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WRIGHT LANE SUBDIVISION

ENVIRONMENTAL IMPACT ASSESSMENT

PID 15171788

Canal, New Brunswick

Prepared for:

CCM Towing and Recovery Inc.
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FUNDY Engineering

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5 July 2022

Project No: 15819

OFFICES IN SAINT JOHN AND CLYDE RIVER

JOB FILE:	15819		
PROJECT TITLE:	Wright Lane Subdivision Environmental Impact Assessment		
VERSION	**ISSUANCE DATE**	**PREPARED BY**	**REVIEWED BY**
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PROFESSIONAL SEAL:

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ACRONYMS

ACCDC:	Atlantic Canada Conservation Data Centre
B.Sc.:	Bachelor of Science
CCM:	CCM Towing and Recovery Inc.
cm:	centimetre
COSEWIC:	Committee On the Status of Endangered Wildlife in Canada
CWS:	Canadian Wildlife Service
DFO:	Department of Fisheries and Oceans
e.g.:	(*exempli gratia*) for example
EIA:	Environmental Impact Assessment
ENR:	Environment and Natural Resources

EP:	Environmental Professional
ESA:	Environmentally Significant Area
et al.:	(*et alii*) and others
etc.:	*et cetera*
FGC:	Fellow of Geoscience Canada
f*SARA*:	federal *Species At Risk Act*
ha:	hectare
i.e.:	(*id est*) namely / that is
Inc.:	Incorporated
km:	kilometre
km^2:	kilometres squared
Ltd.:	Limited
m:	metre
m^2:	metres squared
n.b.:	(*nota bene*) note well / take note
NBDELG:	New Brunswick Department of the Environment and Local Government
NBDJPS:	New Brunswick Department of Justice and Public Safety
NBDNRED:	New Brunswick Department of Natural Resources and Energy Development
P.Geo.:	Professional Geoscientist
p*SARA*:	provincial *Species At Risk Act*
P.Tech.:	Professional Technologist
PDF:	Portable Document Format
Ph.D.:	Doctorate of Philosophy
PID:	Property Identification number
PMP:	Project Management Professional
Q.C.:	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 CCM Towing and Recovery Inc. (CCM), which is owned by Mr. Michael Wright.

1.2 PROPONENT ADDRESS

50 Route 172
Upper L'Etang, New Brunswick
E5C 2C8

1.3 PROPONENT CONTACT

Mr. Michael Wright
Owner

✆ 506.755.0022
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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 15171788 (Figure 1). The 7.12 hectare (ha) property is owned by CCM. Please refer to Appendix I for a copy of the property information records.

Figure 1. Aerial photograph showing the location of PID 15171788 along Wright Lane in Canal, 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:

WRIGHT LANE SUBDIVISION

2.2 PROJECT OVERVIEW

About 5.2 ha or 73 % of the subdivision parent property (*i.e.*, PID 15171788) comprises wetland (Figure 2). Five lots will be subdivided from the parent property and a private road will provide access to those lots. It is expected that residences or cottages will be constructed on the subdivided lots. Each lot will be serviced by individual onsite groundwater wells and septic systems.

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 CCM (% Mr. Michael Wright). 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

Wetland infilling will be required to facilitate residential or cottage development on each lot. Infilling is also required for the private access road. The developer requires an upland area of 4 047 m^2 per lot to facilitate construction of a well, septic field, driveway, and residence / cottage.

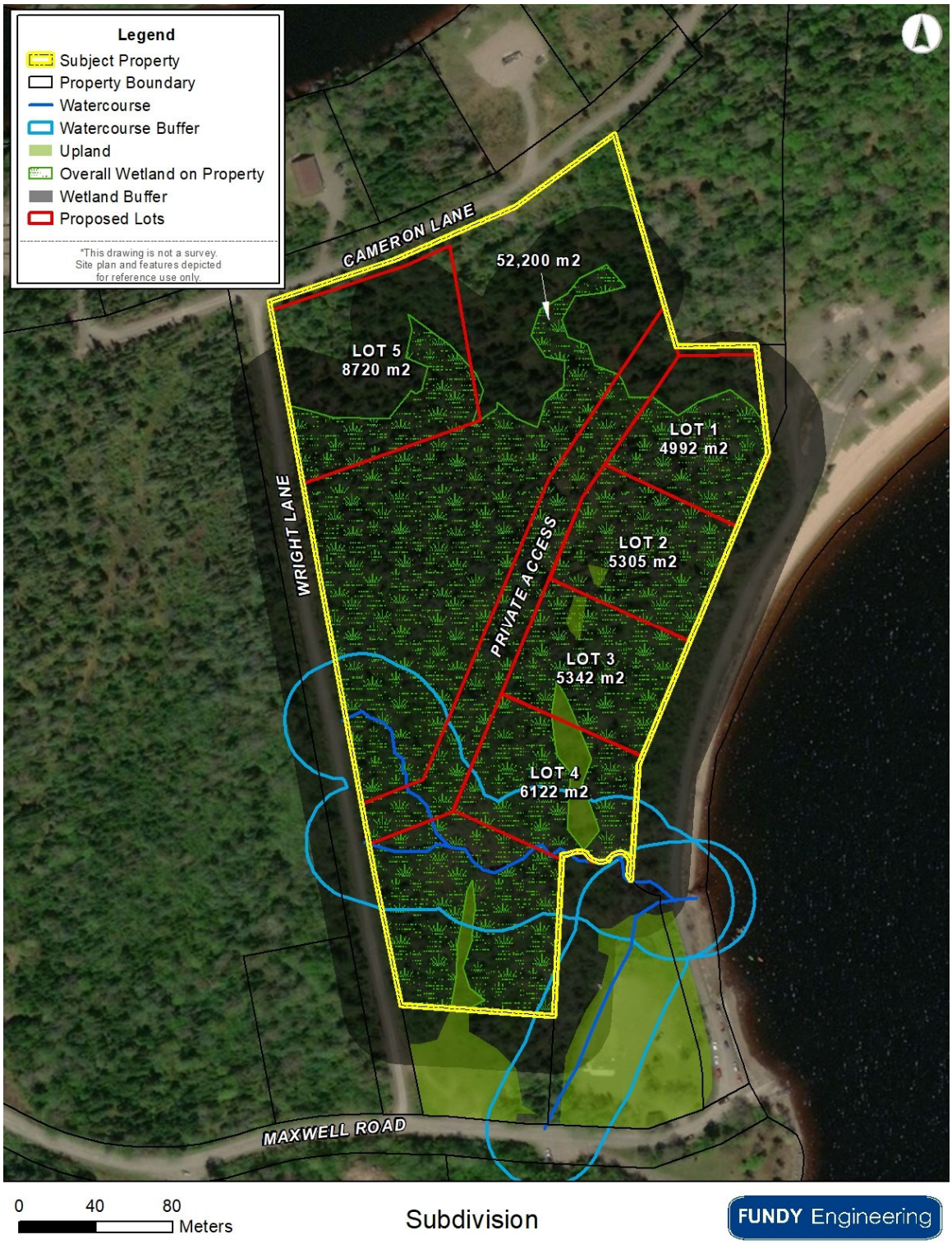

Figure 2. Aerial photograph showing the proposed subdivision of PID 15171788 along Wright Lane in Canal, New Brunswick.

2.5 PROJECT LOCATION

The property is located in Canal, New Brunswick (*i.e.*, Charlotte County, Saint George Parish) along the western shoreline of Lake Utopia as shown in Figure 1. The property is bound by Cameron Lane to the north, Maxwell Road to the east and south, and Wright Lane to the west.

2.6 PROJECT ALTERNATIVES

Prior to purchasing the property, CCM 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. CCM purchased the property as a development opportunity. After purchase, CCM proceeded with obtaining development permits from the Southwest New Brunswick Service Commission.

While constructing the private road to access lots 1 through 4, it is understood that representatives with the NBDELG advised CCM to stop all work on the Project site due to the potential presence of watercourses and wetlands.

The null alternative (*i.e.*, the do-nothing approach) is not an option as it would not allow CCM to recover any of the costs they have currently expended on the property development.

2.7 PROJECT DETAILS

Each proposed lot contains wetland and upland. The amount of wetland infilling required to create 4 047 m^2 of upland per lot to facilitate development will vary as summarized in Table 1. Overall, it is estimated that 19 366 m^2 of wetland will require infilling within the boundaries of the proposed Wright Lane Subdivision as summarized in Table 1 (*n.b.*, that area is strictly wetland and does not include the 30 m regulated buffer).

Table 1. Estimated wetland impact per lot for the proposed Wright Lane Subdivision in Canal, New Brunswick.

Feature	Overall Size (m^2)	Wetland Size (m^2)	Upland Size (m^2)	Wetland Infill Required (m^2)	Compensation Required*	
					(m^2)	($)
Lot 1	4 992	3 556	1 239	2 808	5 616	16 848
Lot 2	5 305	5 263	69	3 978	7 956	23 868
Lot 3	5 342	5 031	311	3 736	7 472	22 416
Lot 4	6 122	5 304	818	3 229	6 458	19 374
Lot 5	8 702	3 094	4 364	0	0	0
Access Road	6 344	5 615	705	5 615	11 230	33 690
TOTAL	**36 807**	**27 863**		**19 366**	**38 732**	**116 196**

NOTES:
*Compensation required assumes a 2:1 ratio by the NBDELG for offsetting wetland impacts (*i.e.*, this is the wetland infill required column multiplied by 2) and \$3 · m^2 for wetland creation through Ducks Unlimited Canada services (*i.e.*, this is the compensation area required multiplied by \$3)

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 the proposed Wright Lane Subdivision 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 2.

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

Table 2. Typical list of heavy equipment anticipated for use during construction of the proposed Wright Lane Subdivision in Canal, New Brunswick.

Equipment Use / Type	Typical Task
ENVIRONMENTAL PROTECTION MEASURES INSTALLATION AND REMOVAL	
Pick-up support truck or van	Transport of equipment and personnel
TREE CUTTING	
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
GRUBBING AND STRIPPING	
Semi-trailer truck and float trailer	Floating equipment to and from site
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
SITE LEVELLING	
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

Equipment Use / Type	Typical Task
Dump truck	Hauling of materials onsite and offsite
Roller	Compaction of material
Pick-up support truck or van	Transport of equipment and personnel
PROJECT CONSTRUCTION	
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
LANDSCAPING	
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
GENERAL CONSTRUCTION EQUIPMENT	
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 cleared and infilled areas). Strawbale barriers will be erected within the access roadside ditch to mitigate sedimentation within the wetland and unnamed watercourses.

2.7.1.2 Tree Cutting

Some of the trees required to be removed for the Project were felled prior to the NBDELG issuing a Stop Work Order (*i.e.*, those required for the access road). Additional standing timber will require cutting to allow the well, septic field, driveway, and residence / cottage 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 infrastructure atop. 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 infilling the area required on each lot for building a well, septic field, driveway, and residence / cottage. The information presented within this document with respect to the Project layout is conceptual. Lots will be sold when purchase agreements are accepted.

The Subdivision is located in a rural area not serviced with potable water and sanitary sewer. Potable water will be supplied via drilled onsite groundwater wells. Drilling and installation of the groundwater wells will be done by a qualified and licensed water well driller. Wastewater will be collected and treated onsite using septic tanks and constructed leach fields. Design of the septic tanks and leach fields will be completed by an approved installer. Electrical services are available for connection along Wright Lane, Cameron Lane, and Maxwell Road. Exterior lighting will be minimal and only that necessary for occupant safety.

Some excavation will be associated with this Project and include excavations for: the cottage / residence foundation; connection of the groundwater wells; installation of the septic tanks and leach fields and connection to the buildings.

The private roadway and driveway materials (*i.e.*, clean crushed rock) will be obtained from local suppliers.

2.7.1.6 Landscaping

Once the lots are developed, the remaining exposed lands will be landscaped. It is expected that those lands will be landscaped with a typical residential-style lawn, trees, and gardens.

2.7.1.7 Environmental Protection Measures Removal

Once the lots have 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 occupants over the long-term. 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 unknown how long it will take for the lots to be fully developed; however, the proponent intends to complete the necessary infill to make the lots sellable within 12 to 24 months of a successful EIA approval.

2.9 FUTURE WETLAND PROTECTION

When the lots are sold, a clause will be included in the purchase and sale agreement that indicates the property contains wetland. It will further note that any impact to that wetland and / or the 30 m regulated buffer will require approval through under the *Watercourse and Wetland Alteration Regulation* [**90-80**] of the *New Brunswick Clean Water Act* [**S.N.B. 1989, c. C-6.1**]. It will also indicate that any impacts may have to 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**].

3.0 DESCRIPTION OF THE BASELINE 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 25 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* (f*SARA*) [**S.C. 2002, c. 29**] and the provincial *Species At Risk Act* (p*SARA*) [**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, 14 listed species (Figure 3) have been observed (Figure 4):

Figure 3. Photographs of species listed under the f*SARA*, p*SARA*, and by the Committee On the Status of Endangered Wildlife In Canada (COSEWIC) that have been observed within a 5 km radius of the proposed Wright Lane Subdivision in Canal, New Brunswick.

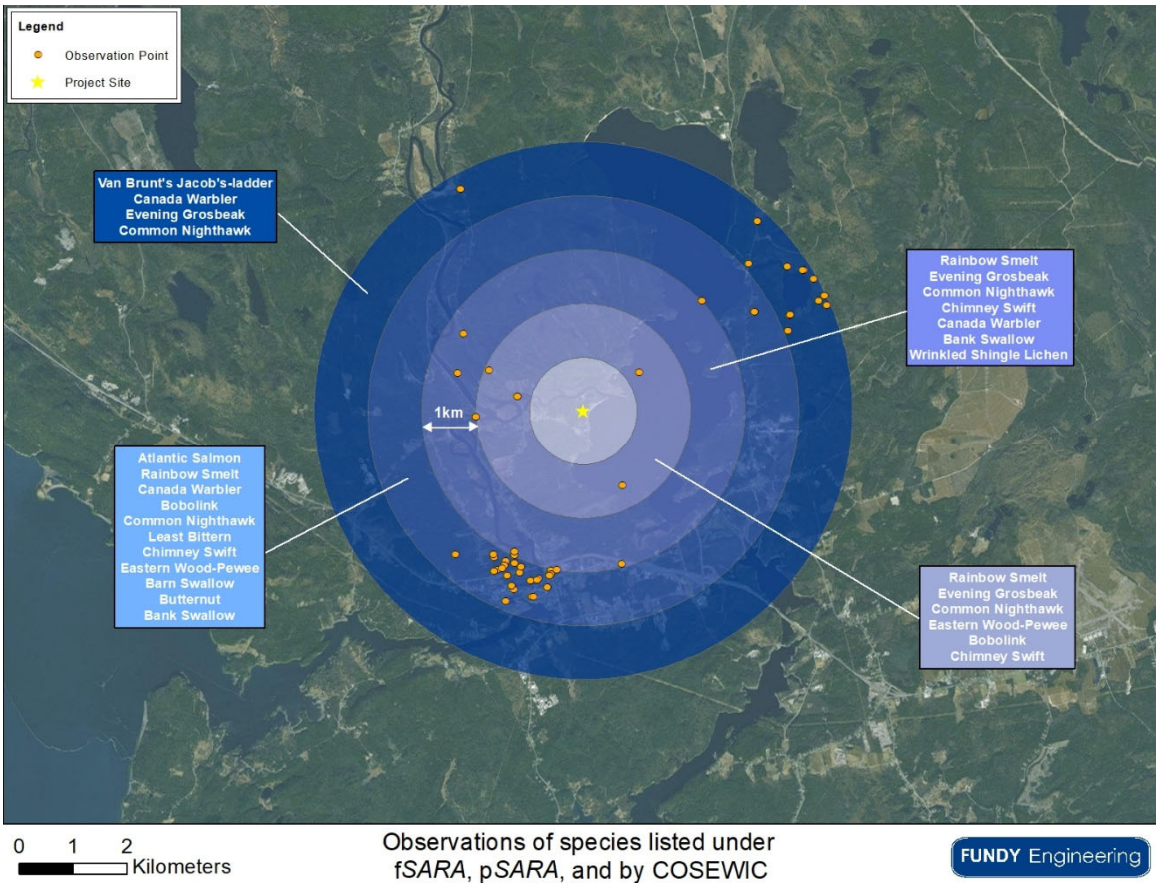

Figure 4. Map showing the recorded observations of species listed under the f*SARA*, p*SARA*, and by the COSEWIC within a 5 km radius of the proposed Wright Lane Subdivision in Canal, New Brunswick. Data obtained from the ACCDC.

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 two location-sensitive species for the area (Figure 5). During the field assessment of the watercourses and wetlands on the property, no snapping turtles or bald eagles were observed.

BALD EAGLE
(*HALIAEETUS LEUCOCEPHALUS*)

fSARA: NO STATUS
COSEWIC: NOT AT RISK
pSARA: ENDANGERED

SNAPPING TURTLE
(*CHELYDRA SERPENTINA*)

fSARA: SPECIAL CONCERN
COSEWIC: SPECIAL CONCERN
pSARA: SPECIAL CONCERN

Figure 5. Photographs of location-sensitive species included in the ACCDC data report within a 5 km radius of the Wright Lane Subdivision proposed for Canal, New Brunswick.

3.2.3 Locally Observed Rare Species

The ACCDC databases show 67 observations of rare species within 5 km of the Project site (Figure 6). Eastern skunk cabbage (*Symplocarpus foetidus*) was the only rare species observed on the property during the watercourse and wetland field delineation completed on 25 May 2022 (*i.e.*, refer to the report within Appendix III) and it was found in all wetland areas on the property.

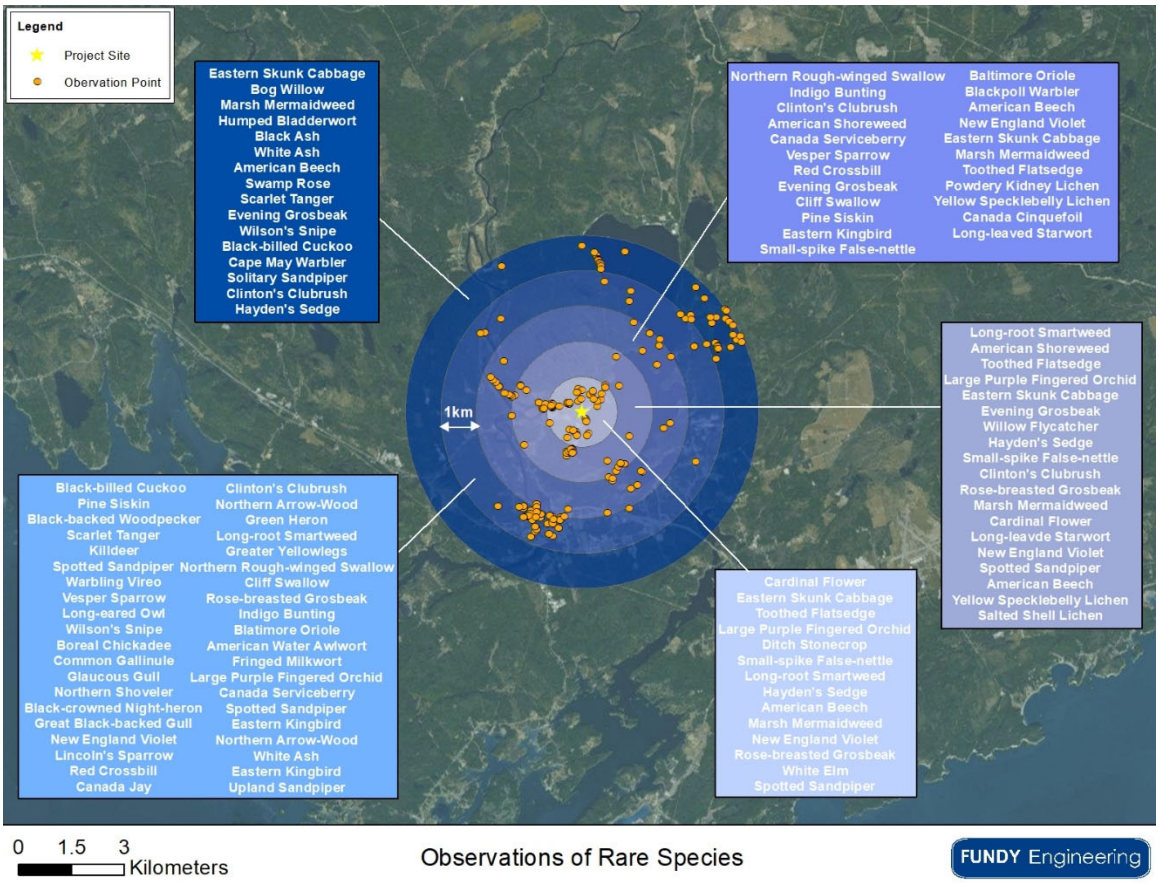

Figure 6. Map showing the recorded observations of rare species within a 5 km radius of the proposed Wright Lane Subdivision in Canal, New Brunswick. Data obtained from the ACCDC.

Skunk cabbage is a low-growing boreal plant that grows in wetlands and moist hillslopes of eastern North America. When the leaves are bruised, they produce an odour reminiscent of a skunk. The flowers emerge from the ground in early spring before the leaves. The leaves die by late summer and the plants go dormant until the following spring. The flowers produce a maroon hoodlike leaf / spathe that surrounds a knob-like structure called a spadix. The spathe grows about 10 cm tall by 1 cm wide. The spadix is a fleshy spike of many petal-less flowers. Skunk cabbage of the ability to produce heat, which allows it to emerge and bloom even when the ground is still frozen.

3.2.4 Environmentally Significant and Managed Areas

The ACCDC query yielded three Environmentally Significant Areas (ESAs) and one managed area within 5 km of the Project site including:

- Lake Utopia / The Canal ESA;
- St. George Roadcuts ESA;
- Magaguadavic River ESA; and
- Lake Utpoia Wildlife Refuge.

Lake Utopia is a unique lake in New Brunswick, which is why it is designated as an ESA. Its outlet, The Canal, drains to the Magaguadavic River. This lake is likely unique in New Brunswick in having an outlet delta at The Canal, which drains the lake to the Magaguadavic River. During periods of heavy rain, the level of the river rises higher than the lake so that the Canal reverses, becoming an inlet.

Two large roadcuts, separated by a deep valley of the Magaguadavic River, form the St. George Roadcuts ESA. To the east of the valley are Early Devonian, orange coloured, felsic volcanics. To the east are Early Silurian grey slates and mafic dykes. Abundant fractures in these rock cuts contain felsic volcanic rocks and minor mafic rocks.

The Magaguadavic River flows through St. George and into Passamaquoddy Bay of the Bay of Fundy. Next to the St. Croix River, it is the second largest source of freshwater to Passamaquoddy Bay. The 1 806 km^2 watershed supports a diverse array of floodplain species. It is also known to have considerable salmon spawning and rearing areas, including in one of its tributaries, Piskahegan Stream. The Magaguadavic and Big Salmon River in Fundy National Park support the most significant remaining salmon runs on the Bay of Fundy.

Utopia Wildlife Refuge was officially designated a conservation area on 5 June 2006. It is part of the 200 km^2 Lepreau Wildlife Management Area (*i.e.*, NB Zone 20) and is situated in the Parishes of Saint George and Pennfield. It is an area where hunting and trapping are not allowed as prescribed under the New Brunswick *Fish and Wildlife Act* [**S.N.B. 1980, c. F-14.1**].

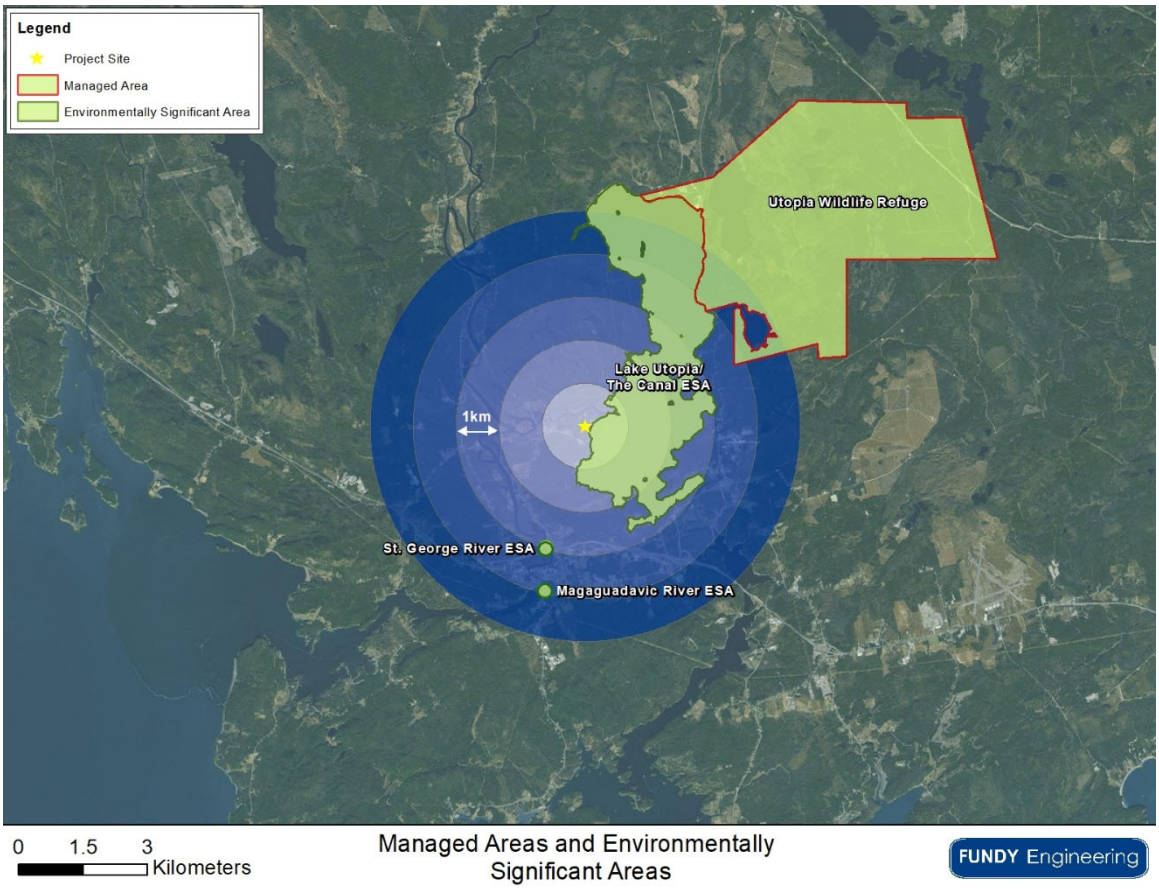

Figure 7. Map showing the environmentally significant and managed areas within a 5 km radius of the proposed Wright Lane Subdivision in Canal, New Brunswick. Data obtained from the ACCDC.

3.3 ARCHAEOLOGICAL AND CULTURAL FEATURES

The Project site is located within traditional Peskotomuhkati territory. There are no known archaeological or cultural features on the property. 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.

3.4 HISTORICAL LAND-USE

Historical aerial photographs of the Project site are shown in Figure 8 through Figure 11. The property has never been previously developed. The surrounding roadways, other than Maxwell Road, are relatively new.

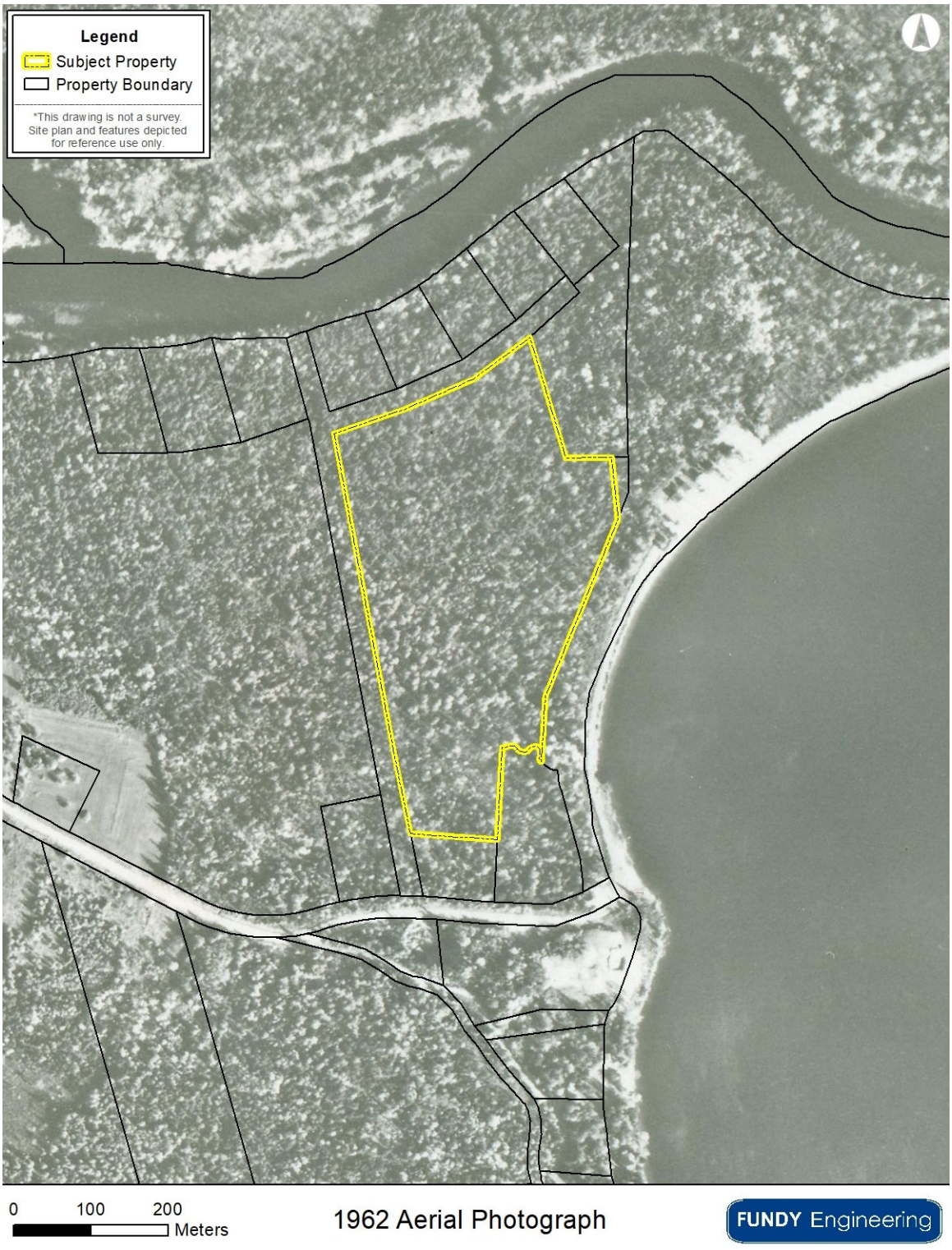

Figure 8. Aerial photograph, circa 1962, of the property proposed for Wright Lane Subdivision in Canal, New Brunswick.

Figure 9. Aerial photograph, circa 1976, of the property proposed for Wright Lane Subdivision in Canal, New Brunswick.

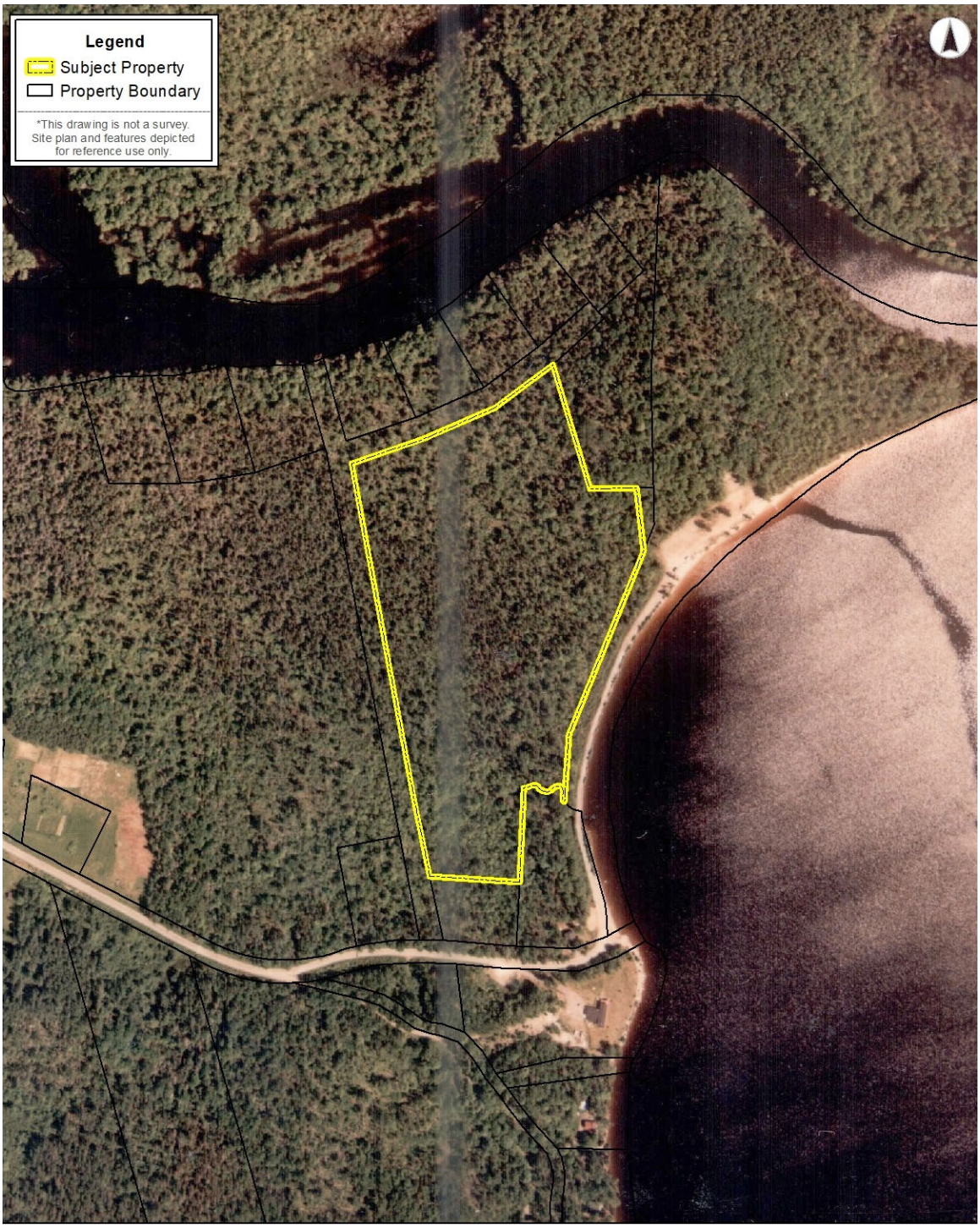

Figure 10. Aerial photograph, circa 1984, of the property proposed for Wright Lane Subdivision in Canal, New Brunswick.

Figure 11. Aerial photograph, circa 1994, of the property proposed for Wright Lane Subdivision in Canal, New Brunswick.

Figure 12. Aerial photograph, circa 2011, of the property proposed for Wright Lane Subdivision in Canal, 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;
- resident fish habitat;
- organic nutrient export; and
- songbird, raptor, and mammal 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 f*SARA* or the p*SARA* 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 Wright Lane Subdivision in Canal, New Brunswick is provided in Table 3.

Table 3. Potential critical adverse environmental effects assessment completed for the proposed Wright Lane Subdivision in Canal, New Brunswick. Blue-shaded rows with bolded text refer to critical values.

Wetland Function, Value	Evaluation Criteria	Criteria Presence						Criteria Importance						Criteria Impact				Criteria Description
		Yes	Likely	Possibly	No	Unknown	Comments	National	Provincial	Regional	Local	Negligible	Why?	High	Moderate	Low	Why?	Highlights
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**	**Not present**
	The wetland provides flood protection benefits				✓								**Located on the shoreline of Lake Utopia**				**< 50 % of the wetland will be infilled and the remaining wetland will still provide this function**	**Not present**
	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	
	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 the lake shoreline					Not present
	SCORE	1	0	1	4	0	0	0	0	0	2	0		0	0	2		
	CRITICAL SCORE	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**		
BIOGEOCHEMICAL VALUES																		
	The wetland receives significant pollution of a type amenable to ameloriation 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 nearby											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 likley 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 be infilled**
	The wetland provides for sediment flow stabilization	✓									✓		↓ streamflow by retaining water; energy dissipation, ↓ sediment transport			✓	Wetland system is only at a localized spatial scale	Function will likely still exist considering < 50 % of wetland will be infilled
	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											Not present
	SCORE	1	0	1	3	0		0	0	0	1	1		0	0	2		
	CRITICAL SCORE	**0**	**0**	**1**	**2**	**0**		**0**	**0**	**0**	**0**	**1**		**0**	**0**	**1**		
HABITAT VALUES																		
	There are rare, threatened, or endangered plant or animal species present (*i.e.*, as listed by COSEWIC or others)	✓					**Skunk cabbage, which is considered rare, was observed during the delineation**				✓		**Skunk cabbage is found throughout the wetland**		✓		**Infilling would result in the loss of habitat for this species**	**< 50 % of wetland will be infilled so habitat will still persist**

Wetland Function, Value	Evaluation Criteria	Criteria Presence						Criteria Importance						Criteria Impact				Criteria Description
		Yes	Likely	Possibly	No	Unknown	Comments	National	Provincial	Regional	Local	Negligible	Why?	High	Moderate	Low	Why?	Highlights
	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											Not present
	The wetland provides habitat for herpetiles	✓					ACCDC data indicate snapping turtle exist in the area				✓		ACCDC data indicate snapping turtle exist in the area			✓	Infilling would result in the loss of habitat for herpetiles	< 50 % of wetland will be infilled so habitat will still persist
	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	2	0	0	7	0		0	0	0	2	0		0	1	1		
	CRITICAL SCORE	**1**	**0**	**0**	**3**	**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 Lake Utopia
	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**		

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

Wetland Function, Value	Evaluation Criteria	Criteria Presence						Criteria Importance						Criteria Impact				Criteria Description
		Yes	Likely	Possibly	No	Unknown	Comments	National	Provincial	Regional	Local	Negligible	Why?	High	Moderate	Low	Why?	Highlights
	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 fish present											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				✓		The nearest suburban area is St. George and the nearest urban centre would be Saint John											Not present
	The wetland receives a large number of visitors each year				✓		Majority of people would not know the wetland exists											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				✓		There is no public access											Not present
	The wetland is public land				✓		Privately owned land											Not present
	SCORE	0	0	0	6	0		0	0	0	0	0		0	0	0		
	CRITICAL SCORE	**0**	**0**	**0**	**1**	**0**		**0**	**0**	**0**	**0**	**0**		**0**	**0**	**0**		
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**

Wetland Function, Value	Evaluation Criteria	Criteria Presence						Criteria Importance						Criteria Impact				Criteria Description
		Yes	Likely	Possibly	No	Unknown	Comments	National	Provincial	Regional	Local	Negligible	Why?	High	Moderate	Low	Why?	Highlights
	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	3	1		0	0	0	0	0		0	0	0		
	CRITICAL SCORE	**0**	**0**	**0**	**1**	**1**		**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 200 cords 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 impacted
	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
	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**		

Wetland Function, Value	Evaluation Criteria	Criteria Presence						Criteria Importance						Criteria Impact				Criteria Description
		Yes	Likely	Possibly	No	Unknown	Comments	National	Provincial	Regional	Local	Negligible	Why?	High	Moderate	Low	Why?	Highlights
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	0	2			0	0	2		
CRITICAL SCORE	**0**	**0**	**1**	**0**	**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 of the five lots would likely be under $1.5 million**	
Project operation will stimulate the local and regional economy			✓									✓	Local economy will benefit from Project operation and maintenance			✓	Only potentially five new residences, little property maintenance, energy costs, *etc.*	
Project operation will stimulate value-added production to the provincial or national economy				✓													Not present	Not present

Wetland Function, Value	Evaluation Criteria	Criteria Presence						Criteria Importance						Criteria Impact				Criteria Description
		Yes	Likely	Possibly	No	Unknown	Comments	National	Provincial	Regional	Local	Negligible	Why?	High	Moderate	Low	Why?	Highlights
	The Project will generate significant new taxes and / or enhance the tax base			✓								✓	There will be an increase in the tax base, but it will not be significant			✓		
	SCORE	0	0	3	1	0	0	0	0	0	0	3		0	0	3		
	CRTICAL SCORE	**0**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**		**0**	**0**	**2**		
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		
URBAN / INDUSTRIAL INFRASTRUCTURE VALUES																		
	The Project will provide accommodation and ease housing shortages		✓								✓		The pandemic has resulted in a housing shortage and there is a demand for new dwellings			✓	This Project will provide up to five new dwellings	
	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	1	0	4	0		0	0	0	1	0		0	0	1		

Results of the *Bond et al.* [1992] assessment are summarized in Table 4. The assessment showed the potential for one critical adverse environmental effect to be realized as a result of developing the proposed Wright Lane Subdivision. That critical adverse environmental effect is related to habitat value and more specifically the value of the habitat provided by the wetland for skunk cabbage.

Table 4. Summary of the potential critical adverse environmental effects assessment completed for the proposed Wright Lane Subdivision in Canal, 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		1	4						2				2
Biogeochemical Values	1		1	3						1	1			2
Habitat Values	2			7		1				2			1	1
Ecological Values			2	5										
SOCIAL / CULTURAL FUNCTIONS														
Aesthetic Values				4										
Recreational Values				4										
Education Awareness Values				4										
Public Status Values				6										
Cultural Attribute Values				3	1									
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	**5**		**4**	**58**	**1**	**1**				**5**	**2**			**6**
PROJECT FUNCTIONS														
Employment Values			2	2							2			2
Economic Values			3	1							3			3
Production Values				6										
Urban Development Values		1		4						1				1
TOTAL OCCURRENCES		**1**	**5**	**13**						**1**	**5**			**6**

*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 (*i.e.*, only one critical value, habitat value, was identified during the complete analysis and < 50 % of the overall wetland habitat will be lost). 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 Saint George detachment of the Royal Canadian Mounted Police (RCMP) should be contacted (506.755.1130) 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 Table 1, about 19 366 m^2 of wetland will be infilled to facilitate the proposed Wright Lane Subdivision. The Proponent understands that wetland impacts must be compensated for and that the compensation ratio is 2:1 (*i.e.*, 38 732 m^2 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 Peskotomuhkati 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:

- Andrea Anderson-Mason *Q.C.*, Fundy-The Isles-Saint John West Member of the Legislative Assembly;
- John Williamson, New Brunswick Southwest Member of Parliament;
- Southwest New Brunswick Planning Commission; and
- Eastern Charlotte Waterways.

6.2.2 Direct Written Communication with Nearby Residents

An information flyer will be hand-delivered to local residents on Maxwell Road east of the intersection of Cranberry Point Road, Wright Lane, Burke's Way, and Cameron Lane.

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, CCM 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
gulfhabitatgolfe@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 Canal is administered by the Southwest New Brunswick Service Commission (*i.e.*, SNBSC Region 10).

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

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

an application for a building permit from Region 9 can be found at:

<https://www.fundyrecycles.com/assets/Uploads/PlanningBuilding/Application-for-Building-Development-Permit-2017.pdf>; and

an application for a building permit from Region 10 can be found at:

<http://snbsc-planning.com/wp-content/uploads/2020/03/permit-form-v3-03092020.pdf>;

Contact information for the Region 10 building services is provided below.

SNBSC, Region 10
12 River Street, Suite A
St. Stephen, New Brunswick
E3L 3H2

- 506.466.7369
- 506.466.7544
- http://snbsc-planning.com/contact/
- connie.klein@snbsc.ca

8.0 PROJECT FUNDING

All costs associated with this project are being borne by CCM. 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 CCM Towing and Recovery Inc. The Proponent has reviewed the document and understands the information contained within.

Respectfully submitted,

Proponent Signature:

Mr. Michael Wright
Owner
CCM Towing and Recovery Inc.

Environmental Consultant Signature:

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

5 July 2022

9.1 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. Crystal Caines, *PMP, P.Tech.* 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*

10.0 REFERENCES

Adamus, P.R. 2018. Manual for Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC): Non-Tidal Wetlands. 97p.

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

Canadian Wildlife Service (CWS). 1991. The federal policy on wetland conservation. Cat. No. CW66-116/1991E. 15p.

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

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

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

Fundy Engineering. 2021. Phase I Environmental Site Assessment, Cemetery Road and Crow Island Road in Back Bay Cove, New Brunswick (PIDs 15183015 and 15205636). Project Number 14850. 59p.

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

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

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

New Brunswick Department of the Environment and Local Government (NBDELG). 2018. Manual for Wetland Ecosystem Services Protocol for Atlantic Canada (WESP-AC): Non-Tidal Wetlands. 97p.

Reed, P.B., Jr. 1988. *National list of plant species that occur in wetlands: 1988 national summary*. Biology Report 88(24). United States Fish and Wildlife Service, Washington, D.C.

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 proposed subdivision on PID 15171788 in Canal, 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, *PhD., 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 authoured 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 francais*
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

Service New Brunswick **Service Nouveau-Brunswick**

Scale/Échelle 1:4300

Date: 2022/05/19 11:52:47

0 100.0 200.0 300.0 métres metres

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.

Parcel Information

PID:	15171788	**County:**	Charlotte
Status:	Active	**Active Date/Time:**	2006-03-14 15:35:07
Land Related Description:	Land	**Management Unit:**	NB0308
Area:	7.12	**Area Unit:**	Hectares
Date Last Updated:	2021-12-21 09:44:12	**Harmonization Status:**	Harmonized
Land Titles Status:	Land Titles	**Land Titles Date/Time:**	2010-08-31 11:12:29
Date of Last CRO:	2021-12-21 09:44:22	**Manner of Tenure:**	Not Applicable
Land Gazette Information:	NO		
Description of Tenure:			
Public Comments:			

Parcel Interest Holders

Owner	Qualifier	Interest Type
CCM Towing and Recovery Inc.		Owner

Assessment Reference

PAN	PAN Type	Taxing Authority Code	Taxing Authority
6393142		515	SAINT GEORGE BONNY RIVER SECOND FALLS

Parcel Locations

Civic Number	Street Name	Street Type	Street Direction	Place Name
	Maxwells	Road		Canal

County Parish

County	Parish
Charlotte	Saint George

Documents

Number	Registration Date	Book	Page	Code	Description
42078049	2021-12-03			1100	Deed/Transfer
41838765	2021-10-01			1100	Deed/Transfer
29167856	2010-08-31			1100	Deed/Transfer
29164762	2010-08-31			3800	Land Titles First Notice
29164754	2010-08-31			3720	Land Titles First Order

Date/Time: 2022-05-19 11:52:25

Documents (cont.)

Number	Registration Date	Book	Page	Code	Description
29164200	2010-08-31			3900	Land Titles First Application
28532415	2010-03-29			1100	Deed/Transfer
28225937	2010-01-04			2200	Easement
28208701	2009-12-23			1100	Deed/Transfer
128539	1994-06-08	546	112	101	Deed

Plans

Number	Suffix	Registation Date	Code	Description	Lot Information	Orientation
34226895		2014-09-30	9050	Subdivision & Amalgamations		Provincial Grid
29139129		2010-08-25	9050	Subdivision & Amalgamations		Provincial Grid
24332174		2007-08-15	9050	Subdivision & Amalgamations		Provincial Grid

Parcel Relations

Related PID	Type Of Relation	Lot Information
1240662	Parent	
15176548	Infant	Lot 07-1
15187016	Infant	Lot 10-1
15196694	Infant	Lot 2014-5
15196702	Infant	

PAN:	6393142	**Status:**	OPEN
Location:	MAXWELL RD	**County:**	Charlotte
Property Description:	VACANT LAND	**Tax Class:**	Fully Taxable
Property Type Code:	103	**Property Type Name:**	Residential Land - Vacant
Taxing Authority Code:	515	**Neighbourhood Code:**	01
Taxing Authority Description:	SAINT GEORGE BONNY RIVER SECOND FALLS	**Neighbourhood Description:**	ST GEORGE LSD OLD F09(PTYS.TO 515-02>'91
Sequence Number:	K008B	**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
CCM TOWING AND RECOVERY INC.	50 ROUTE 172 UPPER L'ETANG, NB	E5C 2C8	Fee Simple, One Owner

Assessments

Year	Assessment	Levy
2022	$ 15,700.00	$ 267.23
2021	$ 12,700.00	$ 224.38
2020	$ 12,700.00	$ 226.35
2019	$ 12,500.00	$ 223.42
2018	$ 12,300.00	$ 221.75

Sales Price Information

Sale Price	Sale Date
$ 63,000.00	2021-12-03
$ 1.00	2021-10-01
$ 1.00	2010-03-16

PID(s)

PID
15171788

Appendix II:

Standard Watercourse and Wetland Delineation

and Wetland Functional Assessment

☎ 877.635.1566 ✉ fundy@fundyeng.com www.fundyeng.com

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

STANDARD WATERCOURSE AND WETLAND DELINEATION AND WETLAND FUNCTIONAL ASSESSMENT

PID 15171788

Wright Lane in Canal, New Brunswick

Prepared for:

CCM Towing and Recovery Inc.
% Mr. Michael Wright
50 Route 172
Upper L'Etang, New Brunswick
E5C 2C8

Correspondence via email:
ccmtowing@hotmail.com

FUNDY Engineering

Serving Our Clients' Needs First

30 May 2022

Project No: 15808

OFFICES IN SAINT JOHN AND CLYDE RIVER

JOB FILE:	15808		
PROJECT TITLE:	Wright Lane in Canal, New Brunswick Standard Watercourse and Wetland Delineation and Wetland Functional Assessment		
VERSION	ISSUANCE DATE	PREPARED BY	REVIEWED BY
FINAL	30 May 2022	MDA	AKD

FUNDY Engineering

Serving Our Clients' Needs First

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.

PROFESSIONAL SEAL:

CONTENTS

TABLES

FIGURES

ACRONYMS

cm:	centimetre
DFO:	Department of Fisheries and Oceans
e.g.:	(*exempli gratia*) for example
EIA:	Environmental Impact Assessment
EP:	Environmental Professional
et al.:	(*et alii*) and others
etc.:	*et cetera*
FGC:	Fellow of Geoscience Canada
GPS:	Global Positioning System
ha:	hectare
HADD:	Harmful Alteration, Disruption, and Destruction
i.e.:	(*id est*) namely / that is
LiDAR:	Light Detection And Ranging
Ltd.:	Limited
mm:	millimetre
m:	metre
m^2:	metres squared
n.b.:	(*nota bene*) 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 CCM Towing and Recovery Inc. (*i.e.*, the Client), % Mr. Michael Wright, to complete a standard watercourse and wetland delineation (*i.e.*, the Work) for a property on Wright Lane in Canal, New Brunswick. The property subject of the Work is identified in the New Brunswick Geomatics Information Centre database as Property IDentification (PID) number 15171788 (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 was advised by NBDELG representatives that that much of the property is likely an unmapped wetland > 2 ha in size. 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 15171788 along Wright Lane in Canal, New Brunswick that is the subject of the standard watercourse and wetland delineation.

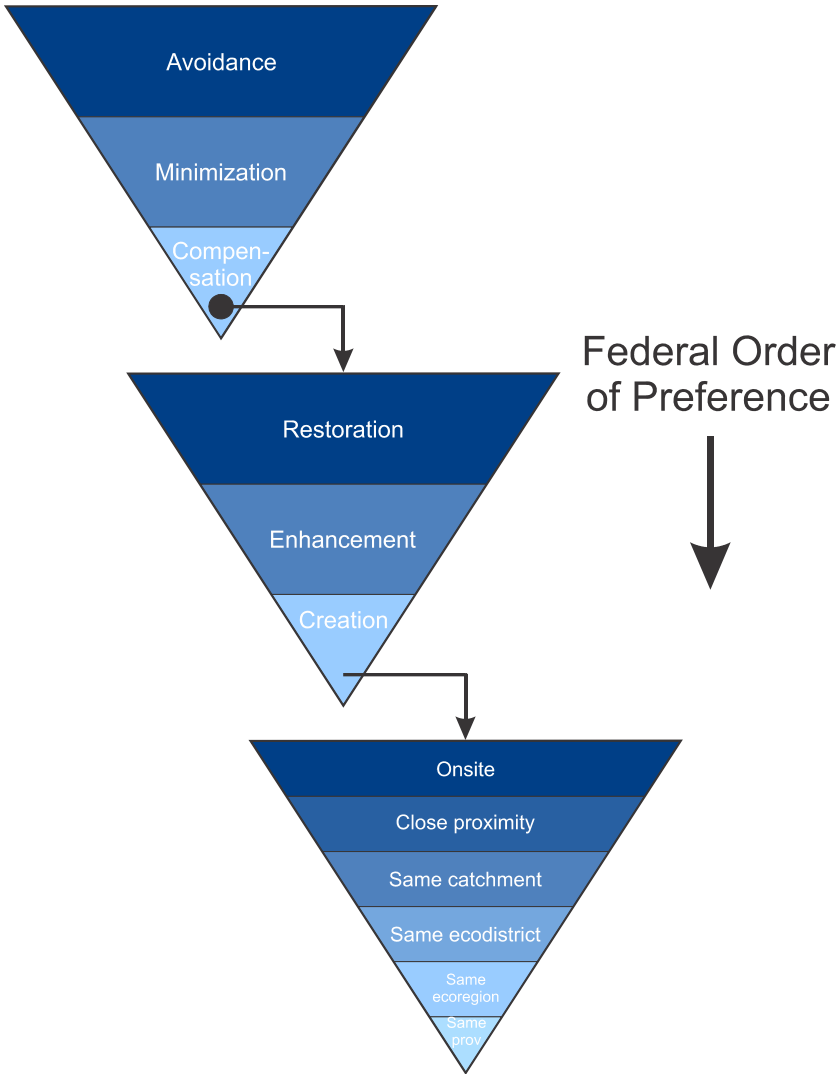

Figure 2. Federal and Provincial Government's preference hierarchy. Based on reports by *Bond et al.* [1992], *Environment Canada* [1996], *Milko* [1998], *Cox and Grose* [2000], and the *Interagency Workshop on Wetland Restoration* [Undated].

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 faculative-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.

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
Hydrologic Functions		
Water storage and delay	The effectiveness for storing runoff or delaying the downslope movement of surface water for long or short periods	Flood control 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
Water Quality Maintenance Functions		
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
Ecological Habitat Functions		
Fish habitat	The capacity to support an abundance and diversity of native fish (both anadromous and resident species)	Support recreational and ecological values
Aquatic invertebrate habitat	The capacity to support or contribute to an abundance or diversity of invertebrate animals, which spend all or part of their life cycle underwater or in moist soil and includes dragonflies, midges, clams, snails, water beetles, shrimp, aquatic worms, and others	Support salmon and other aquatic life and maintain regional biodiversity
Amphibian and reptile habitat	The capacity to support or contribute to an abundance or diversity of native frogs, toads, salamanders, and turtles	Maintain regional biodiversity
Waterbird feeding habitat	The capacity to support or contribute to an abundance or diversity of waterbirds that migrate or winter, but do not breed in the region	Support hunting and ecological values and maintain regional biodiversity
Waterbird nesting habitat	The capacity to support or contribute to an abundance or diversity of waterbirds that nest in the region	Maintain regional biodiversity
Songbird, raptor, and mammal habitat	The capacity to support or contribute to an abundance or diversity of native songbird, raptor, and mammal species and functional groups, especially those that are most dependent on wetlands or water	Maintain regional biodiversity

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 on Wright Lane in Canal (Charlotte County, Saint George Parish), New Brunswick (Figure 1). A property information report is included in Appendix I. According to the GeoNB database, no mapped watercourses and or wetlands are shown to exist on the property (Figure 4). Approximate coordinates for the centre of the property are 45.160094 °N and 65.813156 °W. The property is located in the Fundy Coast ecoregion of New Brunswick.

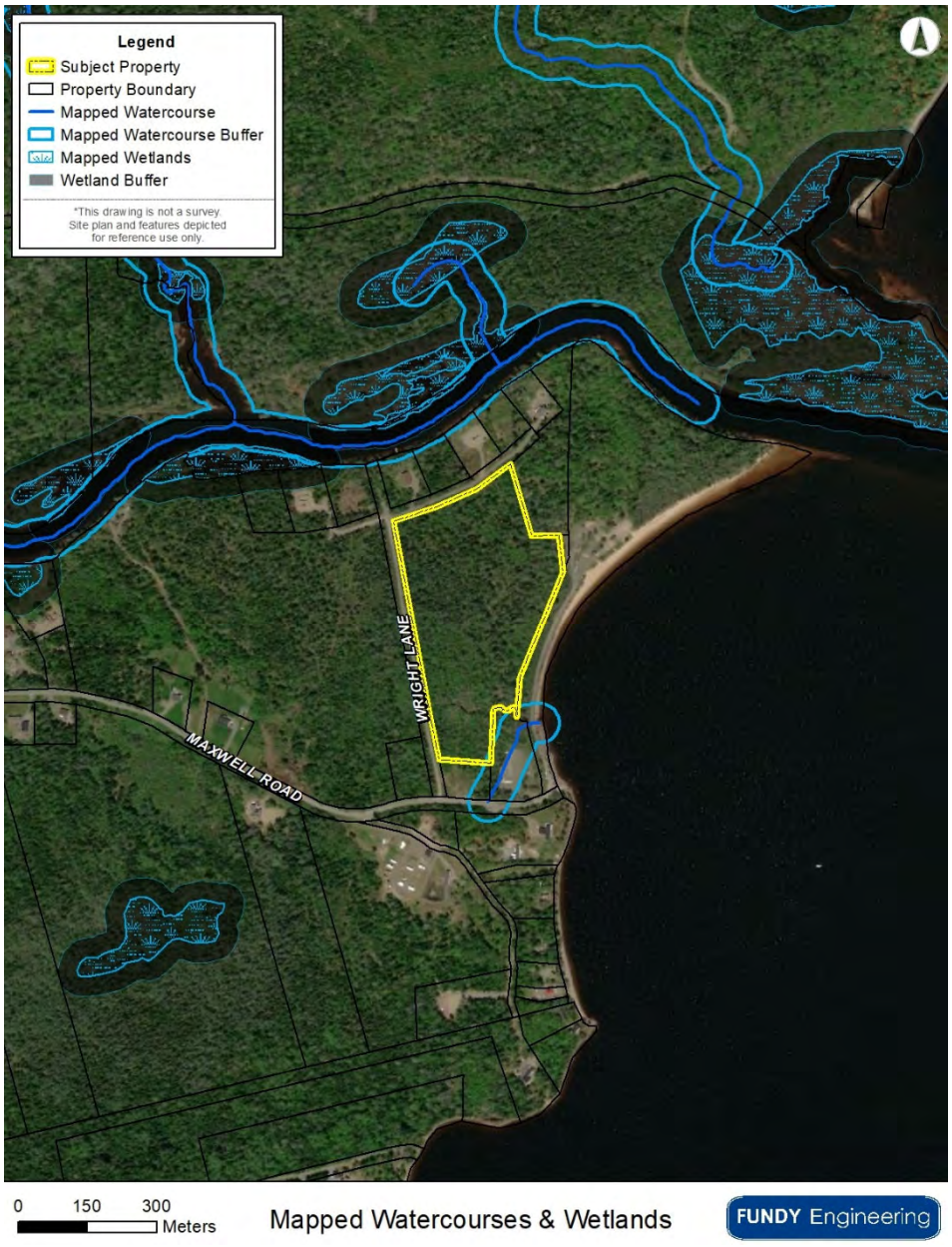

Figure 4. Aerial photograph showing mapped watercourses and wetlands within the NBDELG databases on the project site along Wright Lane in Canal, New Brunswick.

3.1.1 Proposed Development

It is understood that the Client intends to subdivide the property and develop up to five lots as shown in Figure 5. A private access road to access the lots was constructed a few months ago, but work was halted when representatives with the NBDELG reviewed the site and identified presence of a potential wetland.

Figure 5. Aerial photograph showing the proposed lot layout for PID 15171788 along Wright Lane in Canal, New Brunswick.

4.0 FIELD ASSESSMENT

On 25 May 2022, Matt Alexander visited PID 15171788 between 9AM and 2PM 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 ~ 2 mm of precipitation.

The vacant and undeveloped site is bound by Wright Lane to the west, Maxwell Road to the south and east, and Cameron Lane to the north. It was evident that work had recently been done to construct a gravel roadway in to the site to access four of the proposed lots (Figure 6). The grubbings from construction of that roadway was placed on a small portion of the property adjacent to Wright Lane.

Figure 6. Photograph taken on 25 May 2022 showing the newly constructed gravel roadway extending from Wright Lane to the proposed lots on PID 15171788 in Canal, New Brunswick.

4.1 WATERCOURSE DELINEATION

An unnamed watercourse with three tributaries was delineated on the property. Only the southernmost tributary, which flows on to the property after flowing through a 60 cm diameter round concrete culvert under Maxwell Road (Figure 7), was shown in the NBDELG mapping (*i.e.*, Figure 4). The other two tributaries (Figure 8) flow on to the property via 60 cm diameter round concrete culverts under Wright Lane. The wetland on the western side of Wright Lane and surface water runoff collected in the many roadside

ditches appear to be the source of flow in those watercourses. The watercourse leaves the property through a round corrugated PVC culvert under Maxwell Road that discharges on to the beach of Lake Utopia (Figure 9). That PVC culvert was hanging about 30 cm above the shoreline of Lake Utopia during the assessment.

Figure 7. Photograph taken on 25 May 2022 showing the southernmost tributary of the unnamed watercourse flowing on to PID 15171788 from under Maxwell Road in Canal, New Brunswick.

During the assessment, all three tributaries varied from about 1.5 m to up to 3 m wide. Water depths ranged from about 5 cm to 40 cm. Bottom sediments were comprised predominantly of silt and sand. Stream shade was minimal to moderate. Woody debris was plentiful and was likely due to the historic use by beavers. The site of an old beaver dam, lodge, and many trees that were cut down by chewing were observed about midway along on the watercourse through the property. No active use by beavers was observed (*n.b.*, review of historical photographs within Google Earth suggests that it has been several years since beaver were active on the property). No fish were observed within any of the tributaries and is likely because of the hanging culvert at the shoreline of Lake Utopia and the lack of any open water upstream of the property.

Figure 8. Photographs taken on 25 May 2022 showing two of the tributaries of the unnamed watercourse flowing on to PID 15171788 from under Wright Lane Canal, New Brunswick.

Figure 9. Photograph taken on 25 May 2022 showing the unnamed watercourse flowing from PID 15171788 under Maxwell Road in Canal, New Brunswick to the shoreline of Lake Utopia.

Figure 10. Photograph taken on 25 May 2022 showing remnants of a former beaver dam within the unnamed watercourse on PID 15171788 in Canal, New Brunswick.

4.2 WETLAND DELINEATION

One set of "paired" three parameter datum points were used to characterize hydrology, hydric soils, and hydrophytic vegetation; one upland datum point and one wetland datum point. Coordinates for the "paired" datum points are as follows:

- Upland: 45 ° 9 ' 39.04 " N and 66 ° 48 ' 48.55 " W; and
- Wetland: 45 ° 9 ' 39.41 " N and 65 ° 48 ' 47.95 " W.

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

4.2.1 Hydrology

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

Surface water, a high water table, saturation, and inundation visible on aerial imagery, which were all observed at the wetland datum point, were used as positive primary indicators of wetland hydrology. Secondary indicators, including saturation visible on aerial imagery, stunted or stressed plants, geomorphic position, and microtopographic relief, were also observed.

4.2.2 Hydric Soils

Most of the property is low lying. A location with higher microtopographic relief than most of the property was selected as an area believed to be upland. A 55 cm deep test pit was excavated using a shovel to observe the underlying soil conditions (Figure 11). A 10 cm thick root mat was observed atop 35 cm of grey (5 YR 6 / 1) silty clay, atop 10 cm of dark yellowish brown (10 YR 4 / 4) sand. The water table was encountered at a depth of about 50 cm and soil saturation was observed at a depth of about 45 cm.

A 45cm deep test pit was excavated within hydric soils (Figure 11). A 10 cm thick root mat was observed atop 35 cm of very dark grey (10 YR 3 / 1) silty clay characterized as a histic epipedon. The water table was observed at a depth of 10 cm and saturation was observed at the surface.

Figure 11. Photographs taken on 25 May 2022 showing the two test pits used to assess the presence of hydric soils at the project site along Wright Lane in Canal, New Brunswick.

4.2.3 Hydrophytic Vegetation

The dominance test and the prevalence index for both datum points as noted in the data forms of Appendix II was > 50% and ≤ 3.0, respectively, suggesting the presence of 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 III includes photographs showing the representative vegetation. Skunk cabbage (*Symplocarpus foetidus*), which was extremely prevalent on the property, was a very useful indicator of

hydric versus non-hydric soils. Skunk cabbage is ranked by the Atlantic Canada Conservation Data Centre as being vulnerable.

Table 4. List of flora observed on 25 May 2022 at the project site along Wright Lane in Canal, New Brunswick.

Common Name	Scientific Name	Provincial Rarity Rank	Indicator
Balsam fir	*Abies balsamea*	Secure (S5)	FAC
Red maple	*Acer rubrum*	Secure (S5)	FACW+
Speckled alder	*Alnus incana*	Secure (S5)	NI
Wild sarsaparilla	*Aralia nudicaulis*	Secure (S5)	FACU
White birch	*Betula papyrifera*	Secure (S5)	FACU
Black sedge	*Carex nigari*	Apparently Secure (S4) / Secure (S5)	FACW+
Goldthread	*Coptis trifolia*	Secure (S5)	FACW
Bunchberry	*Cornus canadensis*	Secure (S5)	FAC-
Horsetail	*Equisetum arvense*	Secure (S5)	FAC
Wild strawberry	*Fragaria virginiana*	Secure (S5)	FACU
Bedstraw	*Galium asprellum*	Secure (S5)	OBL
Huckleberry	*Gaylussacia baccata*	Secure (S5)	FACU
Sheep laurel	*Kalima angustifolia*	Secure (S5)	FACU
Tamarack	*Larix laricina*	Secure (S5)	FACW
Starflower	*Lysimachia borealis*	Secure (S5)	NI
Sweet clover	*Melilotus officinalis*	Not applicable (SNA)	FACU-
Sensitive fern	*Onoclea sensibilis*	Secure (S5)	FACW
Cinnamon fern	*Osmundastrum cinnamomeum*	Secure (S5)	FACW
Beech fern	*Phegopteris connectilis*	Secure (S5)	NI
Common timothy	*Phleum pratense*	Not applicable (SNA)	FACU
Black spruce	*Picea marianna*	Secure (S5)	FACW-
Red-stemmed feather moss	*Pleurozium schreberi*	Secure	NI
Common cinquefoil	*Potentilla simplex*	Secure (S5)	FACU-
Creeping buttercup	*Ranunculus repens*	Not applicable (SNA)	FAC
Rhodora	*Rhododendron canadense*	Secure (S5)	FACW
Red raspberry	*Rubus idaeus*	Secure (S5)	FAC-
Bebb's willow	*Salix bebbiana*	Secure (S5)	FACW
Pussy willow	*Salix disolor*	Secure (S5)	FACW
Goldenrod	*Solidago canadensis*	Secure (S5)	FACU
Mountain ash	*Sorbus americana*	Secure (S5)	FACU
Skunk cabbage	*Symplocarpus foetidus*	Vulnerable (S3)	OBL
Dandelion	*Taraxacum officinale*	Secure (S5)	FACU-
Eastern marsh fern	*Thelypteris palustris*	Secure (S5)	NI
Eastern white cedar	*Thuja occidentalis*	Secure (S5)	FACW
Coltsfoot	*Tussilago farfara*	Not applicable (SNA)	FACU
Broadleaf cattail	*Typha latifolia*	Secure (S5)	OBL
Lowbush blueberry	*Vaccinium angustifolium*	Secure (S5)	FACU-
Common vetch	*Vicia sativa*	Not applicable (SNA)	FACU-

4.2.4 Boundary Delineation

The boundaries of the wetland, which is characterized as a forested wetland, were only delineated in the area bound by Wright Lane, Cameron Lane, and Maxwell Road (Figure 12). Coordinates for the wetland boundary and watercourses delineated in the field are provided in Appendix IV. Several upland inclusions were identified on the property and they are believed to be remnants of former roadways that may have existed on the property. The overall wetland size on PID 15171788 is estimated at 5.2 ha and occupies about 73 % of the overall property.

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; however, as noted previously, no fish were observed within the onsite watercourses.

The proposed development was overlain on the image showing the delineated watercourses and wetland and is shown in Figure 13. There is very limited amount of land on PID 15171788 that is outside the wetland and its regulated 30 m buffer.

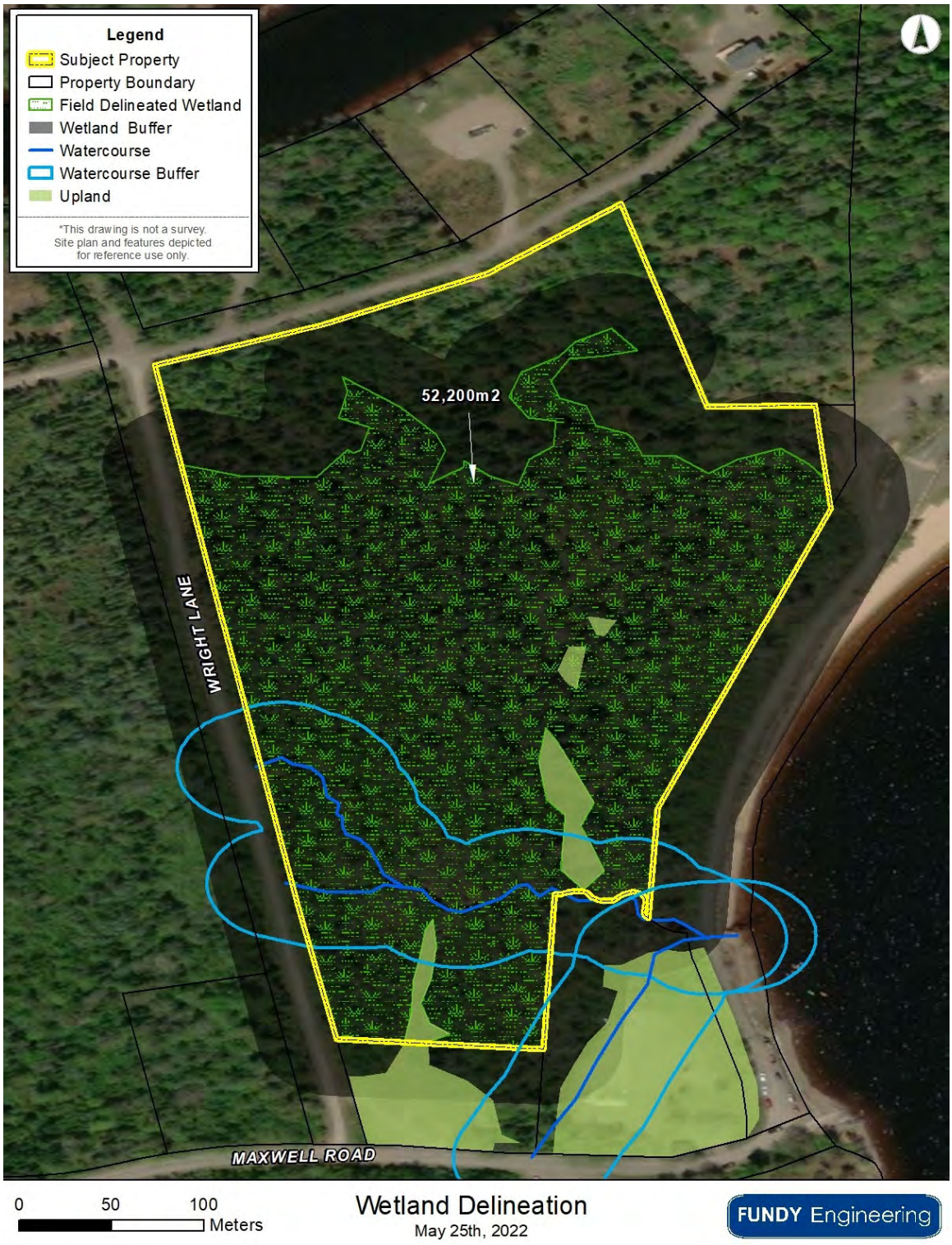

Figure 12. Aerial photograph showing the watercourses and wetland delineated at the project site along Wright Lane in Canal, New Brunswick on 25 May 2022.

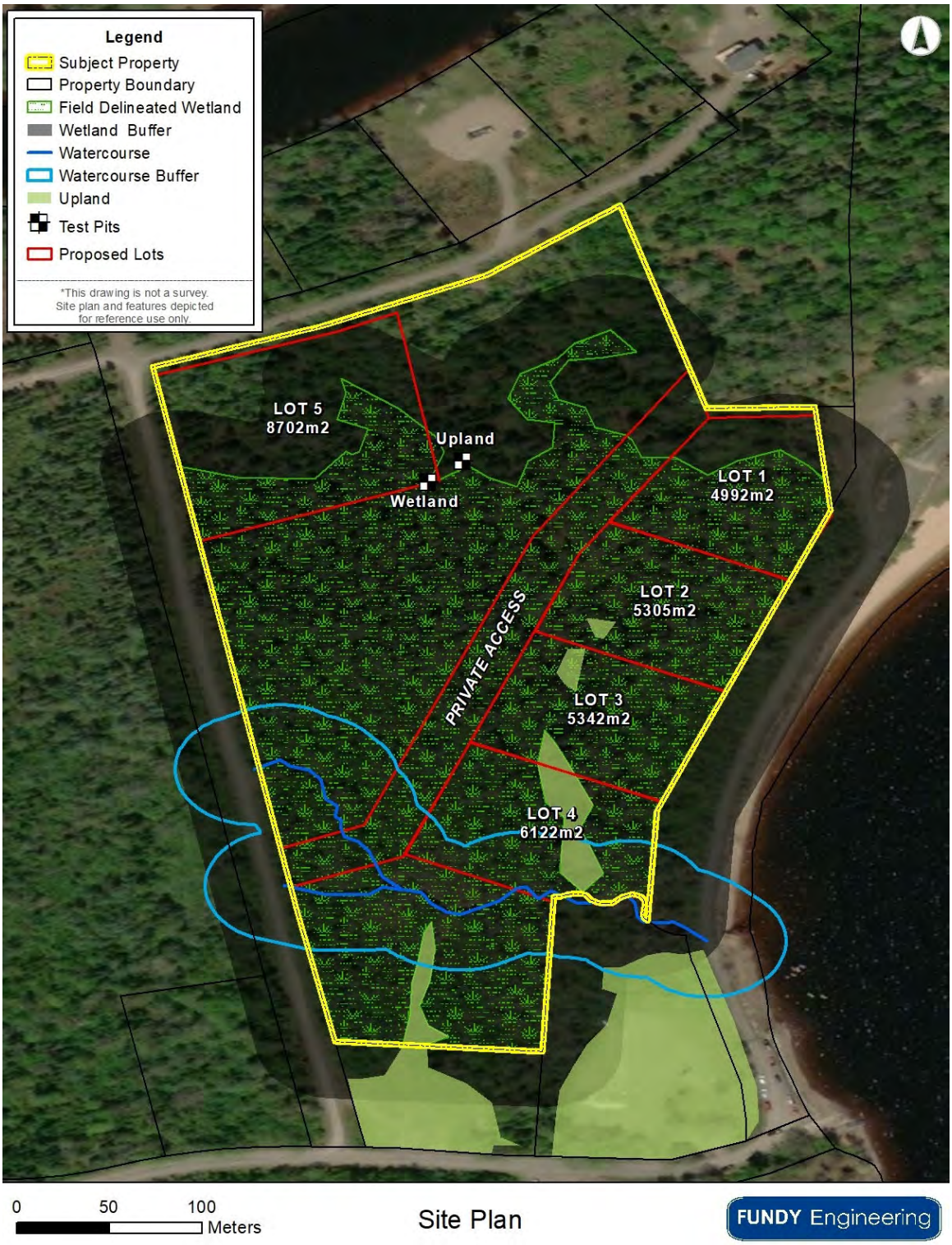

Figure 13. Aerial photograph showing the watercourses and wetland delineated at the project site along Wright Lane in Canal, New Brunswick on 25 May 2022 with the proposed development overlain.

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 V. 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 on PID 15171788 along Wright Lane in Canal, New Brunswick.

Grouped Function	Normalized Function Score*	Function Rating	Benefits Normalized Score*	Benefits Rating
Hydrologic	5.10	Moderate	5.21	Moderate
Water quality support	3.36	Moderate	9.26	Higher
Aquatic support	5.08	Moderate	8.46	Higher
Aquatic habitat	5.99	Moderate	4.40	Moderate
Transition habitat	8.06	Higher	3.90	Moderate
Wetland condition	-	-	0.96	Lower
Wetland risk	-	-	5.56	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 V, the following five functions received a "higher" rating:

- water cooling;
- phosphorous retention;
- resident fish habitat;
- organic nutrient export; and
- songbird, raptor, and mammal 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 along the shoreline of Lake Utopia, which is known to support fish and other aquatic life. The delineated wetland is in a low-lying area that is heavily shaded. The water flowing in to the wetland through the connected unnamed watercourses likely reduces in temperature as it flows through based on the 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 Lake Utopia.

5.2.3 Resident Fish Habitat

Although the watercourses within this wetland were not observed to contain fish, it is likely that this wetland does provide some important function for resident fish habitat in the adjacent waters of Lake Utopia.

5.2.4 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 Lake Utopia. Therefore, this wetland likely supports food chains within Lake Utopia by supplying essential nutrients, either particulate or dissolved.

5.2.5 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.

5.2.6 Overall Condition Risk Assessment

Figure 14 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.

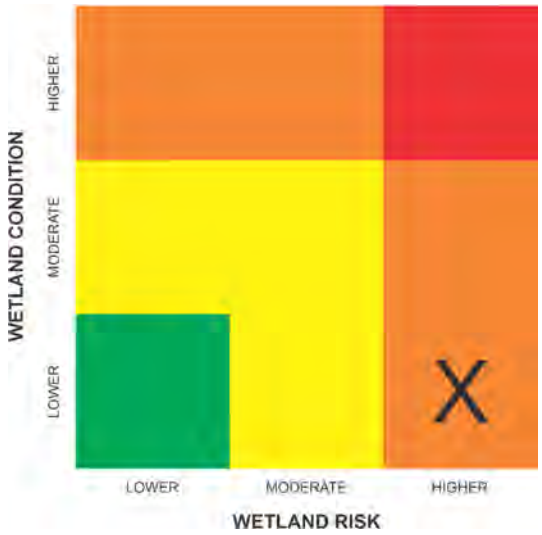

Figure 14. Condition risk assessment for the wetland delineated on PID 15171788 along Wright Lane in Canal, New Brunswick.

6.0 SUMMARY

CCM Towing and Recovery Inc. is proposing to subdivide PID 15171788 in Canal, New Brunswick and develop up to five lots. Fundy Engineering was contracted to complete a watercourse and wetland delineation and wetland functional assessment 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 a portion of the property, but no wetlands. A field visit was conducted on 25 May 2022 to ground-truth environmental features. Results of the field assessment showed that there is an additional unnamed watercourse on the property, but the watercourses do not appear to contain fish. Results further showed that about 73 % or 5.2 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; resident fish habitat; organic nutrient export; and songbird, raptor, and mammal 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. Should the onsite watercourses be impacted, 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 Brunswicker's to enjoy.

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

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

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

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

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

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 interspersion; 6) wetlands that have, or are managed for, social and / or cultural values, including, but not limited to, community, spiritual, archaeological, scientific, educational, and recreational importance.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8.0 REFERENCES

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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 15171788 along Wright Lane in Canal, 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, *PhD., 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 authoured 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 francais*

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

Service New Brunswick **Service Nouveau-Brunswick**

Scale/Échelle 1:4300

Date: 2022/05/19 11:52:47

0 100.0 200.0 300.0 métres metres

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.

Parcel Information

PID:	15171788	**County:**	Charlotte
Status:	Active	**Active Date/Time:**	2006-03-14 15:35:07
Land Related Description:	Land	**Management Unit:**	NB0308
Area:	7.12	**Area Unit:**	Hectares
Date Last Updated:	2021-12-21 09:44:12	**Harmonization Status:**	Harmonized
Land Titles Status:	Land Titles	**Land Titles Date/Time:**	2010-08-31 11:12:29
Date of Last CRO:	2021-12-21 09:44:22	**Manner of Tenure:**	Not Applicable
Land Gazette Information:	NO		
Description of Tenure:			
Public Comments:			

Parcel Interest Holders

Owner	Qualifier	Interest Type
CCM Towing and Recovery Inc.		Owner

Assessment Reference

PAN	PAN Type	Taxing Authority Code	Taxing Authority
6393142		515	SAINT GEORGE BONNY RIVER SECOND FALLS

Parcel Locations

Civic Number	Street Name	Street Type	Street Direction	Place Name
	Maxwells	Road		Canal

County Parish

County	Parish
Charlotte	Saint George

Documents

Number	Registration Date	Book	Page	Code	Description
42078049	2021-12-03			1100	Deed/Transfer
41838765	2021-10-01			1100	Deed/Transfer
29167856	2010-08-31			1100	Deed/Transfer
29164762	2010-08-31			3800	Land Titles First Notice
29164754	2010-08-31			3720	Land Titles First Order

Date/Time: 2022-05-19 11:52:25

Documents (cont.)

Number	Registration Date	Book	Page	Code	Description
29164200	2010-08-31			3900	Land Titles First Application
28532415	2010-03-29			1100	Deed/Transfer
28225937	2010-01-04			2200	Easement
28208701	2009-12-23			1100	Deed/Transfer
128539	1994-06-08	546	112	101	Deed

Plans

Number	Suffix	Registation Date	Code	Description	Lot Information	Orientation
34226895		2014-09-30	9050	Subdivision & Amalgamations		Provincial Grid
29139129		2010-08-25	9050	Subdivision & Amalgamations		Provincial Grid
24332174		2007-08-15	9050	Subdivision & Amalgamations		Provincial Grid

Parcel Relations

Related PID	Type Of Relation	Lot Information
1240662	Parent	
15176548	Infant	Lot 07-1
15187016	Infant	Lot 10-1
15196694	Infant	Lot 2014-5
15196702	Infant	

PAN:	6393142	**Status:**	OPEN
Location:	MAXWELL RD	**County:**	Charlotte
Property Description:	VACANT LAND	**Tax Class:**	Fully Taxable
Property Type Code:	103	**Property Type Name:**	Residential Land - Vacant
Taxing Authority Code:	515	**Neighbourhood Code:**	01
Taxing Authority Description:	SAINT GEORGE BONNY RIVER SECOND FALLS	**Neighbourhood Description:**	ST GEORGE LSD OLD F09(PTYS.TO 515-02>'91
Sequence Number:	K008B	**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
CCM TOWING AND RECOVERY INC.	50 ROUTE 172 UPPER L'ETANG, NB	E5C 2C8	Fee Simple, One Owner

Assessments

Year	Assessment	Levy
2022	$ 15,700.00	$ 267.23
2021	$ 12,700.00	$ 224.38
2020	$ 12,700.00	$ 226.35
2019	$ 12,500.00	$ 223.42
2018	$ 12,300.00	$ 221.75

Sales Price Information

Sale Price	Sale Date
$ 63,000.00	2021-12-03
$ 1.00	2021-10-01
$ 1.00	2010-03-16

PID(s)

PID
15171788

Appendix II:

Wetland Delineation Data Forms

WETLAND DELINEATION DATA FORM – NEW BRUNSWICK

Project/Site: 15808 Municipality/County: CHARLOTTE Sampling Date: 25 MAY 2022

Applicant/Owner: CCM TOWING & RECOVERY INC Sampling Point: UPLAND

Investigator(s): MATT ALEXANDER Affiliation: FUNDY ENGINEERING

Landform (hillslope, terrace, etc.): LOWLAND Local relief (concave, convex, none): FLAT

Slope (%): 0 Lat: 45° 9' 39.41" Long: 66° 48' 47.95" 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

Hydric Soil Present? Yes No ✓

Wetland Hydrology Present? Yes No ✓

Is the Sampled Area within a Wetland? Yes No ✓

If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 5 x 5)	Absolute % Cover	Dominant Species?	Indicator Status
1. ABIES BALSAMEA	40	Y	FAC
2. ACER RUBRUM	5	N	FAC
3. SORBUS AMERICANA	5	N	FACU
4. BETULA PAPYRIFERA	5	N	FACU
5.			
	55	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5 x 5)			
1. ABIES BALSAMEA	10	N	FAC
2. SALIX BEBBIANA	10	N	FACW
3. ALNUS INCANA	5	N	NI
4.			
5.			
	25	= Total Cover	

Herb Stratum (Plot size: 5 x 5)			
1. CORNUS CANADENSIS	90	Y	FAC-
2. TRIENTALIS BOREALIS	5	N	FAC
3. ARALIA NUDICAULIS	5	N	FACU
4. COPTIS TRIFOLIA	5	N	FACW
5. PLEUROZIUM SCHREBERI	50	Y	NI
6. THELYPTERIS PALUSTRIS	5	N	NI
7.			
8.			
9.			
10.			
	90	= Total Cover	

Woody Vine Stratum (Plot size:)			
1.			
2.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	15	x 2 =	30
FAC species	80	x 3 =	240
FACU species	15	x 4 =	60
UPL species	0	x 5 =	0
Column Totals:	110 (A)		330 (B)

Prevalence Index = B/A = 3

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No

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 Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	ROOT							
10-45	SILTY CLAY		5YR 6/1		GREY			
45-55	SAND		10YR 4/4		DARK YELLOWISH BROWN			

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 c Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators 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)

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

Secondary Indicators (minimum of two required)

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

Field Observations:

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

Water Table Present? Yes ✓ No _____ Depth (cm): 50

Saturation Present? (includes capillary fringe) Yes ✓ No _____ Depth (cm): 45

Wetland Hydrology Present? Yes _____ No ✓

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

Remarks:

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)

WETLAND DELINEATION DATA FORM – NEW BRUNSWICK

Project/Site: 15808 Municipality/County: CHARLOTTE Sampling Date: 25 MAY 2022

Applicant/Owner: CCM TOWING + RECOVERY INC Sampling Point: WETLAND

Investigator(s): MATT ALEXANDER Affiliation: FUNDY ENGINEERING

Landform (hillslope, terrace, etc.): LOWLAND Local relief (concave, convex, none): _____

Slope (%): 0 Lat: 45° 9' 39.04" Long: 66° 48' 48.55" 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 _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓ No _____	
Wetland Hydrology Present?	Yes ✓ No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

POINT SELECTED IN UNDISTURBED AREA

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 5x5)			
1. PICEA MARIANA	25	Y	FACW-
2. ABIES BALSAMEA	20	Y	FAC
3. LARIX LARCINIA	10	N	FACW
4. ACER RUBRUM	10	N	FAC
5. BETULA PAPYRIFERA	5	N	FACU
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5x5)			
1. SALIX BEBIANA	10	Y	FACW
2. KALMIA ANGUSTIFOLIA	10	Y	FAC
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 5x5)			
1. SYMPLOCARPUS FOETIDUS	20	Y	OBL
2. PLEUROZIUM SCHREBERI	40	Y	NI
3. CORNUS CANADENSIS	10	N	FAC-
4. VACCINIUM ANGUSTIFOLIUM	5	N	FACU-
5. PHEGOPTERIS HEXAGONOPTERA	15	Y	FAC
6. ARALIA NUDICAULIS	10	N	FACU
7.			
8.			
9.			
10.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	20	x 1 =	20
FACW species	45	x 2 =	90
FAC species	65	x 3 =	195
FACU species	20	x 4 =	80
UPL species	0	x 5 =	0
Column Totals:	150 (A)		385 (B)

Prevalence Index = B/A = 2.6

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

✓ Dominance Test is >50%

✓ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

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

Hydrophytic Vegetation Present? Yes ✓ No _____

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: WETLAND

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

Depth (cm)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-10	ROOT							
10-45	SILTY CLAY		10YR 3/1				VERY DARK GREY	

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

Hydric Soil Indicators:

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

Indicators for Problematic Hydric Soils[3]:

- ___ Coast Prairie Redox (A16)
- ___ 5 c Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators 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)

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

Secondary Indicators (minimum of two required)

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

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (cm): SURFACE

Water Table Present? Yes ✓ No ___ Depth (cm): 10

Saturation Present? (includes capillary fringe) Yes ✓ No ___ Depth (cm): SURFACE

Wetland Hydrology Present? Yes ✓ No ___

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

Remarks:

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)

Appendix III:

Field Assessment Photographs

Appendix IV:

Delineated Wetland Boundary Coordinates

Point	Latitude	Longitude
32	45.160916	-66.813321
33	45.16088	-66.813196
34	45.16083	-66.813062
35	45.16095	-66.813005
36	45.161022	-66.812897
37	45.161112	-66.812674
38	45.161141	-66.812872
39	45.161156	-66.812994
40	45.161253	-66.813098
41	45.161375	-66.813045
42	45.161447	-66.812864
43	45.161525	-66.812779
44	45.161582	-66.812613
45	45.161479	-66.812499
46	45.161455	-66.81264
47	45.161441	-66.812807
48	45.161329	-66.812891
49	45.161255	-66.812851
50	45.16122	-66.812729
51	45.161076	-66.812526
52	45.161053	-66.812497
53	45.160973	-66.812451
54	45.160971	-66.812301
55	45.160884	-66.812137
56	45.160946	-66.811989
57	45.161003	-66.811785
58	45.160927	-66.811638
59	45.158624	-66.812137
60	45.158709	-66.812295
61	45.15874	-66.81247
62	45.158808	-66.812587
63	45.158803	-66.812774
64	45.158826	-66.81295
65	45.158813	-66.813143
66	45.158745	-66.813324
67	45.158806	-66.813472
68	45.158865	-66.813613
69	45.158841	-66.813771
70	45.158843	-66.813978
71	45.15889	-66.814187
72	45.160995	-66.813414
73	45.161079	-66.813452
74	45.161205	-66.81363
75	45.16132	-66.813833
76	45.161354	-66.813904
77	45.161279	-66.813888

78	45.161153	-66.813919
79	45.161108	-66.813786
80	45.161002	-66.813811
81	45.161	-66.813884
82	45.160986	-66.813855
83	45.16086	-66.814036
84	45.160873	-66.814231
85	45.160872	-66.814392
86	45.160899	-66.814551
87	45.160928	-66.814691
88	45.159454	-66.81433
89	45.159469	-66.814154
90	45.159447	-66.814071
91	45.159397	-66.814004
92	45.159309	-66.813982
93	45.159229	-66.813936
94	45.159102	-66.81382
95	45.159054	-66.813773
96	45.158932	-66.813709
97	45.159479	-66.812959
98	45.159584	-66.812873
99	45.159641	-66.812921
100	45.159507	-66.812826
101	45.159279	-66.812683
102	45.159165	-66.81275
103	45.159084	-66.812697
104	45.158955	-66.812638
105	45.15886	-66.812743
106	45.158955	-66.81285
107	45.15906	-66.81285
108	45.159215	-66.812835
109	45.1593	-66.812916
110	45.159369	-66.812935
111	45.159829	-66.812771
112	45.159969	-66.812745
113	45.160036	-66.812716
114	45.160031	-66.812814
115	45.159931	-66.812862
116	45.159871	-66.812833
117	45.1601	-66.812681
118	45.160088	-66.812643
119	45.160171	-66.812586
120	45.160186	-66.812721
121	45.158583	-66.812159
122	45.158556	-66.812259
123	45.158568	-66.812338
124	45.158552	-66.812425

125	45.158492	-66.812552
126	45.158493	-66.812637
127	45.15839	-66.812646
128	45.158366	-66.81258
129	45.157628	-66.813174
130	45.15763	-66.813038
131	45.157665	-66.813138
132	45.157842	-66.813179
133	45.157934	-66.813308
134	45.158011	-66.813485
135	45.158123	-66.813491
136	45.158163	-66.813388
137	45.158208	-66.813484
138	45.158305	-66.813529
139	45.158424	-66.813481
140	45.158578	-66.813455
141	45.158716	-66.813475
142	45.158657	-66.81351
143	45.158521	-66.813541
144	45.158426	-66.813566
145	45.158262	-66.813581
146	45.158101	-66.813616
147	45.157973	-66.8137
148	45.157952	-66.813798
Upland-Utopia	45.160948	-66.813321
Wetland-Utopia	45.160843	-66.813488

Appendix V:

WESP-AC Nontidal Model Input and Output

Cover Page: Basic Description of Assessment	**WESP-AC version 2**
Site Name:	15808 - PID 15171788 in Canal (Maxwell Road), New Brunswick
Investigator Name:	Matt Alexander
Date of Field Assessment:	25 May 2022
Nearest Town:	Saint George, New Brunswick
Latitude (decimal degrees):	45.160094
Longitude (decimal degrees):	65.813156
Is a map based on a formal on-site wetland delineation available?	Yes
Approximate size of the Assessment Area (AA, in hectares):	7.5 hectares
AA as percent of entire wetland (approx.). Attach sketch map if AA is smaller than the entire contiguous wetland.	100%
What percent (approx.) of the **wetland** were you able to visit?	100%
What percent (approx.) of the **AA** were you able to visit?	100%
Were you able to ask the site owner/manager about any of the questions?	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: ' 25 May 2022	Site Identifier: 15808 - Maxwell Road	Investigator: Matt Alexander

Form OF (Office). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only. DIRECTIONS: Conduct an assessment only after reading the accompanying Manual and the Explanations column of the data form. In the Data column, change the 0 (false) to a 1 (true) for the best choice, or for multiple choices where allowed and so indicated. Answering many of the questions below will require using these online map viewers:

Google Earth Pro: https://www.google.com/earth/download/gep/agree.html

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

For most wetlands, completing this office data form will require 1-2 hours. For a list of functions to which each question pertains, see bracketed abbreviations in the Definitions/Explanations column. For detailed descriptions of each WESP-AC model, see Appendix B of the accompanying Manual. Codes for functions and values are: WS= Water Storage, SFS= Stream Flow Support, WC= Water Cooling, SR= Sediment Retention & Stabilisation, PR= Phosphorus Retention, NR= Nitrate Removal, CS= Carbon Sequestration, OE= Organic Nutrient Export, INV= Invertebrate Habitat, FA= Anadromous Fish Habitat, FR= Resident Fish Habitat, AM= Amphibian & Reptile Habitat, WBF= Feeding Waterbird Habitat, WBN= Nesting Waterbird Habitat, SBM= Songbird, Raptor, & Mammal Habitat, POL= Pollinator Habitat, PH= Native Plant Habitat, PU= Public Use & Recognition, EC= Ecological Condition, Sen= Wetland Sensitivity, STR= Stressors.

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

OF11	Distance to Nearest Maintained Road	From the center of the AA, the distance to the nearest maintained public road (dirt or paved) is:		Determine this by viewing aerial imagery in Google Earth and measuring with the Ruler>Line tool. Or use the GeoNB's Draw Line tool. [AM, FAv, FRv, NRv, PH, PU, SBM, STR, WBN]
		<10 m.	0	
		10 - 25 m.	0	
		25 - 50 m.	0	
		50 - 100 m.	1	
		100 - 500 m.	0	
		>500 m.	0	
OF12	Wildlife Access	Draw a circle of radius of 5 km from the center of the AA. If mammals and amphibians can move from the center of the AA to ALL other separate wetlands and ponds located within the circle without being forced to cross pavement (any width), lawns, bare ground, and/or marine waters, mark 1= yes can move to all, 0= no. Change to**blank** if there are no other wetlands within 5 km.	0	In NB, enable the Wetlands layer in GeoNB (despite its omissions) to show surrounding wetlands and roads, while estimating the location of the 5 km circle (or draw the 5 km circle in Google Earth Pro using the Circle tool and compare). Evaluate using Google Earth, being cautious to search for roads hidden under forest canopy. [AM, SBM, STR]
OF13	Distance to Ponded Water	The distance from the AA center to the closest (but separate) ponded water body visible in GoogleEarth imagery is:		In Google Earth, zoom in closely to examine the surrounding landscape for ponds, lakes, and wetlands that appear to be permanently flooded. Enable the GeoNB viewer's Wetlands layer as well. [AM, PH, SBM, Sens, WBF, WBN]
		<50 m, and not separated by any width of paved roads, stretches of open water, row crops, lawn, bare ground, or impervious surface.	0	
		<50 m, but completely separated by those features.	0	
		50-500 m, and not separated.	0	
		50-500 m, but separated by those features.	1	
		0.5 - 1 km, and not separated.	0	
		0.5 - 1 km, but separated by those features.	0	
		None of the above (the closest patches or corridors that large are >1 km away).	0	
OF14	Distance to Large Ponded Water	The distance from the AA center to the closest (but separate)non-tidal body of water that is ponded during most of the year and is**larger than 8 hectares** during most of a normal year is:		Determine this by viewing aerial imagery in Google Earth. [Sens, WBF, WBN]
		<100 m.	0	
		100 m - 1 km.	1	
		1 -2 km.	0	
		2-5 km.	0	
		5-10 km.	0	
		>10 km.	0	
OF15	Tidal Proximity	The distance from the AA edge to the closest**tidal water** body (regardless of its salinity) is:		In Google Earth, measure the distance to the ocean (including Bay of Fundy) or tidal river, whichever is closer. If you need to see how far upriver a river is tidal, see the KMZ file provided with this calculator for NB (NB Headtide). Points shown in those files are only an approximation, so local information if available may be preferable. [FA, WBF]
		<100 m.	0	
		100 m - 1 km.	0	
		1 - 5 km.	1	
		5-10 km.	0	
		10-40 km.	0	
		>40 km.	0	
OF16	Upland Edge Contact	Select one:		[NR, SBM, Sens]
		The AA has no upland edge (or upland is <1% of perimeter). The AA is entirely surrounded by (& contiguous with) other wetlands or water	0	
		1-25% of the AA's perimeter abuts upland (including filled areas). The rest adjoins other wetlands or water that is mostly wider than the AA	1	
		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.	0	
OF17	Flood Damage from Non-tidal Waters	Within 5 km downstream or downslope of the AA (select first true choice):		In the GeoNB map viewer: click on "More" in upper right, then "Flood Information". Expand the menu under it by clicking on the arrow to its left and the slider to its right. Uncheck the first (Limits of Data) box. Where available, LiDAR imagery can provide finer elevational resolution useful for flood modeling. [WSv]
		Maps show Flood Zone or Flood Risk areas and there appears to be infrastructure vulnerable to river flooding not caused by tidal storm surges.	0	
		Maps show Flood Zone or Flood Risk areas, but infrastructure is absent or is not vulnerable to floods from a non-tidal river. In some cases levees, upriver dams, or other measures may partly limit damage or risk from smaller events.	0	
		Maps do **not** show Flood Zone or Flood Risk areas (**or no such mapping has been done locally**) and there appears to be infrastructure vulnerable to river flooding unrelated to tidal storm surges.	0	
		Maps do not show Flood Zone or Flood Risk areas (or no such mapping has been done locally) and there is**no infrastructure** vulnerable to river flooding unrelated to tidal storm surges.	1	
OF18	Relative Elevation in Watershed	In Google Earth, enable the Terrain layer (lower left menu) and open the NB_Watersheds KMZ file that accompanies this calculator. Then determine the AA's approximate elevation (bottom right, NOT the "eye alt"). Then move cursor around to determine the watershed's maximum and minimum elevation. Divide the AA's elevation by the (max-min).	1.10	[FA, NR, Sens, SFSv, WCv, WSv]
OF19	Water Quality Sensitive Watershed or Area	In Google Earth, open the KMZ file NB_Watershed Protected Area which accompanies this calculator. The AA is within such an area. Enter 1= yes, 0= no.	0	If an ACCDC report is available for this AA, it also may contain such information. [NRv]
OF20	Degraded Water Upstream	Sampling indicates a problem with concentrations of**metals, hydrocarbons, nutrients**, or other substances (excluding bacteria, acidic water, high temperatures) being present at levels harmful to aquatic life or humans, and:		May use existing data, or sample those waters as part of this wetland assessment. "Harmful" should be evaluated with regard to current federal or provincial water quality standards. [AM, FA, FR, NRv, PRv, SRv, STR, WBF, WBN]
		The condition is present within the AA.	0	
		The condition is present in waters within 1 km that flow**into** the AA, but has not been documented in the AA itself.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)**This is the situation for nearly all wetlands in this region.**	1	
OF21	Degraded Water Downstream	The problem described above is**downslope from** the AA, and:		May use existing data, or monitor waters as part of this wetland assessment. [NRv, PRv, SRv]
		The condition is present within 1 km downslope and connected to the AA by a channel.	0	
		The condition is present within 5 km downslope and connected to the AA by a channel, or within 1 km but not connected to the AA by a channel.	0	
		Sampling during both low water periods and times with high runoff (storms, snowmelt) indicates no problems in either the AA or inflowing waters.	0	
		Data are insufficient (no or inadequate sampling within 1 km, or condition exists only at >1 km upstream)**This is the situation for nearly all wetlands in this region.**	1	
OF22	Wetland as a % of Its Contributing Area (Catchment)	From a topographic map and field observations, estimate the approximate boundaries of the catchment (CA) of the entire wetland of which the AA may be only a part. Then adjust those boundaries if necessary based on your field observations of the surrounding terrain, and/or by using procedures described in the Manual. Divide the area of the wetland (not just the AA) by the approximate area of its catchment excluding the area of the wetland itself. When doing the calculation, if ponded water is adjacent to the wetland, include that in the wetland's area. The result is:		Topographic maps may be viewed online at the National Atlas of Canada (Toporama): http://atlas.gc.ca/toporama/en/index.html [NR, PR, Sens, SR, WS]
		<0.01, or catchment size unknown due to stormwater pipes that collect water from an indeterminate area.	0	
		0.01 to 0.1.	1	
		0.1 to 1.	0	
		>1 (wetland is larger than its catchment (e.g., wetland with flat surrounding terrain and no inlet, or is entirely isolated by dikes, or is a raised bog).	0	
OF23	Unvegetated Surface in the Contributing Area	The proportion of the AA's contributing area (measured to no more than 1000 m upslope) that is comprised of buildings, roads, parking lots other pavement, exposed bedrock, landslides, and other mostly-bare surface is about :		[FA, INV, NRv, PRv, SRv, STR, WCv, WSv]
		<10%.	1	
		10 to 25%.	0	
		>25%.	0	

OF24	Transport From Upslope	A relatively large proportion of the precipitation that falls farther upslope in the CA reaches this wetland quickly as runoff (surface water), as indicated by the following: (a) input channel is present, (b) input channels have been straightened, (c) upslope wetlands have been ditched extensively, (d) land cover is mostly non-forest, (e) CA slopes are steep, and/or (f) most CA soils are shallow (bedrock near surface) and/or have high runoff coefficients. 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.	0	
		Other (E, SE, W, NW), or no detectable uphill slope or input channel (flat).	1	
OF26	Internal Flow Distance (Path Length)	The horizontal flow distance from the wetland's inlet to outlet is:		Identify inlets and outlets, if any, from topographic maps (use elevations to determine which are inlets and which are outlets) and augment by field inspection. [NR, OE, PR, SR, WS]
		<10 m.	0	
		10 - 50 m.	0	
		50 - 100 m.	0	
		100 - 1000 m.	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.	1917	This layer was provided by Dr. Dan McKenney of the Canadian Forest Service [AM, CS, FR, INV, NR, OE, PH, PR, Sens, SR, WBF, WCv, WS]
OF28	Fish Access or Use	According to agency biologists and/or your own observations, the AA. [*Mark just the first choice that is true.*]:		Regarding the last choice, if uncertain if an AA is fishless, consider the possibility its waters have been stocked. In NB, the list of stocked waters is at: http://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/fish/content/StockedWaters.html [AM, FA, FR, INV, WBF, WBN]
		Is known to support rearing and/or spawning by Atlantic salmon or other anadromous species or eels. In NB, consult Figure A-2 in Appendix A of the Manual. Contact local fishery biologists, review the ACCDC report, and visit these websites: http://www.salmonatlas.com/atlanticsalmon/canada-east/index.1.html http://atlanticsalmonfederation.org/rivers/introduction.html	0	
		Has not been documented to support Atlantic salmon rearing and/or spawning, but is connected to nearby waters likely to contain Atlantic salmon or other anadromous species or eels and is probably accessed by those during some conditions.	0	
		Is probably is not accessed by any anadromous fish species but is known or likely to have other fish at least seasonally.	1	
		Is known or likely to be fishless (e.g., too small, dry, and/or not accessible even temporarily, and not stocked).	0	
OF29	Species of Conservation Concern	Within the past 10 years, in the AA (or in its adjoining waters or wetland), qualified observers have documented [*mark all applicable*]:		Request information from ACCDC and/or conduct your own survey at an appropriate season using an approved protocol. For birds, also check eBird.org. [AMv, EC, PHv, POLv, SBMv, Sens, WBFv, WBNv]
		Presence of one or more of the plant species listed in the Plants_Rare worksheet of the accompanying SuppInfo file, or the AA is within a mapped Atlantic Coastal Plain Flora Buffer	0	
		Presence of one or more of the amphibian or reptile species (AM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file.	0	
		Presence of one or more of the waterbird species (WBF, WBN) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file.	0	
		Presence of one or more of the nesting songbird or raptor species (SBM) of conservation concern as listed in the Wildlife_Rare worksheet of the accompanying SuppInfo file, during their nesting season (May-July for most species).	0	
		None of the above, or no data.	1	
OF30	Important Bird Area (IBA)	In Google Earth, open the KMZ file that accompanies this calculator, called IBAs_Canada. The AA is all or part of an officially designated IBA. Enter 1= yes, 0= no.	0	The source of this layer, which should be checked periodically for updates, is: http://www.ibacanada.com/mapviewer.jsp?lang=EN [SBMv, WBFv, WBNv]
OF31	Black Duck Nesting Area	In Google Earth, open the KMZ file that accompanies this calculator, called BlackDuck. Adjust its alignment and opacity. Determine the predicted density (pairs per 25 sq. km) of nesting American Black Duck in the AA's vicinity: <10 (enter 0), 10-20 (enter 1), 20-30 (enter 2), >30 (enter 3). If outside of region shown in map, change to blank.	1	This was provided by Dr. David Leske. [WBNv]
OF32	Wintering Deer or Moose Concentration Areas	If AA is on private land with no information, change to blank (not 0). If on public/crown land, in Google Earth open the KMZ file that accompanies this report called NB_DeerWinteringAreas.Otherwise: Enter: yes= 1, no= 0.	0	[SBM]
OF33	Other Conservation Designation	With GeoNB, click on Candidate PNA Map Viewer to identify Provincially Significant Wetland, Environmentally Significant Area, Protected Natural Area -- but also include if the AA is all or part of an area designated by government, FIrst Nations, or the Nature Conservancy of Canada (NCC) for its exceptional ecological features or highly intact natural conditions. Enter: yes= 1, no= 0. If uncertain, consult NCC and agencies for more recent information.	0	[PU]
OF34	Conservation Investment	The AA is part of or contiguous to a wetland on which public or private organizational funds were spent to preserve, create, restore, or enhance the wetland (excluding mitigation wetlands). Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank (not 0).	0	[PU]
OF35	Mitigation Investment	The AA is all or part of a mitigation site used explicitly to offset impacts elsewhere. Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank.	0	[PU]
OF36	Sustained Scientific Use	Plants, animals, or water in the AA have been monitored for >2 years, unrelated to any regulatory requirements, and data are available to the public. Or the AA is part of an area that has been designated by an agency or institution as a benchmark, reference, or status-trends monitoring area. Ask the property owner. Enter: yes= 1, no= 0. If no information, change to blank.	0	[PU]
OF37	Calcareous Region	The AA is in an area that is at least partly underlain by soil, sediment, or bedrock that is highly calcareous (enter 3 in next column), moderately calcareous (enter 2), or slightly calcareous (enter 1), none= 0. Limestone is typically a major component (karst geology) and water is not acidic (pH is usually >8).See Figure A-6 in Appendix A of the Manual. If no map coverage, change to blank.	1	If GIS is available, you may use the Bedrock Geology shapefile obtainable at http://www.snb.ca/geonb1/e/DC/catalogue-E.asp [AM, FA, FR, INV, PH]
OF38	Ownership	Select the ONE ownership that covers the most of the AA. In Google Earth, open KMZ file called NB Crown lands.Use more recent information if available.		"Private lands" may include those owned or leased by non-governmental organizations, e.g., charitable conservation land trusts, DUC, TNC. [PU, STR]
		New timber harvest, roads, mineral extraction, and intensive summer recreation (e.g., off-road vehicles) are permanently prohibited. Includes many publicly-owned Protected Lands, and private lands under long-term (30+ year) legal agreements to maintain nearly-unaltered conditions.	0	
		Ownership is public (e.g., municipal, Crown Reservations/Notations) but some or all of the above activities are allowed.	0	
		Ownership is private but public access is allowed, and/or a shorter-term conservation easement (whether renewable or not) is in place.	0	
		Ownership is private and owner does not allow access, or access permission unknown, and not a conservation easement.	1	

Date: ' 25 May 2022	Site Identifier: 15808 - Maxwell Road	Investigator: Matt Alexander

Form F (Field). Non-tidal Wetland Data Form. WESP-AC version 2 for New Brunswick wetlands only.

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

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

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

F24	% of AA Without Surface Water	The percentage of the AA that never contains surface water during an average year (that is, except perhaps for a few hours after snowmelt or rainstorms), but which is still a wetland, is:		1 hectare is 10,000 sq. m or about 2.5 acres. It could have dimensions of 100 m by 100 m, 1000 m by 10 m, or similar. [AM, FA, FR, INV, NR, PH, PR, SBM, Sens, SRv, WBF, WBN, WC]
		<1% . In other words, all or nearly all of the AA is covered by water permanently or at least seasonally.	0	
		1-25% of the AA, or <1% but >0.01 ha never contains surface water.	0	
		25-50% of the AA never contains surface water.	0	
		50-75% of the AA never contains surface water.	0	
		75-99% of the AA never contains surface water, or >99% AND there is at least one persistent water body larger than 1 ha in the AA.	1	
		99-100%. AND there is no persistent ponded water body larger than 1 ha within the AA. Enter "1" and SKIP to F42 (Channel Connection).	0	
F25	% of AA with Persistent Surface Water	Identify the parts of the AA that still contain surface water (flowing or ponded, open or hidden beneath vegetation) even during the driest times of a normal year, i.e., when the AA's surface water is at its lowest annual level. At that time, the percentage of the AA that still contains surface water is:		If you are unable to determine the condition at the driest time of year, ask the land owner or neighbors about it if possible. Indicators of persistence may include fish, some dragonflies, beaver, and muskrat. [AM, CS, FA, FR, INV, NR, POL, PR, SBM, WBF, WBN]
		None. The AA dries up completely (no water in channels either) or never has surface water during most years. SKIP to F27.	0	
		1-20% of the AA.	1	
		20-50% of the AA.	0	
		50-95% of the AA.	0	
		>95% of the AA. True for many fringe wetlands.	0	
F26	% of Summertime Water that Is Shaded	At mid-day during the warmest time of year, the area of surface water within the AA that is shaded by vegetation and other features that are within the AA at that time is:		[FA, WC]
		<5% of the water is shaded, or no surface water is present then.	0	
		5-25% of the water is shaded.	0	
		25-50% of the water is shaded.	1	
		50-75% of the water is shaded.	0	
		>75% of the water is shaded.	0	
F27	% of AA that is Flooded Only Seasonally	The percentage of the AA's area that is between the annual high water and the annual low water (surface water) is:		Flood marks (algal mats, adventitious roots, debris lines, ice scour, etc.) are often evident when not fully inundated. Also, such areas often have a larger proportion of upland and annual (vs. perennial) plant species. In riverine systems, the extent of this zone can be estimated by multiplying by 2 the bankful height and visualising where that would intercept the land along the river. [CS, FA, INV, NR, OE, PH, SR, WBF, WBN, WS]
		None, or <0.01 hectare and <1% of the AA. SKIP to F29.	0	
		1-20% of the AA, or <1% but >0.01 ha.	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.	0	
		5-30% of the water.	1	
		30-70% of the water.	0	
		70-95% of the water.	0	
		>95% of the water.	0	
F32	Ponded Open Water - Minimum Size	During most of the growing season, the largest patch of open water that is ponded and is in or bordering the AA is >0.01 hectare (about 10 m by 10 m) and mostly deeper than 0.5 m. If true enter "1" and continue, If false, enter "0" and SKIP to F41 (Floating Algae & Duckweed).	0	Open water is not obscured by vegetation in aerial ("duck's eye") view. It includes vegetation floating on the water surface or entirely submersed beneath it.
F33	% of Ponded Water that is Open	In ducks-eye aerial view, the percentage of the ponded water that is open (lacking emergent vegetation during most of the growing season, and unhidden by a forest or shrub canopy) is:		[AM, CS, FA, FR, INV, NR, OE, PR, SR, WBF, WBN, WC]
		None, or <1% of the AA and largest pool occupies <0.01 hectares. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		1-4% of the ponded water. Enter "1" and SKIP to F41 (Floating Algae & Duckweed).	0	
		5-30% of the ponded water.	0	
		30-70% of the ponded water.	0	
		70-99% of the ponded water.	0	
		100% of the ponded water.	0	
F34	Width of Vegetated Zone within Wetland	At the time during the growing season when the AA's water level is lowest, the average width of vegetated area in the AA that separates adjoining uplands from open water within the AA is:		"Vegetated area" does not include underwater or floating-leaved plants, i.e., aquatic bed. Width may include wooded riparian areas if they have wetland soil or plant indicators. [AM, CS, NR, OE, PH, PR, SBM, Sens, SR, WBN]
		<1 m.	0	
		1 - 9 m.	0	
		10 - 29 m.	0	
		30 - 49 m.	0	
		50 - 100 m.	0	
		> 100 m, or open water is absent at that time.	0	
F35	Flat Shoreline Extent	During most of the part of the growing season when water is present, the percentage of the AA's water edge length that is nearly flat (a slope less than about 5% measured within 5 m landward of the water) is:		If several isolated pools are present in early summer, estimate the percent of their collective shorelines that has such a gentle slope. [SR, WBN]
		<1% of the water edge.	0	
		1-25% of the water edge.	0	
		25-50% of the water edge.	0	
		50-75% of the water edge.	0	
		>75% of the water edge.	0	
F36	Robust Emergents	The percentage of the emergent vegetation cover in the AA that is cattail (*Typha* spp.), common reed (*Phragmites*), or tall (>1m) bulrush is:		Emergent vegetation is herbaceous plants whose stems are partly above and partly below the water surface during most of the time water is present. [WBN]
		<1% of the emergent vegetation, or emergent vegetation is absent. SKIP to F38.	0	
		1-25% of the emergent vegetation.	0	
		25-75% of the emergent vegetation.	0	
		>75%, of the emergent vegetation.	0	

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

F53	Type of Cover in Buffer	Within 30 m upslope of where the wetland transitions to upland, the upland land cover that is NOT perennial vegetation is mostly (mark ONE):		[AM, FA, INV, NRv, PH, POL, SBM, STR, WBN]
		Impervious surface, e.g., paved road, parking lot, building, exposed rock.	0	
		Bare or nearly bare pervious surface or managed vegetation, e.g., lawn, row crops, unpaved road, dike, landslide.	1	
F54	Buffer Slope	The steepest and/or most disturbed part of the upland area that is within 30 m of the wetland and occupies >10% of that upland area has a percent slope of:		[NRv, PRv, Sens, SRv]
		<1% (flat -- almost no noticeable slope) or all the area within 30 m of the AA edge is other wetlands.	0	
		2-5%.	1	
		5-30%.	0	
		>30%.	0	
F55	Cliffs or Steep Banks	In the AA or within 100 m, there are elevated terrestrial features such as cliffs, talus slopes, stream banks, or excavated pits (but not riprap) that extend at least 2 m nearly vertically, are unvegetated, and potentially contain crevices or other substrate suitable for nesting or den areas. Enter 1 (yes) or 0 (no).	0	Do not include upturned trees as potential den sites. [POL, SBM]
F56	New or Expanded Wetland	Human actions within or adjacent to the AA have persistently expanded a naturally occurring wetland or created a wetland where there previously was none (e.g., by excavation, impoundment):		Determine this using historical aerial photography, old maps, soil maps, or permit files as available [CS, NR, OE, PH, Sens]
		No.	1	
		Yes, and created or expanded 20 - 100 years ago.	0	
		Yes, and created or expanded 3-20 years ago.	0	
		Yes, and created or expanded within last 3 years.	0	
		Yes, but time of origin or expansion unknown.	0	
		Unknown if new or expanded within 20 years or not.	0	
F57	Burn History	More than 1% of the AA's previously vegetated area:		Look for charred soil or stumps (in multiple widely-spaced locations) or ask landowner. [CS, PH, STR]
		Burned within past 5 years.	0	
		Burned 6-10 years ago.	0	
		Burned 11-30 years ago.	0	
		Burned >30 years ago, or no evidence of a burn and no data.	1	
F58	Visibility	The maximum percentage of the wetland that is visible from the best vantage point on public roads, public parking lots, public buildings, or public maintained trails that intersect, adjoin, or are within 100 m of the AA (select one) is:		[PU, STR, WBFv]
		<25%.	0	
		25-50%.	1	
		>50%.	0	
F59	Non-consumptive Uses - Actual or Potential	Assuming access permission was granted, select ALL statements that are true of the AA as it currently exists:		[PU, STR]
		For an average person, walking is physically possible 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).	1	
		Commercial or traditional-use harvesting of native plants, their fruits, or mushrooms.	0	
		Waterfowl hunting.	0	
		Fishing.	0	
		Trapping of furbearers.	0	
		None of the above.	0	
F65	Domestic Wells	The closest wells or water bodies that currently provide drinking water are:		[NRv]
		Within 0-100 m. of the AA.	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]

Investigator: Matt Alexander	Site Identifier: 15808 - Maxwell Road	Date: 25 May 2022

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

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

S4	**Excessive Sediment Loading *from Contributing Area***				
	In the last column, place a check mark next to any item present in the CA that is likely to have elevated the load of waterborne or windborne sediment reaching the wetland from its CA. [FA, FR, INV, PH, SRv, STR]				
	Erosion from plowed fields, fill, timber harvest, dirt roads, vegetation clearing, fires.				
	Erosion from construction, in-channel machinery in the CA.				
	Erosion from off-road vehicles in the CA.				1
	Erosion from livestock or foot traffic in the CA.				
	Stormwater or wastewater effluent.				1
	Sediment from road sanding, gravel mining, other mining, oil/ gas extraction.				1
	Accelerated channel downcutting or headcutting of tributaries due to altered land use.				
	Other human-related disturbances within the CA.				
	If any items were checked above, then for each row of the table below, assign points (3, 2, or 1 as shown in header) in the last column. However, if you believe the checked items did not cumulatively add significantly more sediment or suspended solids to the AA, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Erosion in CA:	Extensive evidence, high intensity.*	Potentially (based on high-intensity* land use) or scattered evidence.	Potentially (based on low-intensity* land use) with little or no direct evidence.	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.	1
	* high-intensity= extensive off-road vehicle use, plowing, grading, excavation, erosion with or without veg removal; low-intensity= veg removal only with little or no apparent erosion or disturbance of soil or sediment.			Sum=	7
				Stressor subscore=	0.58
S5	**Soil or Sediment Alteration *Within the Assessment Area***				
	In the last column, place a check mark next to any item present in the wetland that is likely to have compacted, eroded, or otherwise altered the wetland's soil. Consider only items occurring within past 100 years or since wetland was created or restored (whichever is less). [CS, INV, NR, PH, SR, STR]				
	Compaction from machinery, off-road vehicles, livestock, or mountain bikes, especially during wetter periods.				1
	Leveling or other grading not to the natural contour.				
	Tillage, plowing (but excluding disking for enhancement of native plants).				
	Fill or riprap, excluding small amounts of upland soils containing organic amendments (compost, etc.) or small amounts of topsoil imported from another wetland.				
	Excavation.				
	Ditch cleaning or dredging in or adjacent to the wetland.				1
	Boat traffic in or adjacent to the wetland and sufficient to cause shore erosion or stir bottom sediments.				
	Artificial water level or flow manipulations sufficient to cause erosion or stir bottom sediments.				
	If any items were checked above, then for each row of the table below, assign points. However, if you believe the checked items did not measurably alter the soil structure and/or topography, then leave the "0's" for the scores in the following rows. To estimate effects, contrast the current condition with the condition if the checked items never occurred or were no longer present.				
		Severe (3 points)	Medium (2 points)	Mild (1 point)	
	Spatial extent of altered soil:	>95% of wetland or >95% of its upland edge (if any).	5-95% of wetland or 5-95% of its upland edge (if any).	<5% of wetland and <5% of its upland edge (if any).	1
	Recentness of significant soil alteration in wetland:	Current & ongoing.	1-12 months ago.	>1 yr ago.	2
	Duration:	Long-lasting, minimal veg recovery.	Long-lasting but mostly revegetated.	Short-term, revegetated, not intense.	1
	Timing of soil alteration:	Frequent and year-round.	Frequent but mostly seasonal.	Mainly during one-time or scattered events.	1
				Sum=	5
				Stressor subscore=	0.42

Assessment Area (AA) Results:

Wetland ID: 15808 - Maxwell Road

Date: 25 May 2022

Observer: Matt Alexander

Latitude & Longitude (decimal degrees): 45.160094 and 66.813156

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)	1.62	Lower	5.21	Moderate	2.98	5.25
Stream Flow Support (SFS)	5.10	Moderate	10.00	Higher	2.72	7.06
Water Cooling (WC)	5.54	Higher	5.09	Higher	3.69	3.06
Sediment Retention & Stabilisation (SR)	0.97	Lower	8.09	Higher	3.82	4.91
Phosphorus Retention (PR)	4.47	Higher	7.47	Higher	6.07	7.08
Nitrate Removal & Retention (NR)	1.28	Lower	10.00	Higher	4.62	10.00
Carbon Sequestration (CS)	4.66	Moderate			6.57	
Organic Nutrient Export (OE)	4.97	Moderate			4.97	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	7.57	Higher	5.56	Higher	4.51	3.94
Aquatic Invertebrate Habitat (INV)	2.84	Moderate	5.67	Moderate	4.87	4.30
Amphibian & Turtle Habitat (AM)	4.39	Moderate	4.79	Moderate	5.62	5.00
Waterbird Feeding Habitat (WBF)	6.33	Moderate	3.33	Moderate	5.04	3.33
Waterbird Nesting Habitat (WBN)	3.73	Moderate	2.50	Moderate	3.19	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.00	Higher	2.50	Lower	7.46	2.50
Pollinator Habitat (POL)	7.60	Moderate	0.00	Lower	6.12	0.00
Native Plant Habitat (PH)	4.79	Moderate	5.22	Moderate	5.02	4.53
Public Use & Recognition (PU)			3.24	Moderate		2.64
Wetland Sensitivity (Sens)			1.12	Lower		2.54
Wetland Ecological Condition (EC)			0.96	Lower		4.79
Wetland Stressors (STR) (higher score means more stress)			10.00	Higher		5.95
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	5.10	Moderate	5.21	Moderate	2.98	5.25
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.36	Moderate	9.26	Higher	5.92	8.67
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.08	Moderate	8.46	Higher	4.52	5.94
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	5.99	Moderate	4.40	Moderate	4.64	3.98
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.06	Higher	3.90	Moderate	6.83	3.44
WETLAND CONDITION (EC)			0.96	Lower		4.79
WETLAND RISK (average of Sensitivity & Stressors)			5.56	Higher		4.25

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

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Appendix III:

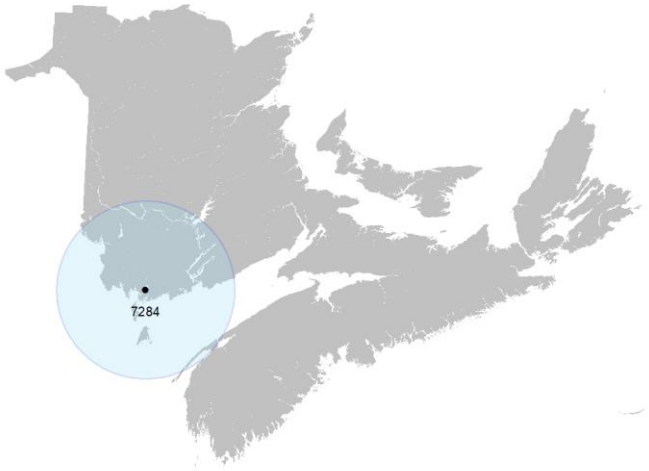
Atlantic Canada Conservation Data Centre Reports

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

DATA REPORT 7284: Canal, NB

Prepared 14 June 2022
by J. Churchill, Data Manager

CONTENTS OF REPORT



Map 1. A 100 km buffer around the study area

1.0 PREFACE

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

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

1.1 DATA LIST

Included datasets:

Filename	Contents
CanalNB_7284ob.xls	Rare or legally-protected Flora and Fauna in your study area
CanalNB_7284ob100km.xls	A list of Rare and legally protected Flora and Fauna within 100 km of your study area
CanalNB_7284msa.xls	Managed and Biologically Significant Areas in your study area
CanalNB_7284ff_py.xls	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:

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

1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

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

Plants, Lichens, Ranking Methods, All other Inquiries	Sean Blaney	Senior Scientist / Executive Director	(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

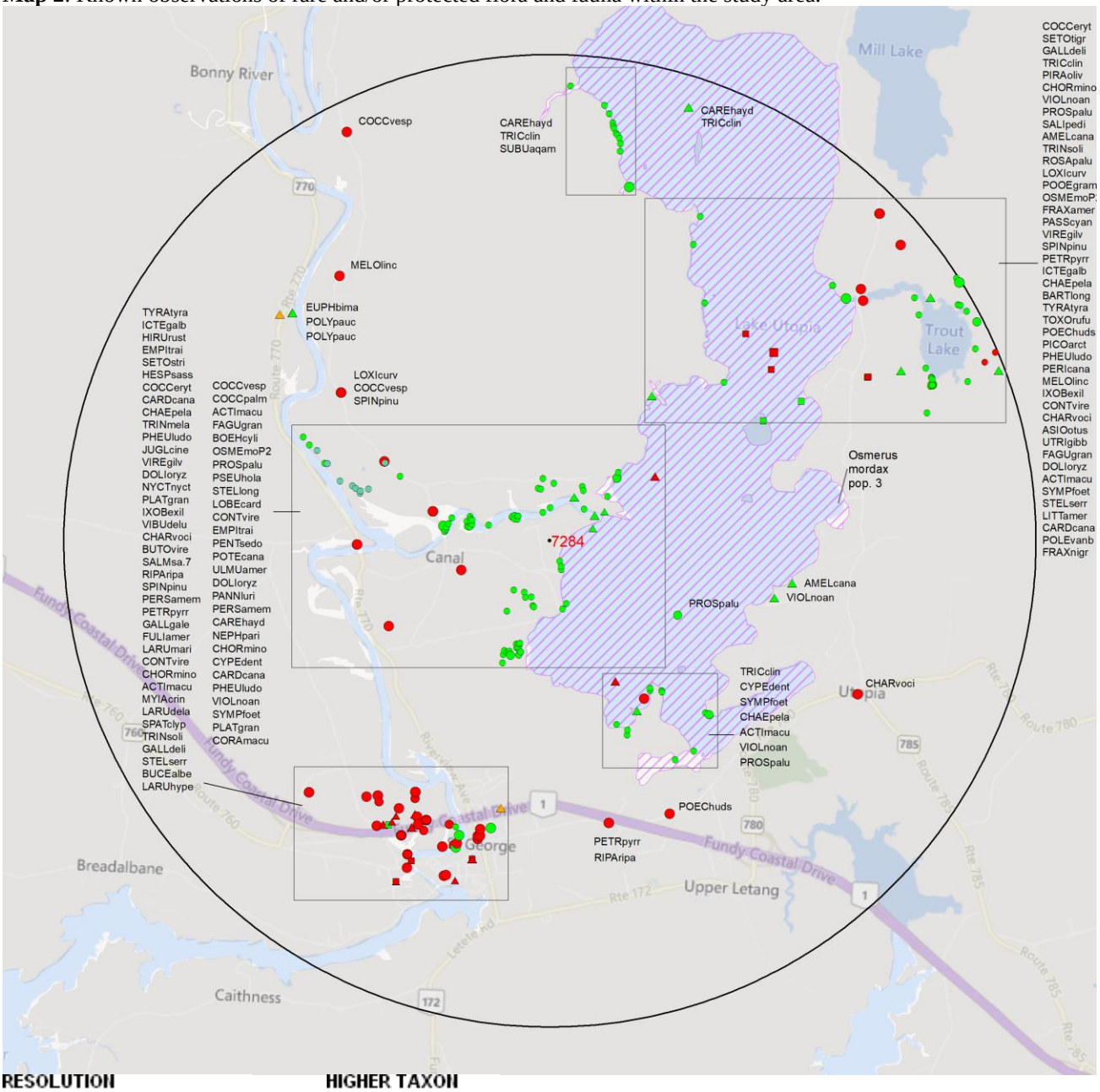
2.1 FLORA

The study area contains 156 records of 28 vascular, 10 records of 4 nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

The study area contains 241 records of 48 vertebrate, 2 records of 2 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if 'location-sensitive' species occur near your study site.

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



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 TAXON

- vertebrate fauna
- invertebrate fauna
- vascular flora
- nonvascular flora

3.0 SPECIAL AREAS

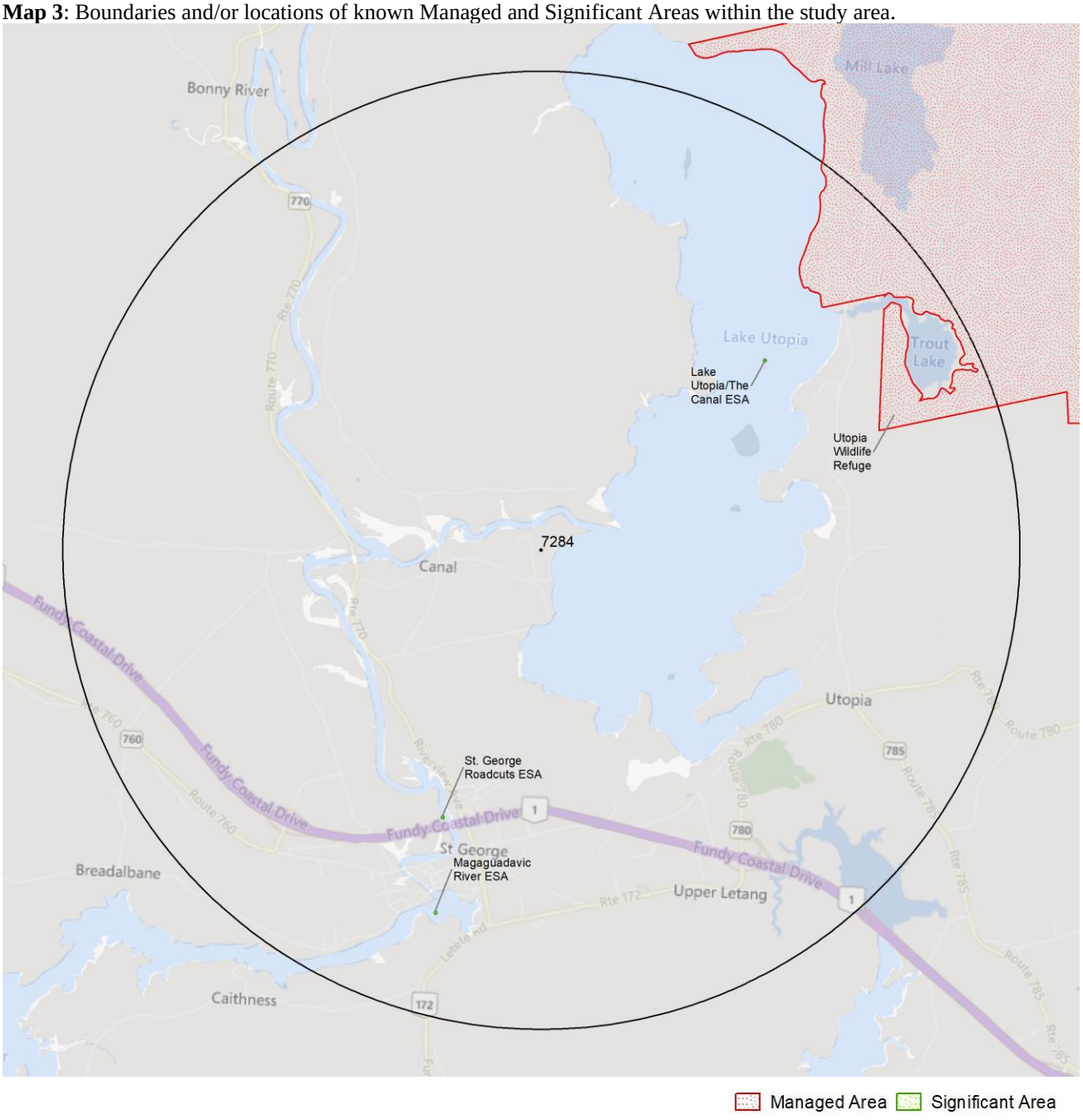
3.1 MANAGED AREAS

The GIS scan identified 1 managed area in the vicinity of the study area (Map 3 and attached file: *msa.xls).

3.2 SIGNIFICANT AREAS

The GIS scan identified 3 biologically significant sites in the vicinity of the study area (Map 3 and attached file: *msa.xls).

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



4.0 RARE SPECIES LISTS

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

4.1 FLORA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
N	*Pannaria lurida*	Wrinkled Shingle Lichen	Threatened	Threatened		S1?	1	2.4 ± 0.0
N	*Coccocarpia palmicola*	Salted Shell Lichen				S1	1	1.9 ± 0.0
N	*Pseudocyphellaria holarctica*	Yellow Specklebelly Lichen				S3S4	3	1.9 ± 0.0
N	*Nephroma parile*	Powdery Kidney Lichen				S3S4	5	2.0 ± 0.0
P	*Juglans cinerea*	Butternut	Endangered	Endangered	Endangered	S1	1	3.0 ± 0.0
P	*Polemonium vanbruntiae*	Van Brunt's Jacob's-ladder	Threatened	Threatened	Threatened	S1	6	4.2 ± 0.0
P	*Fraxinus nigra*	Black Ash	Threatened			S3S4	3	4.1 ± 0.0
P	*Potentilla canadensis*	Canada Cinquefoil				S1	1	2.5 ± 0.0
P	*Viburnum dentatum var. lucidum*	Northern Arrow-Wood				S2	2	3.1 ± 0.0
P	*Polygaloides paucifolia*	Fringed Milkwort				S2	2	3.5 ± 1.0
P	*Persicaria amphibia var. emersa*	Long-root Smartweed				S2	9	0.4 ± 0.0
P	*Viola novae-angliae*	New England Violet				S2S3	9	0.7 ± 0.0
P	*Stellaria longifolia*	Long-leaved Starwort				S3	2	1.1 ± 0.0
P	*Proserpinaca palustris*	Marsh Mermaidweed				S3	7	0.7 ± 0.0
P	*Amelanchier canadensis*	Canada Serviceberry				S3	2	2.5 ± 1.0
P	*Symplocarpus foetidus*	Eastern Skunk Cabbage				S3	31	0.3 ± 0.0
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	11	0.5 ± 0.0
P	*Subularia aquatica ssp. americana*	American Water Awlwort				S3S4	1	3.7 ± 0.0
P	*Lobelia cardinalis*	Cardinal Flower				S3S4	2	0.6 ± 0.0
P	*Penthorum sedoides*	Ditch Stonecrop				S3S4	1	0.5 ± 0.0
P	*Fagus grandifolia*	American Beech				S3S4	6	0.9 ± 0.0
P	*Utricularia gibba*	Humped Bladderwort				S3S4	1	4.3 ± 0.0
P	*Fraxinus americana*	White Ash				S3S4	1	4.0 ± 1.0
P	*Littorella americana*	American Shoreweed				S3S4	2	1.8 ± 1.0
P	*Rosa palustris*	Swamp Rose				S3S4	2	4.8 ± 0.0
P	*Salix pedicellaris*	Bog Willow				S3S4	4	4.3 ± 0.0
P	*Ulmus americana*	White Elm				S3S4	1	0.9 ± 0.0
P	*Boehmeria cylindrica*	Small-spike False-nettle				S3S4	16	0.4 ± 0.0
P	*Carex haydenii*	Hayden's Sedge				S3S4	9	0.3 ± 0.0
P	*Cyperus dentatus*	Toothed Flatsedge				S3S4	5	0.2 ± 0.0
P	*Trichophorum clintonii*	Clinton's Clubrush				S3S4	18	1.9 ± 0.0
P	*Corallorhiza maculata*	Spotted Coralroot				S3S4	1	1.3 ± 0.0

4.2 FAUNA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	*Osmerus mordax pop. 2*	Rainbow Smelt - Lake Utopia Large-bodied population	Endangered	Threatened	Threatened	S1	2	1.3 ± 1.0
A	*Salmo salar pop. 7*	Atlantic Salmon - Outer Bay of Fundy population	Endangered		Endangered	SNR	1	3.4 ± 1.0
A	*Ixobrychus exilis*	Least Bittern	Threatened	Threatened	Threatened	S1S2B	6	3.1 ± 0.0
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened		S2B	27	2.9 ± 0.0
A	*Chaetura pelagica*	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	24	1.6 ± 0.0
A	*Hirundo rustica*	Barn Swallow	Special Concern	Threatened	Threatened	S2B	6	3.2 ± 0.0
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S3B	4	1.2 ± 0.0
A	*Dolichonyx oryzivorus*	Bobolink	Special Concern	Threatened	Threatened	S3B	8	1.2 ± 0.0
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern		S3B,S3S4N,SUM	3	1.9 ± 0.0

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	15	1.2 ± 0.0
A	*Cardellina canadensis*	Canada Warbler	Special Concern	Threatened	Threatened	S3S4B	10	2.0 ± 0.0
A	*Fulica americana*	American Coot	Not At Risk			S1B	1	3.4 ± 0.0
A	*Tringa melanoleuca*	Greater Yellowlegs				S1?B,S4S5M	1	3.2 ± 0.0
A	*Gallinula galeata*	Common Gallinule				S1B	3	3.3 ± 0.0
A	*Bartramia longicauda*	Upland Sandpiper				S1B	4	3.7 ± 7.0
A	*Butorides virescens*	Green Heron				S1S2B	1	3.3 ± 0.0
A	*Nycticorax nycticorax*	Black-crowned Night-heron				S1S2B	1	3.2 ± 0.0
A	*Empidonax traillii*	Willow Flycatcher				S1S2B	3	1.2 ± 0.0
A	*Stelgidopteryx serripennis*	Northern Rough-winged Swallow				S1S2B	4	2.9 ± 7.0
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2B	4	3.0 ± 0.0
A	*Pooecetes gramineus*	Vesper Sparrow				S2B	3	2.9 ± 7.0
A	*Tringa solitaria*	Solitary Sandpiper				S2B,S4S5M	2	3.4 ± 2.0
A	*Larus hyperboreus*	Glaucous Gull				S2N	1	3.8 ± 0.0
A	*Asio otus*	Long-eared Owl				S2S3	1	3.7 ± 7.0
A	*Toxostoma rufum*	Brown Thrasher				S2S3B	1	3.7 ± 7.0
A	*Icterus galbula*	Baltimore Oriole				S2S3B	3	2.9 ± 0.0
A	*Larus delawarensis*	Ring-billed Gull				S2S3B,S4N,S5M	2	3.1 ± 0.0
A	*Larus marinus*	Great Black-backed Gull				S3	3	3.4 ± 0.0
A	*Picoides arcticus*	Black-backed Woodpecker				S3	2	3.7 ± 7.0
A	*Loxia curvirostra*	Red Crossbill				S3	4	2.6 ± 0.0
A	*Spinus pinus*	Pine Siskin				S3	5	2.6 ± 0.0
A	*Spatula clypeata*	Northern Shoveler				S3B	1	3.4 ± 4.0
A	*Charadrius vociferus*	Killdeer				S3B	7	3.1 ± 0.0
A	*Coccyzus erythropthalmus*	Black-billed Cuckoo				S3B	3	3.2 ± 0.0
A	*Myiarchus crinitus*	Great Crested Flycatcher				S3B	1	3.5 ± 0.0
A	*Piranga olivacea*	Scarlet Tanager				S3B	3	3.7 ± 7.0
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S3B	5	1.0 ± 0.0
A	*Passerina cyanea*	Indigo Bunting				S3B	3	2.9 ± 7.0
A	*Setophaga tigrina*	Cape May Warbler				S3B,S4S5M	1	4.8 ± 0.0
A	*Bucephala albeola*	Bufflehead				S3N	2	3.6 ± 0.0
A	*Perisoreus canadensis*	Canada Jay				S3S4	3	3.7 ± 7.0
A	*Poecile hudsonicus*	Boreal Chickadee				S3S4	4	3.1 ± 0.0
A	*Tyrannus tyrannus*	Eastern Kingbird				S3S4B	33	2.9 ± 0.0
A	*Vireo gilvus*	Warbling Vireo				S3S4B	4	3.1 ± 0.0
A	*Actitis macularius*	Spotted Sandpiper				S3S4B,S4M	8	0.9 ± 0.0
A	*Melospiza lincolnii*	Lincoln's Sparrow				S3S4B,S4M	4	3.5 ± 0.0
A	*Gallinago delicata*	Wilson's Snipe				S3S4B,S5M	3	3.4 ± 1.0
A	*Setophaga striata*	Blackpoll Warbler				S3S4B,S5M	1	3.0 ± 0.0
I	*Hesperia sassacus*	Indian Skipper				S3	1	2.8 ± 1.0
I	*Euphyes bimacula*	Two-spotted Skipper				S3	1	3.6 ± 1.0

4.3 LOCATION SENSITIVE SPECIES

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

New Brunswick

Scientific *Name*	Common Name	SARA	Prov Legal Prot	Known within the Study Site?
Chrysemys picta picta	Eastern Painted Turtle	Special Concern		No
Chelydra serpentina	**Snapping Turtle**	**Special Concern**	**Special Concern**	**YES**
Glyptemys insculpta	Wood Turtle	Threatened	Threatened	No
Haliaeetus leucocephalus	**Bald Eagle**		**Endangered**	**YES**
Falco peregrinus pop. 1	Peregrine Falcon - anatum/tundrius pop.	Special Concern	Endangered	No
Cicindela marginipennis	Cobblestone Tiger Beetle	Endangered	Endangered	No
Coenonympha nipisiquit	Maritime Ringlet	Endangered	Endangered	No
Bat hibernaculum or bat species occurrence		[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
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33	eBird. 2014. eBird Basic Dataset. Version: EBD_relNov-2014. Ithaca, New York. Nov 2014. Cornell Lab of Ornithology, 25036 recs.
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5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 42095 records of 158 vertebrate and 1423 records of 73 invertebrate fauna; 8087 records of 337 vascular, 1298 records of 156 nonvascular flora (attached: *ob100km.xls).

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

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Myotis lucifugus*	Little Brown Myotis	Endangered	Endangered	Endangered	S1	62	36.4 ± 5.0	NB
A	*Myotis septentrionalis*	Northern Myotis	Endangered	Endangered	Endangered	S1	14	48.3 ± 1.0	NB
A	*Perimyotis subflavus*	Tricolored Bat	Endangered	Endangered	Endangered	S1	2	55.2 ± 0.0	NB
A	*Eubalaena glacialis*	North Atlantic Right Whale	Endangered	Endangered	Endangered	S1	7	20.0 ± 1.0	NB
A	*Osmerus mordax pop. 2*	Rainbow Smelt - Lake Utopia Large-bodied population	Endangered	Threatened	Threatened	S1	2	1.3 ± 1.0	NB
A	*Charadrius melodus melodus*	Piping Plover melodus subspecies	Endangered	Endangered	Endangered	S1B	27	27.4 ± 0.0	NB
A	*Sterna dougallii*	Roseate Tern	Endangered	Endangered	Endangered	S1B	21	15.7 ± 0.0	NB
A	*Dermochelys coriacea pop. 2*	Leatherback Sea Turtle - Atlantic population	Endangered	Endangered	Endangered	S1S2N	5	35.0 ± 0.0	NB
A	*Salmo salar pop. 1*	Atlantic Salmon - Inner Bay of Fundy population	Endangered	Endangered	Endangered	S2	7	21.3 ± 0.0	NB
A	*Salmo salar pop. 7*	Atlantic Salmon - Outer Bay of Fundy population	Endangered		Endangered	SNR	362	3.4 ± 1.0	NB
A	*Rangifer tarandus pop. 2*	Caribou - Atlantic-Gasp ├⌐sie population	Endangered	Endangered	Extirpated	SX	4	41.1 ± 1.0	NB
A	*Lanius ludovicianus*	Loggerhead Shrike	Endangered	Endangered		SXB	1	56.8 ± 1.0	NB
A	*Sturnella magna*	Eastern Meadowlark	Threatened	Threatened	Threatened	S1B	24	15.1 ± 7.0	NB
A	*Asio flammeus*	Short-eared Owl	Threatened	Special Concern	Special Concern	S1S2B	17	47.9 ± 7.0	NB
A	*Ixobrychus exilis*	Least Bittern	Threatened	Threatened	Threatened	S1S2B	33	3.1 ± 0.0	NB
A	*Hylocichla mustelina*	Wood Thrush	Threatened	Threatened	Threatened	S1S2B	162	6.3 ± 7.0	NB
A	*Hydrobates leucorhous*	Leach's Storm-Petrel	Threatened			S1S2B	145	15.7 ± 0.0	NB
A	*Antrostomus vociferus*	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S2B	72	6.3 ± 7.0	NB
A	*Catharus bicknelli*	Bicknell's Thrush	Threatened	Threatened	Threatened	S2B	21	8.7 ± 7.0	NB
A	*Riparia riparia*	Bank Swallow	Threatened	Threatened		S2B	817	2.9 ± 0.0	NB
A	*Glyptemys insculpta*	Wood Turtle	Threatened	Threatened	Threatened	S2S3	1643	5.6 ± 0.0	NB
A	*Chaetura pelagica*	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	416	1.6 ± 0.0	NB
A	*Acipenser oxyrinchus*	Atlantic Sturgeon	Threatened		Threatened	S3B,S3N	2	59.0 ± 1.0	NB
A	*Tringa flavipes*	Lesser Yellowlegs	Threatened			S3M	654	12.5 ± 0.0	NB
A	*Limosa haemastica*	Hudsonian Godwit	Threatened			S3M	95	36.1 ± 1.0	NB
A	*Anguilla rostrata*	American Eel	Threatened		Threatened	S4N	66	18.6 ± 1.0	NB
A	*Coturnicops noveboracensis*	Yellow Rail	Special Concern	Special Concern	Special Concern	S1?B,SUM	3	89.5 ± 7.0	NB
A	*Histrionicus histrionicus pop. 1*	Harlequin Duck - Eastern population	Special Concern	Special Concern	Endangered	S1B,S1S2N,S2M	208	13.0 ± 0.0	NB
A	*Hirundo rustica*	Barn Swallow	Special Concern	Threatened	Threatened	S2B	1128	3.2 ± 0.0	NB
A	*Balaenoptera physalus*	Fin Whale	Special Concern	Special Concern		S2S3	19	13.1 ± 0.0	NB
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S2S3B,S3M	126	6.3 ± 3.0	NB
A	*Bucephala islandica*	Barrow's Goldeneye	Special Concern	Special Concern	Special Concern	S2S3N,S3M	60	13.0 ± 0.0	NB
A	*Acipenser brevirostrum*	Shortnose Sturgeon	Special Concern	Special Concern	Special Concern	S3	12	54.1 ± 10.0	NB
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Special Concern	S3	67	1.0 ± 0.0	NB
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S3B	559	1.2 ± 0.0	NB
A	*Contopus cooperi*	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S3B	260	7.1 ± 7.0	NB
A	*Dolichonyx oryzivorus*	Bobolink	Special Concern	Threatened	Threatened	S3B	604	1.2 ± 0.0	NB
A	*Coccothraustes vespertinus*	Evening Grosbeak	Special Concern	Special Concern		S3B,S3S4N,SUM	165	1.9 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
A	*Chordeiles minor*	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	294	1.2 ± 0.0	NB
A	*Phalaropus lobatus*	Red-necked Phalarope	Special Concern	Special Concern		S3M	227	11.2 ± 0.0	NB
A	*Podiceps auritus*	Horned Grebe	Special Concern	Special Concern	Special Concern	S3N	269	10.1 ± 0.0	NB
A	*Cardellina canadensis*	Canada Warbler	Special Concern	Threatened	Threatened	S3S4B	1111	2.0 ± 0.0	NB
A	*Phocoena phocoena*	Harbour Porpoise	Special Concern		Spec.Concern	S4	233	9.2 ± 1.0	NB
A	*Chrysemys picta picta*	Eastern Painted Turtle	Special Concern	Special Concern		S4	75	11.4 ± 0.0	NB
A	*Anarhichas lupus*	Atlantic Wolffish	Special Concern	Special Concern	Special Concern	SNR	1	29.1 ± 0.0	NB
A	*Fulica americana*	American Coot	Not At Risk			S1B	7	3.4 ± 0.0	NB
A	*Falco peregrinus pop. 1*	Peregrine Falcon - anatum/tundrius	Not At Risk	Special Concern	Endangered	S1B,S3M	569	13.3 ± 1.0	NB
A	*Falco peregrinus*	Peregrine Falcon	Not At Risk	Special Concern		S1B,S3M	1	51.2 ± 0.0	NB
A	*Bubo scandiacus*	Snowy Owl	Not At Risk			S1N,S2S3M	33	22.4 ± 0.0	NB
A	*Accipiter cooperii*	Cooper's Hawk	Not At Risk			S1S2B	21	18.2 ± 0.0	NB
A	*Buteo lineatus*	Red-shouldered Hawk	Not At Risk			S1S2B	52	11.6 ± 0.0	NB
A	*Aegolius funereus*	Boreal Owl	Not At Risk			S1S2B,SUM	5	48.3 ± 1.0	NB
A	*Sorex dispar*	Long-tailed Shrew	Not At Risk			S2	2	59.3 ± 1.0	NB
A	*Chlidonias niger*	Black Tern	Not At Risk			S2B	348	50.5 ± 0.0	NB
A	*Podiceps grisegena*	Red-necked Grebe	Not At Risk			S2N,S3M	720	10.1 ± 0.0	NB
A	*Globicephala melas*	Long-finned Pilot Whale	Not At Risk			S2S3	3	22.2 ± 1.0	NB
A	*Desmognathus fuscus pop. 2*	Northern Dusky Salamander - Quebec / New Brunswick population	Not At Risk			S3	95	22.7 ± 1.0	NB
A	*Megaptera novaeangliae*	Humpback Whale	Not At Risk			S3	31	15.8 ± 0.0	NB
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B,SUM	387	15.7 ± 0.0	NB
A	*Lagenorhynchus acutus*	Atlantic White-sided Dolphin	Not At Risk			S3S4	2	59.4 ± 0.0	NB
A	*Haliaeetus leucocephalus*	Bald Eagle	Not At Risk		Endangered	S4	1637	1.3 ± 0.0	NB
A	*Lynx canadensis*	Canada Lynx	Not At Risk		Endangered	S4	8	19.2 ± 50.0	NB
A	*Canis lupus*	Grey Wolf	Not At Risk		Extirpated	SX	3	49.9 ± 1.0	NB
A	*Puma concolor pop. 1*	Cougar - Eastern population	Data Deficient		Endangered	SU	42	6.0 ± 1.0	NB
A	*Calidris canutus rufa*	Red Knot rufa subspecies - Tierra del Fuego / Patagonia wintering population	E,SC	Endangered	Endangered	S2M	407	20.2 ± 0.0	NB
A	*Morone saxatilis*	Striped Bass	E,SC			S3S4B,S3S4N	12	24.1 ± 1.0	NB
A	*Thryothorus ludovicianus*	Carolina Wren				S1	35	8.1 ± 0.0	NB
A	*Vireo flavifrons*	Yellow-throated Vireo				S1?B	16	44.3 ± 27.0	NB
A	*Tringa melanoleuca*	Greater Yellowlegs				S1?B,S4S5M	1320	3.2 ± 0.0	NB
A	*Aythya americana*	Redhead				S1B	8	39.3 ± 0.0	NB
A	*Gallinula galeata*	Common Gallinule				S1B	28	3.3 ± 0.0	NB
A	*Grus canadensis*	Sandhill Crane				S1B	9	22.4 ± 0.0	NB
A	*Bartramia longicauda*	Upland Sandpiper				S1B	49	3.7 ± 7.0	NB
A	*Phalaropus tricolor*	Wilson's Phalarope				S1B	61	37.3 ± 1.0	NB
A	*Leucophaeus atricilla*	Laughing Gull				S1B	88	13.1 ± 0.0	NB
A	*Rissa tridactyla*	Black-legged Kittiwake				S1B	63	13.9 ± 0.0	NB
A	*Uria aalge*	Common Murre				S1B	154	14.4 ± 0.0	NB
A	*Alca torda*	Razorbill				S1B	192	14.4 ± 0.0	NB
A	*Fratercula arctica*	Atlantic Puffin				S1B	190	13.3 ± 1.0	NB
A	*Progne subis*	Purple Martin				S1B	196	21.4 ± 0.0	NB
A	*Histrionicus histrionicus*	Harlequin Duck				S1B,S1S2N,S2M	1	51.0 ± 0.0	NB
A	*Aythya marila*	Greater Scaup				S1B,S2N,S4M	40	21.1 ± 2.0	NB
A	*Oxyura jamaicensis*	Ruddy Duck				S1B,S2S3M	48	19.0 ± 0.0	NB
A	*Aythya affinis*	Lesser Scaup				S1B,S4M	207	22.2 ± 0.0	NB
A	*Eremophila alpestris*	Horned Lark				S1B,S4N,S5M	28	9.1 ± 7.0	NB
A	*Sterna paradisaea*	Arctic Tern				S1B,SUM	152	13.3 ± 1.0	NB
A	*Chroicocephalus ridibundus*	Black-headed Gull				S1N,S2M	40	11.9 ± 0.0	NB
A	*Branta bernicla*	Brant				S1N,S2S3M	541	13.0 ± 1.0	NB
A	*Calidris alba*	Sanderling				S1N,S3S4M	907	19.4 ± 1.0	NB
A	*Butorides virescens*	Green Heron				S1S2B	32	3.3 ± 0.0	NB
A	*Nycticorax nycticorax*	Black-crowned Night-heron				S1S2B	66	3.2 ± 0.0	NB

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A	*Empidonax traillii*	Willow Flycatcher				S1S2B	96	1.2 ± 0.0	NB
A	*Stelgidopteryx serripennis*	Northern Rough-winged Swallow				S1S2B	28	2.9 ± 7.0	NB
A	*Troglodytes aedon*	House Wren				S1S2B	35	8.9 ± 0.0	NB
A	*Calidris bairdii*	Baird's Sandpiper				S1S2M	139	36.9 ± 1.0	NB
A	*Melanitta americana*	American Scoter				S1S2N,S3M	795	6.6 ± 16.0	NB
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S2B	456	3.0 ± 0.0	NB
A	*Cistothorus palustris*	Marsh Wren				S2B	394	37.8 ± 0.0	NB
A	*Mimus polyglottos*	Northern Mockingbird				S2B	141	8.7 ± 7.0	NB
A	*Pooecetes gramineus*	Vesper Sparrow				S2B	60	2.9 ± 7.0	NB
A	*Mareca strepera*	Gadwall				S2B,S3M	97	21.1 ± 3.0	NB
A	*Tringa solitaria*	Solitary Sandpiper				S2B,S4S5M	272	3.4 ± 2.0	NB
A	*Pinicola enucleator*	Pine Grosbeak				S2B,S4S5N,S4S5M	29	19.2 ± 7.0	NB
A	*Phalacrocorax carbo*	Great Cormorant				S2N	318	11.5 ± 0.0	NB
A	*Somateria spectabilis*	King Eider				S2N	56	19.3 ± 17.0	NB
A	*Larus hyperboreus*	Glaucous Gull				S2N	160	3.8 ± 0.0	NB
A	*Melanitta perspicillata*	Surf Scoter				S2N,S4M	112	11.8 ± 9.0	NB
A	*Melanitta deglandi*	White-winged Scoter				S2N,S4M	44	11.8 ± 9.0	NB
A	*Asio otus*	Long-eared Owl				S2S3	20	3.7 ± 7.0	NB
A	*Picoides dorsalis*	American Three-toed Woodpecker				S2S3	10	19.2 ± 7.0	NB
A	*Toxostoma rufum*	Brown Thrasher				S2S3B	81	3.7 ± 7.0	NB
A	*Icterus galbula*	Baltimore Oriole				S2S3B	186	2.9 ± 0.0	NB
A	*Somateria mollissima*	Common Eider				S2S3B,S2S3N,S4M	2013	6.6 ± 16.0	NB
A	*Larus delawarensis*	Ring-billed Gull				S2S3B,S4N,S5M	311	3.1 ± 0.0	NB
A	*Pluvialis dominica*	American Golden-Plover				S2S3M	289	21.3 ± 0.0	NB
A	*Calcarius lapponicus*	Lapland Longspur				S2S3N,SUM	36	48.7 ± 0.0	NB
A	*Larus marinus*	Great Black-backed Gull				S3	451	3.4 ± 0.0	NB
A	*Picoides arcticus*	Black-backed Woodpecker				S3	45	3.7 ± 7.0	NB
A	*Loxia curvirostra*	Red Crossbill				S3	107	2.6 ± 0.0	NB
A	*Spinus pinus*	Pine Siskin				S3	199	2.6 ± 0.0	NB
A	*Prosopium cylindraceum*	Round Whitefish				S3	3	63.1 ± 10.0	NB
A	*Salvelinus namaycush*	Lake Trout				S3	6	21.9 ± 0.0	NB
A	*Sorex maritimensis*	Maritime Shrew				S3	1	88.8 ± 1.0	NB
A	*Spatula clypeata*	Northern Shoveler				S3B	97	3.4 ± 4.0	NB
A	*Charadrius vociferus*	Killdeer				S3B	763	3.1 ± 0.0	NB
A	*Tringa semipalmata*	Willet				S3B	171	21.1 ± 2.0	NB
A	*Cepphus grylle*	Black Guillemot				S3B	808	10.6 ± 7.0	NB
A	*Coccyzus erythropthalmus*	Black-billed Cuckoo				S3B	173	3.2 ± 0.0	NB
A	*Myiarchus crinitus*	Great Crested Flycatcher				S3B	315	3.5 ± 0.0	NB
A	*Piranga olivacea*	Scarlet Tanager				S3B	188	3.7 ± 7.0	NB
A	*Pheucticus ludovicianus*	Rose-breasted Grosbeak				S3B	603	1.0 ± 0.0	NB
A	*Passerina cyanea*	Indigo Bunting				S3B	111	2.9 ± 7.0	NB
A	*Molothrus ater*	Brown-headed Cowbird				S3B	219	7.1 ± 7.0	NB
A	*Setophaga tigrina*	Cape May Warbler				S3B,S4S5M	110	4.8 ± 0.0	NB
A	*Mergus serrator*	Red-breasted Merganser				S3B,S4S5N,S5M	397	8.7 ± 7.0	NB
A	*Anas acuta*	Northern Pintail				S3B,S5M	50	38.6 ± 1.0	NB
A	*Anser caerulescens*	Snow Goose				S3M	7	48.7 ± 0.0	NB
A	*Numenius phaeopus hudsonicus*	Whimbrel				S3M	461	13.3 ± 1.0	NB
A	*Arenaria interpres*	Ruddy Turnstone				S3M	754	20.2 ± 0.0	NB
A	*Calidris pusilla*	Semipalmated Sandpiper				S3M	2610	11.2 ± 0.0	NB
A	*Calidris melanotos*	Pectoral Sandpiper				S3M	353	28.9 ± 2.0	NB
A	*Limnodromus griseus*	Short-billed Dowitcher				S3M	862	12.5 ± 0.0	NB
A	*Phalaropus fulicarius*	Red Phalarope				S3M	126	11.2 ± 0.0	NB
A	*Bucephala albeola*	Bufflehead				S3N	1133	3.6 ± 0.0	NB

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A	*Calidris maritima*	Purple Sandpiper				S3N	271	11.8 ± 9.0	NB
A	*Uria lomvia*	Thick-billed Murre				S3N,S3M	67	12.4 ± 0.0	NB
A	*Perisoreus canadensis*	Canada Jay				S3S4	217	3.7 ± 7.0	NB
A	*Poecile hudsonicus*	Boreal Chickadee				S3S4	181	3.1 ± 0.0	NB
A	*Eptesicus fuscus*	Big Brown Bat				S3S4	50	12.5 ± 1.0	NB
A	*Synaptomys cooperi*	Southern Bog Lemming				S3S4	18	59.7 ± 1.0	NB
A	*Tyrannus tyrannus*	Eastern Kingbird				S3S4B	535	2.9 ± 0.0	NB
A	*Vireo gilvus*	Warbling Vireo				S3S4B	241	3.1 ± 0.0	NB
A	*Actitis macularius*	Spotted Sandpiper				S3S4B,S4M	1083	0.9 ± 0.0	NB
A	*Melospiza lincolnii*	Lincoln's Sparrow				S3S4B,S4M	227	3.5 ± 0.0	NB
A	*Gallinago delicata*	Wilson's Snipe				S3S4B,S5M	862	3.4 ± 1.0	NB
A	*Setophaga striata*	Blackpoll Warbler				S3S4B,S5M	91	3.0 ± 0.0	NB
A	*Pluvialis squatarola*	Black-bellied Plover				S3S4M	1144	12.5 ± 0.0	NB
A	*Morus bassanus*	Northern Gannet				SHB	849	12.5 ± 0.0	NB
C	*Quercus macrocarpa - Acer rubrum / Onoclea sensibilis - Carex arcta Forest*	Bur Oak - Red Maple / Sensitive Fern - Northern Clustered Sedge Forest				S2	1	93.9 ± 0.0	NB
C	*Acer saccharinum / Onoclea sensibilis - Lysimachia terrestris Forest*	Silver Maple / Sensitive Fern - Swamp Yellow Loosestrife Forest				S3	1	60.0 ± 0.0	NB
C	*Acer saccharum - Fraxinus americana / Polystichum acrostichoides Forest*	Sugar Maple - White Ash / Christmas Fern Forest				S3S4	2	80.4 ± 0.0	NB
I	*Bombus bohemicus*	Ashton Cuckoo Bumble Bee	Endangered	Endangered		S1	9	20.5 ± 5.0	NB
I	*Danaus plexippus*	Monarch	Endangered	Special Concern	Special Concern	S2S3?B	248	8.3 ± 0.0	NB
I	*Bombus affinis*	Rusty-patched Bumble Bee	Endangered	Endangered		SH	1	90.3 ± 5.0	NB
I	*Bombus suckleyi*	Suckley's Cuckoo Bumble Bee	Threatened			SH	1	67.6 ± 5.0	NB
I	*Gomphurus ventricosus*	Skillet Clubtail	Special Concern	Endangered	Endangered	S2	94	83.8 ± 0.0	NB
I	*Cicindela marginipennis*	Cobblestone Tiger Beetle	Special Concern	Endangered	Endangered	S2S3	87	93.2 ± 0.0	NB
I	*Ophiogomphus howei*	Pygmy Snaketail	Special Concern	Special Concern	Special Concern	S2S3	17	6.6 ± 0.0	NB
I	*Alasmidonta varicosa*	Brook Floater	Special Concern	Special Concern	Special Concern	S3	1	60.9 ± 0.0	NB
I	*Lampsilis cariosa*	Yellow Lampmussel	Special Concern	Special Concern	Special Concern	S3	79	59.9 ± 0.0	NB
I	*Bombus terricola*	Yellow-banded Bumble Bee	Special Concern	Special Concern		S4	94	7.2 ± 0.0	NB
I	*Coccinella transversoguttata richardsoni*	Transverse Lady Beetle	Special Concern			SH	15	51.5 ± 0.0	NB
I	*Appalachina sayana sayana*	Spike-lip Crater Snail	Not At Risk			S3?	2	65.5 ± 1.0	NB
I	*Conotrachelus juglandis*	Butternut Curculio				S1	3	86.5 ± 0.0	NB
I	*Haematopota rara*	Shy Cleg				S1	1	86.6 ± 1.0	NB
I	*Tharsalea dorcas*	Dorcas Copper				S1	1	37.4 ± 0.0	NB
I	*Erora laeta*	Early Hairstreak				S1	4	64.2 ± 7.0	NB
I	*Somatochlora septentrionalis*	Muskeg Emerald				S1	1	84.9 ± 1.0	NB
I	*Polites origenes*	Crossline Skipper				S1?	8	82.5 ± 0.0	NB
I	*Icaricia saepiolus*	Greenish Blue				S1S2	4	11.7 ± 0.0	NB
I	*Pachydiplax longipennis*	Blue Dasher				S1S2	3	11.4 ± 1.0	NB
I	*Encyclops caeruleus*	Cerulean Long-horned Beetle				S2	1	89.0 ± 0.0	NB
I	*Scaphinotus viduus*	Bereft Snail-eating Beetle				S2	1	76.2 ± 0.0	NB
I	*Brachyleptura circumdata*	Dark-shouldered Long-horned Beetle				S2	6	87.5 ± 0.0	NB
I	*Satyrium calanus*	Banded Hairstreak				S2	24	49.0 ± 0.0	NB
I	*Satyrium calanus falacer*	Falacer Hairstreak				S2	1	89.3 ± 1.0	NB
I	*Strymon melinus*	Gray Hairstreak				S2	4	37.8 ± 2.0	NB
I	*Hybomitra frosti*	Frost's Horse Fly				S2S3	1	76.4 ± 0.0	NB
I	*Tabanus vivax*	Vivacious Horse Fly				S2S3	1	55.6 ± 0.0	NB
I	*Ophiogomphus colubrinus*	Boreal Snaketail				S2S3	40	27.3 ± 1.0	NB
I	*Sphaeroderus nitidicollis*	Polished Snail-eating Beetle				S3	1	92.0 ± 0.0	NB
I	*Lepturopsis biforis*	Two-spotted Long-horned				S3	1	61.8 ± 1.0	NB

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I	*Orthosoma brunneum*	Beetle Moist Long-horned Beetle				S3	1	97.2 ± 5.0	NB
I	*Elaphrus americanus*	Boreal Elaphrus Beetle				S3	1	87.6 ± 0.0	NB
I	*Semanotus terminatus*	Light Long-horned Beetle				S3	1	78.0 ± 0.0	NB
I	*Desmocerus palliatus*	Elderberry Borer				S3	9	61.8 ± 1.0	NB
I	*Agonum excavatum*	Excavated Harp Ground Beetle				S3	1	87.6 ± 0.0	NB
I	*Clivina americana*	America Pedunculate Ground Beetle				S3	1	87.6 ± 0.0	NB
I	*Olisthopus parmatus*	Tawny-bordered Harp Ground Beetle				S3	1	92.0 ± 0.0	NB
I	*Tachys scitulus*	Handsome Riverbank Ground Beetle				S3	1	87.6 ± 0.0	NB
I	*Carabus maeander*	Meander Ground Beetle				S3	1	55.7 ± 0.0	NB
I	*Coccinella hieroglyphica kirbyi*	a Ladybird Beetle				S3	1	61.8 ± 1.0	NB
I	*Hippodamia parenthesis*	Parenthesis Lady Beetle				S3	4	61.8 ± 1.0	NB
I	*Stenocorus vittiger*	Shrub Long-horned Beetle				S3	1	87.6 ± 0.0	NB
I	*Gnathacmaeops pratensis*	Meadow Flower Longhorn Beetle				S3	5	61.8 ± 1.0	NB
I	*Pogonocherus mixtus*	Mixed-spotted Flatface Sawyer				S3	1	61.8 ± 1.0	NB
I	*Badister neopulchellus*	Red-black Spotted Beetle				S3	1	87.6 ± 0.0	NB
I	*Gonotropis dorsalis*	Birch Fungus Weevil				S3	1	78.0 ± 0.0	NB
I	*Naemia seriata*	Seaside Lady Beetle				S3	2	20.2 ± 0.0	NB
I	*Saperda lateralis*	Red-edged Long-horned Beetle				S3	2	48.3 ± 0.0	NB
I	*Epargyreus clarus*	Silver-spotted Skipper				S3	15	30.4 ± 1.0	NB
I	*Hesperia sassacus*	Indian Skipper				S3	20	2.8 ± 1.0	NB
I	*Euphyes bimacula*	Two-spotted Skipper				S3	22	3.6 ± 1.0	NB
I	*Satyrium acadica*	Acadian Hairstreak				S3	17	41.3 ± 1.0	NB
I	*Plebejus idas*	Northern Blue				S3	2	23.0 ± 0.0	NB
I	*Plebejus idas empetri*	Crowberry Blue				S3	25	14.1 ± 2.0	NB
I	*Argynnis aphrodite*	Aphrodite Fritillary				S3	26	8.3 ± 0.0	NB
I	*Boloria bellona*	Meadow Fritillary				S3	62	9.1 ± 4.0	NB
I	*Nymphalis l-album*	Compton Tortoiseshell				S3	26	40.2 ± 0.0	NB
I	*Gomphurus vastus*	Cobra Clubtail				S3	118	77.9 ± 0.0	NB
I	*Celithemis martha*	Martha's Pennant				S3	8	14.7 ± 0.0	NB
I	*Ladona exusta*	White Corporal				S3	10	17.5 ± 0.0	NB
I	*Enallagma pictum*	Scarlet Bluet				S3	10	38.4 ± 0.0	NB
I	*Ischnura kellicotti*	Lilypad Forktail				S3	19	30.0 ± 0.0	NB
I	*Arigomphus furcifer*	Lilypad Clubtail				S3	24	50.1 ± 0.0	NB
I	*Alasmidonta undulata*	Triangle Floater				S3	19	24.5 ± 1.0	NB
I	*Atlanticoncha ochracea*	Tidewater Mucket				S3	134	53.1 ± 1.0	NB
I	*Striatura ferrea*	Black Striate Snail				S3	1	86.7 ± 1.0	NB
I	*Neohelix albolabris*	Whitelip Snail				S3	2	78.6 ± 0.0	NB
I	*Spurwinkia salsa*	Saltmarsh Hydrobe				S3	34	34.3 ± 0.0	NB
I	*Pantala hymenaea*	Spot-Winged Glider				S3B	12	19.8 ± 1.0	NB
I	*Bombus griseocollis*	Brown-belted Bumble Bee				S3S4	2	89.6 ± 0.0	NB
I	*Somatochlora forcipata*	Forcipate Emerald				S3S4	19	19.8 ± 1.0	NB
I	*Somatochlora tenebrosa*	Clamp-Tipped Emerald				S3S4	7	43.9 ± 1.0	NB
N	*Erioderma pedicellatum (Atlantic pop.)*	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered	SH	1	31.2 ± 1.0	NB
N	*Pannaria lurida*	Wrinkled Shingle Lichen	Threatened	Threatened		S1?	160	2.4 ± 0.0	NB
N	*Anzia colpodes*	Black-foam Lichen	Threatened	Threatened		S1S2	3	49.8 ± 1.0	NB
N	*Fuscopannaria leucosticta*	White-rimmed Shingle Lichen	Threatened			S2	196	41.3 ± 0.0	NB
N	*Pectenia plumbea*	Blue Felt Lichen	Special Concern	Special Concern	Special Concern	S1	393	30.7 ± 5.0	NB

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N	*Pseudevernia cladonia*	Ghost Antler Lichen	Not At Risk			S2S3	18	13.1 ± 0.0	NB
N	*Imbribryum muehlenbeckii*	Muehlenbeck's Bryum Moss				S1	1	54.4 ± 1.0	NB
N	*Sphagnum macrophyllum*	Sphagnum				S1	4	26.4 ± 0.0	NB
N	*Coscinodon cribrosus*	Sieve-Toothed Moss				S1	1	58.8 ± 0.0	NB
N	*Leptogium hirsutum*	Jellyskin Lichen				S1	26	48.2 ± 0.0	NB
N	*Coccocarpia palmicola*	Salted Shell Lichen				S1	3	1.9 ± 0.0	NB
N	*Peltigera collina*	Tree Pelt Lichen				S1	1	51.0 ± 10.0	NB
N	*Peltigera malacea*	Veinless Pelt Lichen				S1	1	94.1 ± 0.0	NS
N	*Pseudocalliergon trifarium*	Three-ranked Spear Moss				S1?	1	48.9 ± 0.0	NB
N	*Dichelyma falcatum*	a Moss				S1?	2	50.6 ± 1.0	NB
N	*Dicranum bonjeanii*	Bonjean's Broom Moss				S1?	1	88.8 ± 1.0	NB
N	*Oxyrrhynchium hians*	Light Beaked Moss				S1?	1	90.6 ± 1.0	NB
N	*Plagiothecium latebricola*	Alder Silk Moss				S1?	1	55.5 ± 0.0	NB
N	*Niphotrichum ericoides*	Dense Rock Moss				S1?	1	58.9 ± 3.0	NB
N	*Splachnum pensylvanicum*	Southern Dung Moss				S1?	1	84.0 ± 0.0	NB
N	*Platylomella lescurii*	a Moss				S1?	1	25.2 ± 1.0	NB
N	*Heterodermia squamulosa*	Scaly Fringe Lichen				S1?	7	47.4 ± 0.0	NB
N	*Pilophorus fibula*	New England Matchstick Lichen				S1?	1	14.9 ± 0.0	NB
N	*Peltigera venosa*	Fan Pelt Lichen				S1?	2	44.4 ± 0.0	NB
N	*Cladonia oricola*	Cladonia Lichen				S1?	2	41.5 ± 0.0	NB
N	*Pallavicinia lyellii*	Lyell's Ribbonwort				S1S2	2	72.1 ± 1.0	NB
N	*Reboulia hemisphaerica*	Purple-margined Liverwort				S1S2	1	25.3 ± 1.0	NB
N	*Solenostoma obovatum*	Egg Flapwort				S1S2	1	67.8 ± 0.0	NB
N	*Brachythecium acuminatum*	Acuminate Ragged Moss				S1S2	2	90.6 ± 10.0	NB
N	*Ptychostomum salinum*	Saltmarsh Bryum				S1S2	1	23.5 ± 1.0	NB
N	*Pseudocampylium radicale*	Long-stalked Fine Wet Moss				S1S2	1	90.6 ± 1.0	NB
N	*Ditrichum pallidum*	Pale Cow-hair Moss				S1S2	1	78.6 ± 1.0	NB
N	*Sphagnum platyphyllum*	Flat-leaved Peat Moss				S1S2	2	52.4 ± 0.0	NB
N	*Tomentypnum falcifolium*	Sickle-leaved Golden Moss				S1S2	1	32.7 ± 1.0	NB
N	*Pseudotaxiphyllum distichaceum*	a Moss				S1S2	2	23.5 ± 1.0	NB
N	*Hamatocaulis vernicosus*	a Moss				S1S2	1	84.1 ± 100.0	NB
N	*Pilophorus cereolus*	Powdered Matchstick Lichen				S1S2	1	14.9 ± 0.0	NB
N	*Calypogeia neesiana*	Nees' Pouchwort				S1S3	1	79.8 ± 1.0	NB
N	*Fuscocephaloziopsis connivens*	Forcipated Pincerwort				S1S3	1	69.7 ± 0.0	NB
N	*Cephaloziella elachista*	Spurred Threadwort				S1S3	1	48.8 ± 5.0	NB
N	*Porella pinnata*	Pinnate Scalewort				S1S3	2	53.1 ± 1.0	NB
N	*Amphidium mougeotii*	a Moss				S2	3	25.8 ± 8.0	NB
N	*Anomodon viticulosus*	a Moss				S2	6	56.2 ± 0.0	NB
N	*Cynodontium strumiferum*	Strumose Dogtooth Moss				S2	1	25.8 ± 8.0	NB
N	*Dicranella palustris*	Drooping-Leaved Fork Moss				S2	1	97.7 ± 100.0	NB
N	*Didymodon ferrugineus*	Rusty Beard Moss				S2	1	79.1 ± 1.0	NB
N	*Ditrichum flexicaule*	Flexible Cow-hair Moss				S2	1	67.1 ± 1.0	NB
N	*Anomodon tristis*	a Moss				S2	1	55.0 ± 1.0	NB
N	*Hypnum pratense*	Meadow Plait Moss				S2	1	52.2 ± 0.0	NB
N	*Isothecium myosuroides*	Slender Mouse-tail Moss				S2	10	21.9 ± 0.0	NB
N	*Physcomitrium immersum*	a Moss				S2	7	84.2 ± 1.0	NB
N	*Platydictya jungermannioides*	False Willow Moss				S2	1	21.9 ± 0.0	NB
N	*Seligeria calcarea*	Chalk Brittle Moss				S2	1	67.1 ± 1.0	NB
N	*Sphagnum lindbergii*	Lindberg's Peat Moss				S2	8	23.5 ± 1.0	NB
N	*Tayloria serrata*	Serrate Trumpet Moss				S2	1	91.5 ± 1.0	NB
N	*Tetraplodon mnioides*	Entire-leaved Nitrogen Moss				S2	3	23.5 ± 1.0	NB
N	*Thamnobryum alleghaniense*	a Moss				S2	1	86.8 ± 0.0	NB
N	*Tortula mucronifolia*	Mucronate Screw Moss				S2	1	58.3 ± 0.0	NB
N	*Ulota phyllantha*	a Moss				S2	3	21.9 ± 0.0	NB

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N	*Anomobryum julaceum*	Slender Silver Moss				S2	1	90.6 ± 1.0	NB
N	*Usnea ceratina*	Warty Beard Lichen				S2	1	8.8 ± 0.0	NB
N	*Leptogium corticola*	Blistered Jellyskin Lichen				S2	3	80.2 ± 1.0	NB
N	*Leptogium milligranum*	Stretched Jellyskin Lichen				S2	3	51.5 ± 0.0	NB
N	*Nephroma laevigatum*	Mustard Kidney Lichen				S2	3	51.0 ± 10.0	NB
N	*Peltigera lepidophora*	Scaly Pelt Lichen				S2	3	44.3 ± 0.0	NB
N	*Andreaea rothii*	Dusky Rock Moss				S2?	1	79.3 ± 0.0	NB
N	*Ptychostomum pallescens*	Tall Clustered Bryum				S2?	2	41.2 ± 1.0	NB
N	*Dichelyma capillaceum*	Hairlike Dichelyma Moss				S2?	2	51.2 ± 2.0	NB
N	*Dicranum spurium*	Spurred Broom Moss				S2?	3	17.5 ± 0.0	NB
N	*Schistostega pennata*	Luminous Moss				S2?	2	90.6 ± 1.0	NB
N	*Seligeria diversifolia*	a Moss				S2?	1	96.9 ± 0.0	NB
N	*Sphagnum angermanicum*	a Peatmoss				S2?	2	29.3 ± 1.0	NB
N	*Collema leptaleum*	Crumpled Bat's Wing Lichen				S2?	1	93.9 ± 0.0	NB
N	*Physcia subtilis*	Slender Rosette Lichen				S2?	1	74.5 ± 0.0	NB
N	*Ptychostomum cernuum*	Swamp Bryum				S2S3	2	27.0 ± 0.0	NB
N	*Buxbaumia aphylla*	Brown Shield Moss				S2S3	2	25.8 ± 8.0	NB
N	*Calliergonella cuspidata*	Common Large Wetland Moss				S2S3	4	21.5 ± 10.0	NB
N	*Drepanocladus polygamus*	Polygamous Hook Moss				S2S3	1	69.3 ± 1.0	NB
N	*Palustriella falcata*	Curled Hook Moss				S2S3	1	67.1 ± 1.0	NB
N	*Didymodon rigidulus*	Rigid Screw Moss				S2S3	3	56.2 ± 0.0	NB
N	*Ephemerum serratum*	a Moss				S2S3	1	93.2 ± 0.0	NB
N	*Fissidens bushii*	Bush's Pocket Moss				S2S3	2	56.2 ± 0.0	NB
N	*Neckera complanata*	a Moss				S2S3	4	56.2 ± 0.0	NB
N	*Orthotrichum elegans*	Showy Bristle Moss				S2S3	3	12.7 ± 2.0	NB
N	*Codriophorus fascicularis*	Clustered Rock Moss				S2S3	1	18.2 ± 0.0	NB
N	*Bucklandiella affinis*	Lesser Rock Moss				S2S3	1	91.6 ± 0.0	NS
N	*Scorpidium scorpioides*	Hooked Scorpion Moss				S2S3	4	48.9 ± 0.0	NB
N	*Seligeria campylopoda*	a Moss				S2S3	1	84.1 ± 100.0	NB
N	*Sphagnum centrale*	Central Peat Moss				S2S3	2	50.9 ± 0.0	NB
N	*Sphagnum subfulvum*	a Peatmoss				S2S3	4	32.7 ± 1.0	NB
N	*Taxiphyllum deplanatum*	Imbricate Yew-leaved Moss				S2S3	1	23.5 ± 1.0	NB
N	*Zygodon viridissimus*	a Moss				S2S3	3	21.0 ± 3.0	NB
N	*Schistidium agassizii*	Elf Bloom Moss				S2S3	2	12.7 ± 2.0	NB
N	*Loeskeobryum brevirostre*	a Moss				S2S3	4	67.1 ± 1.0	NB
N	*Sphaerophorus globosus*	Northern Coral Lichen				S2S3	1	63.4 ± 0.0	NB
N	*Polychidium muscicola*	Eyed Mossthorns Woollybear Lichen				S2S3	3	62.2 ± 0.0	NB
N	*Cynodontium tenellum*	Delicate Dogtooth Moss				S3	1	23.5 ± 1.0	NB
N	*Hypnum curvifolium*	Curved-leaved Plait Moss				S3	1	22.2 ± 5.0	NB
N	*Schistidium maritimum*	a Moss				S3	5	21.9 ± 0.0	NB
N	*Solorina saccata*	Woodland Owl Lichen				S3	1	44.3 ± 0.0	NB
N	*Ahtiana aurescens*	Eastern Candlewax Lichen				S3	2	50.6 ± 0.0	NB
N	*Normandina pulchella*	Rimmed Elf-ear Lichen				S3	8	93.4 ± 0.0	NS
N	*Cladonia strepsilis*	Olive Cladonia Lichen				S3	2	18.8 ± 2.0	NB
N	*Hypotrachyna catawbiensis*	Powder-tipped Antler Lichen				S3	15	18.8 ± 2.0	NB
N	*Scytinium lichenoides*	Tattered Jellyskin Lichen				S3	2	44.4 ± 0.0	NB
N	*Leptogium laceroides*	Short-bearded Jellyskin Lichen				S3	2	52.9 ± 0.0	NB
N	*Peltigera membranacea*	Membranous Pelt Lichen				S3	3	52.6 ± 0.0	NB
N	*Cladonia botrytes*	Wooden Soldiers Lichen				S3	1	51.1 ± 0.0	NB
N	*Cladonia deformis*	Lesser Sulphur-cup Lichen				S3	1	18.8 ± 2.0	NB
N	*Aulacomnium androgynum*	Little Groove Moss				S3?	9	18.4 ± 1.0	NB
N	*Dicranella rufescens*	Red Forklet Moss				S3?	2	82.2 ± 4.0	NB
N	*Rhytidiadelphus loreus*	Lanky Moss				S3?	1	64.3 ± 10.0	NB
N	*Sphagnum lescurii*	a Peatmoss				S3?	2	50.3 ± 1.0	NB
N	*Sphagnum inundatum*	a Sphagnum				S3?	2	77.6 ± 0.0	NB

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N	*Rostania occultata*	Crusted Tarpaper Lichen				S3?	1	93.9 ± 0.0	NB
N	*Scytinium subtile*	Appressed Jellyskin Lichen				S3?	5	18.8 ± 2.0	NB
N	*Anomodon rugelii*	Rugel's Anomodon Moss				S3S4	1	51.2 ± 2.0	NB
N	*Barbula convoluta*	Lesser Bird's-claw Beard Moss				S3S4	1	74.5 ± 8.0	NB
N	*Brachytheciastrum velutinum*	Velvet Ragged Moss				S3S4	4	20.3 ± 0.0	NB
N	*Dicranella cerviculata*	a Moss				S3S4	3	20.3 ± 6.0	NB
N	*Dicranum majus*	Greater Broom Moss				S3S4	7	21.9 ± 0.0	NB
N	*Fissidens bryoides*	Lesser Pocket Moss				S3S4	3	77.4 ± 4.0	NB
N	*Elodium blandowii*	Blandow's Bog Moss				S3S4	1	59.6 ± 0.0	NB
N	*Heterocladium dimorphum*	Dimorphous Tangle Moss				S3S4	1	12.7 ± 2.0	NB
N	*Isopterygiopsis muelleriana*	a Moss				S3S4	7	20.3 ± 0.0	NB
N	*Myurella julacea*	Small Mouse-tail Moss				S3S4	2	25.8 ± 8.0	NB
N	*Orthotrichum speciosum*	Showy Bristle Moss				S3S4	1	90.2 ± 0.0	NB
N	*Physcomitrium pyriforme*	Pear-shaped Urn Moss				S3S4	5	85.5 ± 0.0	NB
N	*Pogonatum dentatum*	Mountain Hair Moss				S3S4	2	22.2 ± 0.0	NB
N	*Sphagnum torreyanum*	a Peatmoss				S3S4	4	46.0 ± 0.0	NB
N	*Sphagnum austinii*	Austin's Peat Moss				S3S4	2	13.5 ± 1.0	NB
N	*Sphagnum contortum*	Twisted Peat Moss				S3S4	1	67.2 ± 0.0	NB
N	*Sphagnum quinquefarium*	Five-ranked Peat Moss				S3S4	1	67.1 ± 1.0	NB
N	*Splachnum rubrum*	Red Collar Moss				S3S4	1	85.6 ± 1.0	NB
N	*Tetraphis geniculata*	Geniculate Four-tooth Moss				S3S4	5	21.9 ± 0.0	NB
N	*Tetraplodon angustatus*	Toothed-leaved Nitrogen Moss				S3S4	2	23.5 ± 1.0	NB
N	*Weissia controversa*	Green-Cushioned Weissia				S3S4	2	67.6 ± 1.0	NB
N	*Abietinella abietina*	Wiry Fern Moss				S3S4	2	22.2 ± 0.0	NB
N	*Trichostomum tenuirostre*	Acid-Soil Moss				S3S4	4	20.3 ± 0.0	NB
N	*Rauiella scita*	Smaller Fern Moss				S3S4	1	53.3 ± 1.0	NB
N	*Pannaria rubiginosa*	Brown-eyed Shingle Lichen				S3S4	12	50.4 ± 0.0	NB
N	*Pseudocyphellaria holarctica*	Yellow Specklebelly Lichen				S3S4	57	1.9 ± 0.0	NB
N	*Cladonia terrae-novae*	Newfoundland Reindeer Lichen				S3S4	5	13.5 ± 1.0	NB
N	*Cladonia floerkeana*	Gritty British Soldiers Lichen				S3S4	1	84.7 ± 0.0	NB
N	*Cladonia parasitica*	Fence-rail Lichen				S3S4	1	50.5 ± 0.0	NB
N	*Nephroma parile*	Powdery Kidney Lichen				S3S4	17	2.0 ± 0.0	NB
N	*Protopannaria pezizoides*	Brown-gray Moss-shingle Lichen				S3S4	22	8.8 ± 0.0	NB
N	*Parmelia fertilis*	Fertile Shield Lichen				S3S4	1	78.2 ± 0.0	NB
N	*Usnea strigosa*	Bushy Beard Lichen				S3S4	2	68.5 ± 0.0	NB
N	*Fuscopannaria sorediata*	a Lichen				S3S4	10	41.2 ± 0.0	NB
N	*Pannaria conoplea*	Mealy-rimmed Shingle Lichen				S3S4	41	42.4 ± 0.0	NB
N	*Physcia tenella*	Fringed Rosette Lichen				S3S4	1	83.6 ± 0.0	NB
N	*Anaptychia palmulata*	Shaggy Fringed Lichen				S3S4	15	51.4 ± 0.0	NB
N	*Peltigera neopolydactyla*	Undulating Pelt Lichen				S3S4	1	18.8 ± 2.0	NB
N	*Grimmia anodon*	Toothless Grimmia Moss				SH	2	60.2 ± 10.0	NB
N	*Leucodon brachypus*	a Moss				SH	1	17.7 ± 100.0	NB
P	*Juglans cinerea*	Butternut	Endangered	Endangered	Endangered	S1	157	3.0 ± 0.0	NB
P	*Polemonium vanbruntiae*	Van Brunt's Jacob's-ladder	Threatened	Threatened	Threatened	S1	74	4.2 ± 0.0	NB
P	*Fraxinus nigra*	Black Ash	Threatened			S3S4	455	4.1 ± 0.0	NB
P	*Isoetes prototypus*	Prototype Quillwort	Special Concern	Special Concern	Endangered	S1	22	54.6 ± 0.0	NB
P	*Symphyotrichum anticostense*	Anticosti Aster	Special Concern	Special Concern	Endangered	S3	6	51.6 ± 0.0	NB
P	*Pterospora andromedea*	Woodland Pinedrops			Endangered	S1	19	89.3 ± 0.0	NB
P	*Antennaria parlinii ssp. fallax*	Parlin's Pussytoes				S1	7	36.5 ± 0.0	NB
P	*Antennaria howellii ssp. petaloidea*	Pussy-Toes				S1	4	51.9 ± 1.0	NB
P	*Bidens discoidea*	Swamp Beggarticks				S1	3	91.4 ± 0.0	NB

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P	*Helianthus decapetalus*	Ten-rayed Sunflower				S1	14	89.5 ± 1.0	NB
P	*Hieracium paniculatum*	Panicled Hawkweed				S1	5	70.0 ± 1.0	NB
P	*Senecio pseudoarnica*	Seabeach Ragwort				S1	18	55.3 ± 0.0	NB
P	*Barbarea orthoceras*	American Yellow Rocket				S1	2	49.5 ± 10.0	NB
P	*Cardamine parviflora*	Small-flowered Bittercress				S1	12	19.5 ± 1.0	NB
P	*Cardamine concatenata*	Cut-leaved Toothwort				S1	3	31.6 ± 0.0	NB
P	*Draba arabisans*	Rock Whitlow-Grass				S1	7	34.0 ± 0.0	NB
P	*Draba cana*	Lance-leaved Draba				S1	10	96.1 ± 0.0	NB
P	*Draba glabella*	Rock Whitlow-Grass				S1	8	48.5 ± 1.0	NB
P	*Mononeuria groenlandica*	Greenland Stitchwort				S1	5	41.3 ± 0.0	NB
P	*Chenopodiastrum simplex*	Maple-leaved Goosefoot				S1	10	60.2 ± 1.0	NB
P	*Blitum capitatum*	Strawberry-Blite				S1	3	61.2 ± 1.0	NB
P	*Callitriche terrestris*	Terrestrial Water-Starwort				S1	1	52.8 ± 0.0	NB
P	*Hypericum virginicum*	Virginia St. John's-wort				S1	7	57.8 ± 0.0	NB
P	*Viburnum acerifolium*	Maple-leaved Viburnum				S1	11	38.5 ± 1.0	NB
P	*Corema conradii*	Broom Crowberry				S1	1	59.1 ± 10.0	NB
P	*Vaccinium boreale*	Northern Blueberry				S1	1	22.8 ± 0.0	NB
P	*Vaccinium corymbosum*	Highbush Blueberry				S1	9	34.1 ± 5.0	NB
P	*Euphorbia polygonifolia*	Seaside Spurge				S1	8	51.9 ± 0.0	NB
P	*Hylodesmum glutinosum*	Large Tick-trefoil				S1	1	46.3 ± 1.0	NB
P	*Lespedeza capitata*	Round-headed Bush-clover				S1	5	98.7 ± 0.0	NB
P	*Gentiana rubricaulis*	Purple-stemmed Gentian				S1	18	18.4 ± 0.0	NB
P	*Lomatogonium rotatum*	Marsh Felwort				S1	3	25.0 ± 0.0	NB
P	*Proserpinaca pectinata*	Comb-leaved Mermaidweed				S1	2	19.7 ± 0.0	NB
P	*Lycopus virginicus*	Virginia Bugleweed				S1	2	64.4 ± 0.0	NB
P	*Pycnanthemum virginianum*	Virginia Mountain Mint				S1	4	82.3 ± 0.0	NB
P	*Decodon verticillatus*	Swamp Loosestrife				S1	2	93.6 ± 0.0	NB
P	*Lysimachia hybrida*	Lowland Yellow Loosestrife				S1	17	39.7 ± 0.0	NB
P	*Lysimachia quadrifolia*	Whorled Yellow Loosestrife				S1	16	50.2 ± 1.0	NB
P	*Primula laurentiana*	Laurentian Primrose				S1	6	92.7 ± 1.0	NS
P	*Crataegus jonesiae*	Jones' Hawthorn				S1	5	20.0 ± 0.0	NB
P	*Potentilla canadensis*	Canada Cinquefoil				S1	1	2.5 ± 0.0	NB
P	*Rubus flagellaris*	Northern Dewberry				S1	3	23.3 ± 0.0	NB
P	*Galium brevipes*	Limestone Swamp Bedstraw				S1	4	41.0 ± 5.0	NB
P	*Saxifraga paniculata ssp. laestadii*	Laestadius' Saxifrage				S1	8	67.1 ± 1.0	NB
P	*Agalinis tenuifolia*	Slender Agalinis				S1	9	86.8 ± 0.0	NB
P	*Gratiola lutea*	Golden Hedge-hyssop				S1	2	40.3 ± 5.0	NB
P	*Pedicularis canadensis*	Canada Lousewort				S1	23	20.8 ± 0.0	NB
P	*Viola sagittata var. ovata*	Arrow-Leaved Violet				S1	24	42.5 ± 0.0	NB
P	*Carex backii*	Rocky Mountain Sedge				S1	5	95.7 ± 1.0	NB
P	*Carex merritt-fernaldii*	Merritt Fernald's Sedge				S1	2	21.6 ± 0.0	NB
P	*Carex salina*	Saltmarsh Sedge				S1	2	57.0 ± 1.0	NB
P	*Carex waponahkikensis*	Dawn-land Sedge				S1	2	34.2 ± 0.0	NB
P	*Carex sterilis*	Sterile Sedge				S1	1	89.3 ± 0.0	NB
P	*Carex grisea*	Inflated Narrow-leaved Sedge				S1	12	87.2 ± 0.0	NB
P	*Carex saxatilis*	Russet Sedge				S1	14	57.9 ± 10.0	NB
P	*Cyperus diandrus*	Low Flatsedge				S1	7	86.6 ± 1.0	NB
P	*Eleocharis flavescens var. olivacea*	Bright-green Spikerush				S1	4	40.7 ± 1.0	NB
P	*Rhynchospora capillacea*	Slender Beakrush				S1	3	89.3 ± 0.0	NB
P	*Sisyrinchium angustifolium*	Narrow-leaved Blue-eyed-grass				S1	4	50.1 ± 0.0	NB
P	*Juncus greenei*	Greene's Rush				S1	1	12.4 ± 0.0	NB
P	*Juncus subtilis*	Creeping Rush				S1	1	80.6 ± 5.0	NB
P	*Allium canadense*	Canada Garlic				S1	11	82.3 ± 0.0	NB
P	*Goodyera pubescens*	Downy Rattlesnake-Plantain				S1	3	89.4 ± 0.0	NB

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P	*Malaxis monophyllos var. brachypoda*	North American White Adder's-mouth				S1	3	50.9 ± 10.0	NB
P	*Platanthera flava var. herbiola*	Pale Green Orchid				S1	13	26.0 ± 0.0	NB
P	*Platanthera macrophylla*	Large Round-Leaved Orchid				S1	2	41.0 ± 0.0	NB
P	*Spiranthes casei*	Case's Ladies'-Tresses				S1	6	91.6 ± 0.0	NB
P	*Bromus pubescens*	Hairy Wood Brome Grass				S1	6	93.7 ± 0.0	NB
P	*Cinna arundinacea*	Sweet Wood Reed Grass				S1	55	37.6 ± 0.0	NB
P	*Danthonia compressa*	Flattened Oat Grass				S1	1	84.8 ± 0.0	NB
P	*Dichanthelium dichotomum*	Forked Panic Grass				S1	20	37.6 ± 0.0	NB
P	*Glyceria obtusa*	Atlantic Manna Grass				S1	6	20.8 ± 5.0	NB
P	*Sporobolus compositus*	Rough Dropseed				S1	17	88.3 ± 0.0	NB
P	*Potamogeton friesii*	Fries' Pondweed				S1	6	50.9 ± 5.0	NB
P	*Potamogeton nodosus*	Long-leaved Pondweed				S1	8	85.6 ± 1.0	NB
P	*Potamogeton strictifolius*	Straight-leaved Pondweed				S1	2	73.2 ± 0.0	NB
P	*Xyris difformis*	Bog Yellow-eyed-grass				S1	6	45.3 ± 0.0	NB
P	*Asplenium ruta-muraria var. cryptolepis*	Wallrue Spleenwort				S1	4	67.1 ± 1.0	NB
P	*Dryopteris clintoniana*	Clinton's Wood Fern				S1	1	91.7 ± 0.0	NB
P	*Sceptridium oneidense*	Blunt-lobed Moonwort				S1	4	59.0 ± 0.0	NB
P	*Sceptridium rugulosum*	Rugulose Grapefern				S1	1	41.2 ± 1.0	NB
P	*Selaginella rupestris*	Rock Spikemoss				S1	36	88.4 ± 0.0	NB
P	*Polygonum aviculare ssp. neglectum*	Narrow-leaved Knotweed				S1?	6	35.4 ± 0.0	NB
P	*Alisma subcordatum*	Southern Water Plantain				S1?	6	56.7 ± 5.0	NB
P	*Wolffia columbiana*	Columbian Watermeal				S1?	7	83.1 ± 0.0	NB
P	*Euphrasia farlowii*	Farlow's Eyebright				S1S2	1	19.4 ± 1.0	NB
P	*Spiranthes ochroleuca*	Yellow Ladies'-tresses				S1S2	10	44.4 ± 5.0	NB
P	*Potamogeton bicupulatus*	Snailseed Pondweed				S1S2	5	22.5 ± 0.0	NB
P	*Spiranthes cernua*	Nodding Ladies'-Tresses				S1S3	18	7.3 ± 0.0	NB
P	*Spiranthes arcisepala*	Appalachian Ladies'-tresses				S1S3	6	44.5 ± 0.0	NB
P	*Neottia bifolia*	Southern Twayblade			Endangered	S2	11	67.8 ± 0.0	NB
P	*Sanicula trifoliata*	Large-Fruited Sanicle				S2	1	87.4 ± 5.0	NB
P	*Sanicula odorata*	Clustered Sanicle				S2	1	94.0 ± 0.0	NB
P	*Betula minor*	Dwarf White Birch				S2	1	98.2 ± 0.0	NB
P	*Atriplex glabriuscula var. franktonii*	Frankton's Saltbush				S2	3	18.5 ± 1.0	NB
P	*Hypericum x dissimulatum*	Disguised St. John's-wort				S2	7	7.7 ± 1.0	NB
P	*Viburnum dentatum var. lucidum*	Northern Arrow-Wood				S2	190	3.1 ± 0.0	NB
P	*Astragalus eucosmus*	Elegant Milk-vetch				S2	10	78.8 ± 0.0	NB
P	*Quercus macrocarpa*	Bur Oak				S2	134	20.1 ± 0.0	NB
P	*Nuphar x rubrodisca*	Red-disk Yellow Pond-lily				S2	11	28.9 ± 0.0	NB
P	*Polygaloides paucifolia*	Fringed Milkwort				S2	13	3.5 ± 1.0	NB
P	*Persicaria amphibia var. emersa*	Long-root Smartweed				S2	56	0.4 ± 0.0	NB
P	*Micranthes virginiensis*	Early Saxifrage				S2	14	84.8 ± 0.0	NB
P	*Scrophularia lanceolata*	Lance-leaved Figwort				S2	3	78.3 ± 100.0	NB
P	*Carex cephaloidea*	Thin-leaved Sedge				S2	2	85.7 ± 0.0	NB
P	*Carex albicans var. emmonsii*	White-tinged Sedge				S2	3	25.3 ± 0.0	NB
P	*Cyperus lupulinus ssp. macilentus*	Hop Flatsedge				S2	51	93.2 ± 0.0	NB
P	*Calypso bulbosa var. americana*	Calypso				S2	4	39.5 ± 0.0	NB
P	*Coeloglossum viride*	Long-bracted Frog Orchid				S2	5	76.4 ± 5.0	NB
P	*Cypripedium parviflorum var. makasin*	Small Yellow Lady's-Slipper				S2	5	43.4 ± 1.0	NB

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P	*Platanthera huronensis*	Fragrant Green Orchid				S2	2	47.0 ± 1.0	NB
P	*Puccinellia nutkaensis*	Alaska Alkaligrass				S2	10	18.6 ± 1.0	NB
P	*Schizaea pusilla*	Little Curlygrass Fern				S2	25	35.1 ± 0.0	NB
P	*Coryphopteris simulata*	Bog Fern				S2	4	92.8 ± 0.0	NB
P	*Toxicodendron radicans var. radicans*	Eastern Poison Ivy				S2?	12	72.1 ± 0.0	NB
P	*Symphyotrichum novi-belgii var. crenifolium*	New York Aster				S2?	10	15.7 ± 0.0	NB
P	*Humulus lupulus var. lupuloides*	Common Hop				S2?	4	84.1 ± 0.0	NB
P	*Rubus x recurvicaulis*	arching dewberry				S2?	3	48.7 ± 1.0	NB
P	*Osmorhiza longistylis*	Smooth Sweet Cicely				S2S3	3	22.9 ± 0.0	NB
P	*Symphyotrichum racemosum*	Small White Aster				S2S3	8	69.4 ± 1.0	NB
P	*Alnus serrulata*	Smooth Alder				S2S3	42	38.5 ± 1.0	NB
P	*Cuscuta cephalanthi*	Buttonbush Dodder				S2S3	2	58.3 ± 1.0	NB
P	*Gentiana linearis*	Narrow-Leaved Gentian				S2S3	5	90.5 ± 5.0	NB
P	*Hedeoma pulegioides*	American False Pennyroyal				S2S3	58	20.7 ± 5.0	NB
P	*Aphyllon uniflorum*	One-flowered Broomrape				S2S3	20	32.7 ± 0.0	NB
P	*Polygala senega*	Seneca Snakeroot				S2S3	4	86.2 ± 1.0	NB
P	*Persicaria careyi*	Carey's Smartweed				S2S3	8	20.8 ± 1.0	NB
P	*Hepatica americana*	Round-lobed Hepatica				S2S3	31	37.5 ± 0.0	NB
P	*Ranunculus sceleratus*	Cursed Buttercup				S2S3	8	37.7 ± 1.0	NB
P	*Cephalanthus occidentalis*	Common Buttonbush				S2S3	69	38.0 ± 0.0	NB
P	*Galium obtusum*	Blunt-leaved Bedstraw				S2S3	5	56.2 ± 0.0	NB
P	*Euphrasia randii*	Rand's Eyebright				S2S3	38	19.3 ± 0.0	NB
P	*Dirca palustris*	Eastern Leatherwood				S2S3	16	89.3 ± 1.0	NB
P	*Phryma leptostachya*	American Lopseed				S2S3	4	93.4 ± 1.0	NB
P	*Verbena urticifolia*	White Vervain				S2S3	17	85.6 ± 1.0	NB
P	*Viola novae-angliae*	New England Violet				S2S3	16	0.7 ± 0.0	NB
P	*Carex rostrata*	Narrow-leaved Beaked Sedge				S2S3	2	45.0 ± 0.0	NB
P	*Carex vacillans*	Estuarine Sedge				S2S3	4	18.0 ± 1.0	NB
P	*Scirpus atrovirens*	Dark-green Bulrush				S2S3	2	50.9 ± 0.0	NB
P	*Juncus ranarius*	Seaside Rush				S2S3	1	56.2 ± 0.0	NB
P	*Allium tricoccum*	Wild Leek				S2S3	4	80.2 ± 0.0	NB
P	*Corallorhiza maculata var. occidentalis*	Spotted Coralroot				S2S3	6	21.6 ± 0.0	NB
P	*Corallorhiza maculata var. maculata*	Spotted Coralroot				S2S3	3	88.1 ± 1.0	NB
P	*Elymus canadensis*	Canada Wild Rye				S2S3	19	56.2 ± 0.0	NB
P	*Piptatheropsis canadensis*	Canada Ricegrass				S2S3	6	38.5 ± 1.0	NB
P	*Puccinellia phryganodes ssp. neoarctica*	Creeping Alkali Grass				S2S3	18	9.8 ± 0.0	NB
P	*Poa glauca*	Glaucous Blue Grass				S2S3	1	58.8 ± 2.0	NB
P	*Potamogeton vaseyi*	Vasey's Pondweed				S2S3	12	41.5 ± 0.0	NB
P	*Isoetes tuckermanii ssp. acadiensis*	Acadian Quillwort				S2S3	10	14.7 ± 1.0	NB
P	*Botrychium tenebrosum*	Swamp Moonwort				S2S3	1	43.2 ± 0.0	NB
P	*Panax trifolius*	Dwarf Ginseng				S3	9	51.7 ± 0.0	NB
P	*Artemisia campestris ssp. caudata*	Tall Wormwood				S3	85	53.2 ± 0.0	NB
P	*Artemisia campestris*	Field Wormwood				S3	1	97.4 ± 0.0	NB
P	*Nabalus racemosus*	Glaucous Rattlesnakeroot				S3	77	52.0 ± 1.0	NB
P	*Solidago racemosa*	Racemose Goldenrod				S3	16	76.6 ± 0.0	NB
P	*Tanacetum bipinnatum ssp. huronense*	Lake Huron Tansy				S3	27	65.6 ± 1.0	NB
P	*Ionactis linariifolia*	Flax-leaved Aster				S3	1	93.0 ± 0.0	NB

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P	*Pseudognaphalium macounii*	Macoun's Cudweed				S3	10	50.5 ± 0.0	NB
P	*Impatiens pallida*	Pale Jewelweed				S3	1	89.2 ± 0.0	NB
P	*Turritis glabra*	Tower Mustard				S3	1	56.2 ± 0.0	NB
P	*Arabis pycnocarpa*	Cream-flowered Rockcress				S3	13	58.3 ± 0.0	NB
P	*Cardamine maxima*	Large Toothwort				S3	28	56.2 ± 0.0	NB
P	*Boechera stricta*	Drummond's Rockcress				S3	9	58.3 ± 1.0	NB
P	*Sagina nodosa*	Knotted Pearlwort				S3	25	13.2 ± 0.0	NB
P	*Sagina nodosa ssp. borealis*	Knotted Pearlwort				S3	2	44.2 ± 0.0	NB
P	*Stellaria humifusa*	Saltmarsh Starwort				S3	7	11.6 ± 0.0	NB
P	*Stellaria longifolia*	Long-leaved Starwort				S3	7	1.1 ± 0.0	NB
P	*Oxybasis rubra*	Red Goosefoot				S3	4	55.5 ± 0.0	NB
P	*Hudsonia tomentosa*	Woolly Beach-heath				S3	4	36.1 ± 0.0	NB
P	*Cornus obliqua*	Silky Dogwood				S3	207	37.4 ± 0.0	NB
P	*Lonicera oblongifolia*	Swamp Fly Honeysuckle				S3	23	40.1 ± 6.0	NB
P	*Triosteum aurantiacum*	Orange-fruited Tinker's Weed				S3	8	86.1 ± 1.0	NB
P	*Viburnum lentago*	Nannyberry				S3	92	38.2 ± 0.0	NB
P	*Rhodiola rosea*	Roseroot				S3	55	7.1 ± 1.0	NB
P	*Astragalus alpinus*	Alpine Milk-vetch				S3	2	56.2 ± 0.0	NB
P	*Astragalus alpinus var. brunetianus*	Alpine Milk-Vetch				S3	3	83.0 ± 0.0	NB
P	*Oxytropis campestris var. johannensis*	Field Locoweed				S3	11	66.8 ± 50.0	NB
P	*Bartonia paniculata ssp. iodandra*	Branched Bartonia				S3	19	24.7 ± 1.0	NB
P	*Gentianella amarella ssp. acuta*	Northern Gentian				S3	10	45.2 ± 0.0	NB
P	*Geranium bicknellii*	Bicknell's Crane's-bill				S3	6	21.4 ± 1.0	NB
P	*Myriophyllum farwellii*	Farwell's Water Milfoil				S3	36	5.6 ± 0.0	NB
P	*Myriophyllum humile*	Low Water Milfoil				S3	15	38.4 ± 0.0	NB
P	*Myriophyllum quitense*	Andean Water Milfoil				S3	71	51.2 ± 0.0	NB
P	*Proserpinaca palustris*	Marsh Mermaidweed				S3	51	0.7 ± 0.0	NB
P	*Utricularia resupinata*	Inverted Bladderwort				S3	19	21.8 ± 0.0	NB
P	*Fraxinus pennsylvanica*	Red Ash				S3	139	40.5 ± 0.0	NB
P	*Rumex pallidus*	Seabeach Dock				S3	17	13.5 ± 1.0	NB
P	*Rumex occidentalis*	Western Dock				S3	1	81.1 ± 1.0	NB
P	*Podostemum ceratophyllum*	Horn-leaved Riverweed				S3	28	38.5 ± 1.0	NB
P	*Primula mistassinica*	Mistassini Primrose				S3	13	49.2 ± 0.0	NB
P	*Pyrola minor*	Lesser Pyrola				S3	2	28.5 ± 0.0	NB
P	*Anemone multifida*	Cut-leaved Anemone				S3	1	88.8 ± 0.0	NB
P	*Clematis occidentalis*	Purple Clematis				S3	21	36.7 ± 0.0	NB
P	*Ranunculus flabellaris*	Yellow Water Buttercup				S3	24	30.3 ± 0.0	NB
P	*Amelanchier canadensis*	Canada Serviceberry				S3	18	2.5 ± 1.0	NB
P	*Crataegus scabrida*	Rough Hawthorn				S3	3	66.8 ± 0.0	NB
P	*Rubus occidentalis*	Black Raspberry				S3	28	19.4 ± 0.0	NB
P	*Salix candida*	Sage Willow				S3	2	80.8 ± 1.0	NB
P	*Salix myricoides*	Bayberry Willow				S3	7	26.1 ± 0.0	NB
P	*Salix nigra*	Black Willow				S3	135	52.0 ± 1.0	NB
P	*Salix interior*	Sandbar Willow				S3	34	56.2 ± 0.0	NB
P	*Comandra umbellata*	Bastard's Toadflax				S3	1	56.2 ± 0.0	NB
P	*Agalinis purpurea var. parviflora*	Small-flowered Purple False Foxglove				S3	11	77.9 ± 1.0	NB
P	*Valeriana uliginosa*	Swamp Valerian				S3	2	37.1 ± 1.0	NB
P	*Viola adunca*	Hooked Violet				S3	4	17.7 ± 1.0	NB
P	*Symplocarpus foetidus*	Eastern Skunk Cabbage				S3	119	0.3 ± 0.0	NB
P	*Carex adusta*	Lesser Brown Sedge				S3	4	55.0 ± 1.0	NB
P	*Carex arcta*	Northern Clustered Sedge				S3	54	38.5 ± 1.0	NB
P	*Carex conoidea*	Field Sedge				S3	30	20.4 ± 1.0	NB

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P	*Carex garberi*	Garber's Sedge				S3	4	48.4 ± 1.0	NB
P	*Carex granularis*	Limestone Meadow Sedge				S3	7	62.5 ± 0.0	NB
P	*Carex gynocrates*	Northern Bog Sedge				S3	4	45.4 ± 0.0	NB
P	*Carex hirtifolia*	Pubescent Sedge				S3	3	85.7 ± 0.0	NB
P	*Carex livida*	Livid Sedge				S3	2	58.8 ± 2.0	NB
P	*Carex ormostachya*	Necklace Spike Sedge				S3	8	53.0 ± 0.0	NB
P	*Carex plantaginea*	Plantain-Leaved Sedge				S3	5	81.4 ± 0.0	NB
P	*Carex prairea*	Prairie Sedge				S3	1	92.8 ± 5.0	NS
P	*Carex rosea*	Rosy Sedge				S3	25	56.2 ± 0.0	NB
P	*Carex sprengelii*	Longbeak Sedge				S3	2	90.5 ± 0.0	NB
P	*Carex tenuiflora*	Sparse-Flowered Sedge				S3	17	38.5 ± 1.0	NB
P	*Carex vaginata*	Sheathed Sedge				S3	16	40.1 ± 6.0	NB
P	*Cyperus esculentus*	Perennial Yellow Nutsedge				S3	1	97.3 ± 0.0	NB
P	*Cyperus esculentus var. leptostachyus*	Perennial Yellow Nutsedge				S3	68	56.2 ± 0.0	NB
P	*Cyperus squarrosus*	Awned Flatsedge				S3	36	84.5 ± 0.0	NB
P	*Eriophorum gracile*	Slender Cottongrass				S3	3	50.0 ± 0.0	NB
P	*Blysmopsis rufa*	Red Bulrush				S3	4	49.0 ± 0.0	NB
P	*Elodea nuttallii*	Nuttall's Waterweed				S3	12	38.5 ± 1.0	NB
P	*Juncus vaseyi*	Vasey Rush				S3	1	7.9 ± 0.0	NB
P	*Najas gracillima*	Thread-Like Naiad				S3	11	5.8 ± 0.0	NB
P	*Cypripedium reginae*	Showy Lady's-Slipper				S3	23	44.2 ± 1.0	NB
P	*Neottia auriculata*	Auricled Twayblade				S3	9	53.1 ± 1.0	NB
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	63	0.5 ± 0.0	NB
P	*Platanthera orbiculata*	Small Round-leaved Orchid				S3	15	17.6 ± 1.0	NB
P	*Spiranthes lucida*	Shining Ladies'-Tresses				S3	11	48.5 ± 1.0	NB
P	*Agrostis mertensii*	Northern Bent Grass				S3	1	19.4 ± 1.0	NB
P	*Bromus latiglumis*	Broad-Glumed Brome				S3	2	53.0 ± 0.0	NB
P	*Dichanthelium linearifolium*	Narrow-leaved Panic Grass				S3	11	37.5 ± 0.0	NB
P	*Leersia virginica*	White Cut Grass				S3	42	76.3 ± 10.0	NB
P	*Muhlenbergia richardsonis*	Mat Muhly				S3	9	89.2 ± 0.0	NB
P	*Schizachyrium scoparium*	Little Bluestem				S3	28	70.4 ± 0.0	NB
P	*Zizania aquatica*	Southern Wild Rice				S3	1	56.2 ± 0.0	NB
P	*Zizania aquatica var. aquatica*	Eastern Wild Rice				S3	3	90.6 ± 5.0	NB
P	*Adiantum pedatum*	Northern Maidenhair Fern				S3	18	25.3 ± 0.0	NB
P	*Asplenium trichomanes*	Maidenhair Spleenwort				S3	11	55.5 ± 0.0	NB
P	*Anchistea virginica*	Virginia chain fern				S3	43	55.3 ± 1.0	NB
P	*Dryopteris goldieana*	Goldie's Woodfern				S3	8	90.4 ± 0.0	NB
P	*Woodsia alpina*	Alpine Cliff Fern				S3	6	67.1 ± 1.0	NB
P	*Woodsia glabella*	Smooth Cliff Fern				S3	1	88.7 ± 1.0	NB
P	*Isoetes tuckermanii ssp. tuckermanii*	Tuckerman's Quillwort				S3	20	14.5 ± 1.0	NB
P	*Diphasiastrum x sabinifolium*	Savin-leaved Ground-cedar				S3	7	37.5 ± 1.0	NB
P	*Huperzia appressa*	Mountain Firmoss				S3	2	60.4 ± 1.0	NB
P	*Sceptridium dissectum*	Dissected Moonwort				S3	27	24.1 ± 5.0	NB
P	*Botrychium lanceolatum ssp. angustisegmentum*	Narrow Triangle Moonwort				S3	12	55.7 ± 0.0	NB
P	*Botrychium simplex*	Least Moonwort				S3	11	43.6 ± 0.0	NB
P	*Ophioglossum pusillum*	Northern Adder's-tongue				S3	6	42.9 ± 1.0	NB
P	*Selaginella selaginoides*	Low Spikemoss				S3	4	33.0 ± 0.0	NB
P	*Crataegus submollis*	Quebec Hawthorn				S3?	19	19.3 ± 1.0	NB
P	*Crataegus succulenta*	Fleshy Hawthorn				S3?	1	90.6 ± 5.0	NB
P	*Platanthera hookeri*	Hooker's Orchid				S3?	25	37.2 ± 2.0	NB
P	*Bidens hyperborea*	Estuary Beggarticks				S3S4	1	56.2 ± 0.0	NB
P	*Solidago altissima*	Tall Goldenrod				S3S4	6	62.5 ± 0.0	NB
P	*Symphyotrichum boreale*	Boreal Aster				S3S4	20	7.4 ± 0.0	NB
P	*Betula pumila*	Bog Birch				S3S4	26	48.8 ± 0.0	NB

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P	*Mertensia maritima*	Sea Lungwort				S3S4	50	12.8 ± 0.0	NB
P	*Subularia aquatica ssp. americana*	American Water Awlwort				S3S4	18	3.7 ± 0.0	NB
P	*Lobelia cardinalis*	Cardinal Flower				S3S4	396	0.6 ± 0.0	NB
P	*Callitriche hermaphroditica*	Northern Water-starwort				S3S4	6	27.7 ± 0.0	NB
P	*Viburnum edule*	Squashberry				S3S4	6	20.1 ± 0.0	NB
P	*Crassula aquatica*	Water Pygmyweed				S3S4	11	55.4 ± 1.0	NB
P	*Penthorum sedoides*	Ditch Stonecrop				S3S4	83	0.5 ± 0.0	NB
P	*Elatine americana*	American Waterwort				S3S4	8	50.5 ± 1.0	NB
P	*Hedysarum americanum*	Alpine Hedysarum				S3S4	3	56.2 ± 0.0	NB
P	*Fagus grandifolia*	American Beech				S3S4	178	0.9 ± 0.0	NB
P	*Geranium robertianum*	Herb Robert				S3S4	25	13.6 ± 0.0	NB
P	*Stachys hispida*	Smooth Hedge-Nettle				S3S4	12	78.4 ± 0.0	NB
P	*Stachys pilosa*	Hairy Hedge-Nettle				S3S4	6	56.2 ± 0.0	NB
P	*Teucrium canadense*	Canada Germander				S3S4	3	52.4 ± 0.0	NB
P	*Utricularia radiata*	Little Floating Bladderwort				S3S4	77	6.1 ± 0.0	NB
P	*Utricularia gibba*	Humped Bladderwort				S3S4	43	4.3 ± 0.0	NB
P	*Fraxinus americana*	White Ash				S3S4	173	4.0 ± 1.0	NB
P	*Epilobium strictum*	Downy Willowherb				S3S4	23	37.3 ± 0.0	NB
P	*Fallopia scandens*	Climbing False Buckwheat				S3S4	36	11.7 ± 0.0	NB
P	*Rumex persicarioides*	Peach-leaved Dock				S3S4	1	60.7 ± 0.0	NB
P	*Littorella americana*	American Shoreweed				S3S4	37	1.8 ± 1.0	NB
P	*Thalictrum confine*	Northern Meadow-rue				S3S4	87	11.9 ± 0.0	NB
P	*Drymocallis arguta*	Tall Wood Beauty				S3S4	36	18.1 ± 1.0	NB
P	*Rosa palustris*	Swamp Rose				S3S4	168	4.8 ± 0.0	NB
P	*Rubus pensilvanicus*	Pennsylvania Blackberry				S3S4	13	21.6 ± 3.0	NB
P	*Galium boreale*	Northern Bedstraw				S3S4	6	44.4 ± 0.0	NB
P	*Galium labradoricum*	Labrador Bedstraw				S3S4	18	17.7 ± 0.0	NB
P	*Salix pedicellaris*	Bog Willow				S3S4	73	4.3 ± 0.0	NB
P	*Geocaulon lividum*	Northern Comandra				S3S4	13	22.3 ± 0.0	NB
P	*Parnassia glauca*	Fen Grass-of-Parnassus				S3S4	2	56.2 ± 0.0	NB
P	*Agalinis neoscotica*	Nova Scotia Agalinis				S3S4	55	40.3 ± 0.0	NB
P	*Limosella australis*	Southern Mudwort				S3S4	11	37.3 ± 5.0	NB
P	*Ulmus americana*	White Elm				S3S4	146	0.9 ± 0.0	NB
P	*Boehmeria cylindrica*	Small-spike False-nettle				S3S4	162	0.4 ± 0.0	NB
P	*Juniperus horizontalis*	Creeping Juniper				S3S4	34	17.7 ± 1.0	NB
P	*Carex capillaris*	Hairlike Sedge				S3S4	6	56.2 ± 0.0	NB
P	*Carex eburnea*	Bristle-leaved Sedge				S3S4	1	77.6 ± 0.0	NB
P	*Carex exilis*	Coastal Sedge				S3S4	108	18.1 ± 0.0	NB
P	*Carex haydenii*	Hayden's Sedge				S3S4	93	0.3 ± 0.0	NB
P	*Carex lupulina*	Hop Sedge				S3S4	117	37.8 ± 1.0	NB
P	*Carex tenera*	Tender Sedge				S3S4	61	18.8 ± 2.0	NB
P	*Carex wiegandii*	Wiegand's Sedge				S3S4	33	17.5 ± 0.0	NB
P	*Carex recta*	Estuary Sedge				S3S4	8	18.0 ± 0.0	NB
P	*Carex atratiformis*	Scabrous Black Sedge				S3S4	2	56.2 ± 0.0	NB
P	*Cladium mariscoides*	Smooth Twigrush				S3S4	81	19.7 ± 0.0	NB
P	*Cyperus dentatus*	Toothed Flatsedge				S3S4	122	0.2 ± 0.0	NB
P	*Eleocharis quinqueflora*	Few-flowered Spikerush				S3S4	10	67.0 ± 0.0	NB
P	*Rhynchospora capitellata*	Small-headed Beakrush				S3S4	20	47.0 ± 0.0	NB
P	*Trichophorum clintonii*	Clinton's Clubrush				S3S4	26	1.9 ± 0.0	NB
P	*Bolboschoenus fluviatilis*	River Bulrush				S3S4	59	50.5 ± 0.0	NB
P	*Triglochin gaspensis*	Gasp ├ Arrowgrass				S3S4	21	13.5 ± 1.0	NB
P	*Lilium canadense*	Canada Lily				S3S4	96	11.1 ± 0.0	NB
P	*Triantha glutinosa*	Sticky False-Asphodel				S3S4	10	56.2 ± 0.0	NB
P	*Corallorhiza maculata*	Spotted Coralroot				S3S4	11	1.3 ± 0.0	NB
P	*Liparis loeselii*	Loesel's Twayblade				S3S4	20	33.6 ± 0.0	NB
P	*Neottia cordata*	Heart-leaved Twayblade				S3S4	23	6.8 ± 0.0	NB
P	*Platanthera obtusata*	Blunt-leaved Orchid				S3S4	40	17.4 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	# recs	Distance (km)	Prov
P	*Platanthera obtusata ssp. obtusata*	Blunt-leaved Orchid				S3S4	1	64.0 ± 0.0	NB
P	*Calamagrostis pickeringii*	Pickering's Reed Grass				S3S4	120	17.8 ± 0.0	NB
P	*Calamagrostis stricta*	Slim-stemmed Reed Grass				S3S4	3	51.9 ± 2.0	NB
P	*Eragrostis pectinacea*	Tufted Love Grass				S3S4	16	20.7 ± 0.0	NB
P	*Stuckenia filiformis*	Thread-leaved Pondweed				S3S4	6	58.8 ± 0.0	NB
P	*Potamogeton praelongus*	White-stemmed Pondweed				S3S4	14	41.6 ± 0.0	NB
P	*Potamogeton richardsonii*	Richardson's Pondweed				S3S4	37	58.8 ± 1.0	NB
P	*Xyris montana*	Northern Yellow-Eyed-Grass				S3S4	28	22.8 ± 0.0	NB
P	*Cryptogramma stelleri*	Steller's Rockbrake				S3S4	2	56.2 ± 0.0	NB
P	*Asplenium viride*	Green Spleenwort				S3S4	16	51.2 ± 0.0	NB
P	*Dryopteris fragrans*	Fragrant Wood Fern				S3S4	3	55.5 ± 0.0	NB
P	*Equisetum palustre*	Marsh Horsetail				S3S4	11	63.7 ± 0.0	NB
P	*Polypodium appalachianum*	Appalachian Polypody				S3S4	14	13.5 ± 1.0	NB
P	*Montia fontana*	Water Blinks				SH	1	22.8 ± 1.0	NB
P	*Solidago caesia*	Blue-stemmed Goldenrod				SX	2	61.2 ± 1.0	NB
P	*Celastrus scandens*	Climbing Bittersweet				SX	3	81.2 ± 100.0	NB
P	*Carex swanii*	Swan's Sedge				SX	45	54.9 ± 1.0	NB

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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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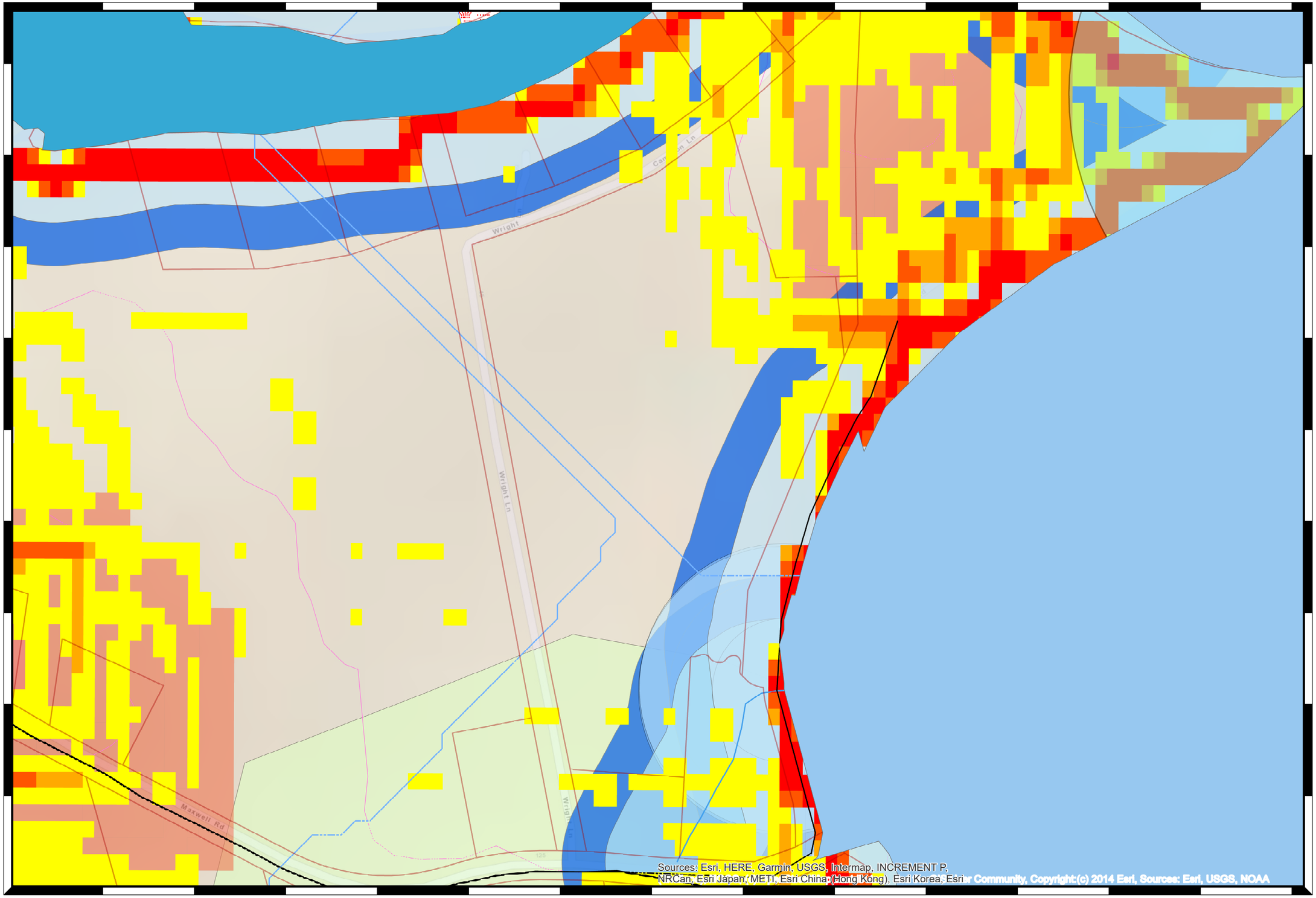
Appendix IV:

Archaeological Predictive Modelling



N
W E
S

Legend

SymbolID
- 0
- HistoricFeb2022
- PreContactFeb2022
- UndefinedSites
- SuspectedShipwrecks
- Shipwrecks
- 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

0 0.02 0.04 0.08 0.12 0.16
Kilometers

New Nouveau Brunswick

Time: 5:55:20 PM
Date: 6/27/2022

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