Mount Allison University, 128 recs.
1	Steeves, R. 2004. <i>Goodyera pubescens</i> occurrence from Colpitts Brook, Albert Co. , Pers. comm. to C.S. Blaney. 1 rec.
1	Taylor, Eric B. 1997. Status of the Sympatric Smelt (genus <i>Osmerus</i>) Populations of Lake Utopia, New Brunswick. Committee on the Status of Endangered Wildlife in Canada, 1 rec.
1	Toner, M. 2005. <i>Listera australis</i> population at Bull Pasture Plains. NB Dept of Natural Resources. Pers. comm. to S. Blaney, 8 recs.
1	Toner, M. 2009. Wood Turtle Sightings. NB Dept of Natural Resources. Pers. comm. to S. Gerriets, Jul 13 & Sep 2, 2 recs.
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Appendix IV:
Archaeological Predictive Modelling



Legend S

SymbolID

- 0
- HistoricFeb2022
- PreContactFeb2022
- UndefinedSites
- SuspectedShipwrecks
- Shipwrecks
- SuspectedPlaneCrash
- SuspectedPlaneCrash
- RecordedPlaneCrash
- ProtoHistoricSite
- RecentFinds
- Cemeteries
- New Brunswick Portage Routes

waterbody

<all other values>

WATER CODE

- AQ
- LK
- ON
- PN
- RV
- SL
- WA
- PIDs

Roads

<all other values>

TRANSPORTA

- 1
- 3
- 2
- PreContactFeb2022_Buffer
- HistoricFeb2022_Buffer
- PortageBuffer4
- PortageBuffer
- wetland

watercourse

<all other values>

WATERCOURS

- 1
- 2
- Predicted Flow Channel

Slope_demnb2

<VALUE>

- 0 - 25.36652904
- 25.36652905 - 60.23010614
- 60.23010615 - 72.92877099
- 72.928771 - 77.50883873
- 77.50883874 - 80.67965486
- 80.67965487 - 83.85047099
- 83.850471 - 89.83979034

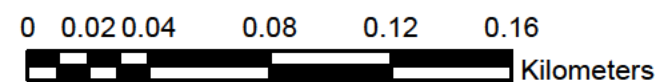
- High Potential1
- Medium Potential1

MarinePaleoShoreline

VALUE

- 0 - 28
- 28.00000001 - 38
- 38.00000001 - 48
- 48.00000001 - 810
- Alluvial Sediments

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri



Time: 12:19:41 PM
Date: 6/28/2022

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