



10825, Route 11, Six Roads, NB E1X 3A7  
Téléphone: (506) 395-6699 • Télécopieur: (506) 393-6695  
www.msconsultants.nb.ca

**Registration document**  
**Environmental Impact Assessment**  
Victory Baptist Fellowship Development

Projet n° 20-02  
June 2020

**Registration document - EIA**  
**presented to :**



Breakwater Consulting Ltd.  
85, Pleasant street  
Miramichi, (N.-B.)  
E1V 1X8  
Phone : (506) 622-0617

## **PREFACE**

South Esk Miramichi Victory Living want to develop four (4) apartment buildings for senior citizens to meet the growing need for this type of housing. The project included the development of new wells, installation of septic systems, drainage of surface water, construction of a new public street and bushing of existing trees.

The Victory Baptist Fellowship Development project includes a « waterworks with a capacity greater than fifty cubic meters (50 m<sup>3</sup>) of water daily ». Under the *Environmental Impact Assessment (EIA) Regulation - Clean Environment Act*, the project must be registered for review and shall be subject to a water supply source assessment (WSSA) that conforms to the guidelines elaborated by the New Brunswick Department of Environment and Local Government (DELG).

MSC Multi-Service Consultants Inc. was commissioned by Breakwater Consultants to produce the registration document that reports on the results of the EIA study and includes details of the proposed project, its potential environmental impacts, and how significant impacts may be addressed. The registration document is submitting to start the regulatory process and to conduct a WSSA evaluating the sustainability of the water supply, assessing the water quality, and evaluating potential impacts to existing water users. The WSSA will be done concurrently with the EIA review process by Craig HydroGeoLogic Inc. as soon as possible after the approval of the DELG.

After an assessment of the existing environment, potential environmental impacts and proposed mitigation, the proposed project is unlikely to have long-term negative environmental impacts. MSC Multi-Service Consultants certifies that all of the information herein is true and accurate to the best of their knowledge and information sources available at the time of preparing the document. This EIA has been prepared solely for the benefit of Breakwater Consultants. MSC Multi-Service Consultants takes no responsibility for damages resulting from decisions and / or actions taken based on this EIA.

# **TABLE OF CONTENTS**

<b>LIST OF TABLES.....</b>	<b>IV</b>
<b>LIST OF FIGURES.....</b>	<b>IV</b>
<b>LIST OF ACRONYMS AND ABBREVIATIONS .....</b>	<b>V</b>
<b>1.0 THE PROPONENT.....</b>	<b>1</b>
1.1 NAME OF PROPONENT.....	1
1.2 ADDRESS OF PROPONENT.....	1
1.3 PRINCIPAL PROPONENT CONTACT .....	1
1.4 PRINCIPAL CONTACT PERSON FOR PURPOSES OF EIA .....	1
1.5 PROPERTY OWNERSHIP .....	1
<b>2.0 PROJECT DESCRIPTION .....</b>	<b>2</b>
2.1 PROJECT NAME .....	2
2.2 PROJECT OVERVIEW .....	2
2.3 PURPOSE, RATIONALE OR NEED FOR THE UNDERTAKING .....	2
2.4 PROJECT LOCATION .....	2
2.5 SITING CONSIDERATIONS.....	4
2.6 PHYSICAL COMPONENTS AND DIMENSIONS OF THE PROJECT .....	4
2.7 CONSTRUCTION DETAILS .....	5
2.8 OPERATION AND MAINTENANCE DETAILS .....	5
2.9 FUTURE MODIFICATIONS, EXTENSIONS OR ABANDONMENT.....	5
2.10 DOCUMENTS RELATED TO THE UNDERTAKING .....	5
<b>3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT .....</b>	<b>6</b>
3.1 EXISTING AND HISTORIC LAND USES .....	6
3.2 GEOLOGY AND TOPOGRAPHY.....	7
3.3 AIR QUALITY .....	7
3.4 WILDLIFE AND WILDLIFE HABITAT .....	8
3.5 MIGRATORY BIRDS .....	8
3.6 SPECIES AT RISK .....	8
3.6.1 <i>Rare species – flora</i> .....	11
3.6.2 <i>Rare species– fauna</i> .....	13
3.6.3 <i>Location sensitive species</i> .....	21
3.7 GROUNDWATER.....	21
3.8 SURFACE WATER .....	21
3.9 VALUED SPACES AND LOCATIONS .....	23
3.9.1 <i>Archaeological and Heritage Resources</i> .....	23
3.9.2 <i>environmentally significant areas</i> .....	23
3.9.3 <i>managed areas</i> .....	23
3.9.4 <i>Important Bird Areas</i> .....	24
3.10 LIFESTYLE AND QUALITY OF LIFE .....	24

<b>4.0 IDENTIFICATION OF ENVIRONMENTAL IMPACTS .....</b>	<b>25</b>
4.1 AIR QUALITY .....	25
4.2 WILDLIFE AND WILDLIFE HABITAT .....	25
4.3 MIGRATORY BIRDS AND SPECIES AT RISK.....	26
4.4 GROUNDWATER .....	26
4.5 SURFACE WATER.....	27
4.6 VALUED SPACES AND LOCATIONS .....	27
4.7 LIFESTYLE AND QUALITY OF LIFE .....	28
4.8 MAINTENANCE ACTIVITIES .....	28
4.9 ACCIDENTAL EVENTS .....	28
4.10 MATRIX SYNTHESIS.....	29
<b>5.0 SUMMARY OF PROPOSED MITIGATION.....</b>	<b>30</b>
5.1 AIR QUALITY .....	30
5.2 WILDLIFE AND WILDLIFE HABITAT .....	30
5.3 MIGRATORY BIRDS AND SPECIES AT RISK .....	31
5.4 GROUNDWATER .....	31
5.5 SURFACE WATER .....	31
5.6 VALUED SPACES AND LOCATIONS .....	32
5.7 LIFESTYLE AND QUALITY OF LIFE .....	32
5.8 ACCIDENTAL EVENTS .....	32
<b>6.0 PUBLIC AND FIRST NATIONS INVOLVEMENT.....</b>	<b>33</b>
<b>7.0 APPROVAL OF THE PROJECT .....</b>	<b>34</b>
<b>8.0 FUNDING.....</b>	<b>34</b>
<b>9.0 SIGNATURE .....</b>	<b>34</b>
<b>10.0 REFERENCES .....</b>	<b>35</b>

**APPENDICE A – DOCUMENTS RELATED TO THE UNDERTAKING**

**APPENDICE B – AERIAL PHOTOGRAPHIES**

**APPENDICE C – WSSA INITIAL APPLICATION**

**APPENDICE D – AC CDC REPORT**

## **LIST OF TABLES**

Table 1. Definition of terms related to species at risk .....	9
Table 2. Rare species of flora identified by AC CDC .....	11
Table 3. Rare species of fauna identified by AC CDC .....	13
Table 4. Matrix synthesis for the anticipated impact .....	29

## **LIST OF FIGURES**

Figure 1. Site location .....	3
Figure 2. Recent aerial view .....	6
Figure 3. Wind rose (source : meteoblue) .....	7
Figure 4. Surface water location .....	22
Figure 5. IBA within a 5km radius from the study site .....	24

## **LIST OF ACRONYMS AND ABBREVIATIONS**

The following acronyms and abbreviations are used in the present text:

AC CDC	Atlantic Canada Conservation Data Centre
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DELG	New Brunswick Department of Environment and Local Government
EIA	Environmental Impact Assessment
ESA	Environmentally significant areas
IBBA	Important Bird and Biodiversity Areas
MBCA	Migratory Birds Convention Act
NBSARA	New Brunswick Species at Risk Act
SARA	Canada Species at Risk Act
TRC	Technical Review Committee
WSSA	Water Supply Source Assessment

## **1.0 THE PROPONENT**

### **1.1 NAME OF PROPONENT**

South Esk Miramichi Victory Living is the proponent of the project.

### **1.2 ADDRESS OF PROPONENT**

South Esk Miramichi Victory Living  
55 Highway 420  
South Esk, NB E1V 4R3

### **1.3 PRINCIPAL PROPONENT CONTACT**

Dewer Somers, President  
Phone: (506) 624-4745  
Email: dewesomers@yahoo.ca

### **1.4 PRINCIPAL CONTACT PERSON FOR PURPOSES OF EIA**

Marcel Basque, P.Eng, Project Director  
MSC Multi-Service Consultants Inc.  
10825, route 11  
Six Roads, NB E1X 3A7

Phone: (506) 395-6699  
Fax: (506) 393-6695  
Email: marcel@mscconsultants.nb.ca

### **1.5 PROPERTY OWNERSHIP**

The project is located on a property owned by the proponent.

## **2.0 PROJECT DESCRIPTION**

### **2.1 PROJECT NAME**

Victory Baptist Fellowship Development

### **2.2 PROJECT OVERVIEW**

The proponent wishes to develop a new complex of four (4) apartment buildings for senior citizens. The project included the development of new wells, installation of septic systems, drainage of surface water, construction of a new public street and bushing of existing trees.

### **2.3 PURPOSE, RATIONALE OR NEED FOR THE UNDERTAKING**

The proportion of seniors within the population has been steadily growing since 1960. Senior citizens are becoming more likely to sell their property and move into apartment a few years after they retired. This lifestyle choice allows them to get free from the burden of maintaining a home and enjoy life with the money they get from the sale of their house. The proponent wants to build apartment for these senior citizens to meet the growing need for this type of housing.

The consequences/results of not implementing the undertaking are the following:

- No decrease in demand for this type of housing;
- No stimulation of the real estate market;
- Senior citizens have less money to spend and simulate the economy.

### **2.4 PROJECT LOCATION**

The Victory Baptist Fellowship Development will take place in the wooded portion of the parcel 40141418 if the project is permitted to proceed. A highway and residential properties delimit the property of 7.4 hectares. A map indicating the location of the site relative to well-known existing features is shown on Figure 1.

Parcel identification number (PID): 40141418

Street address: 55 Highway 420

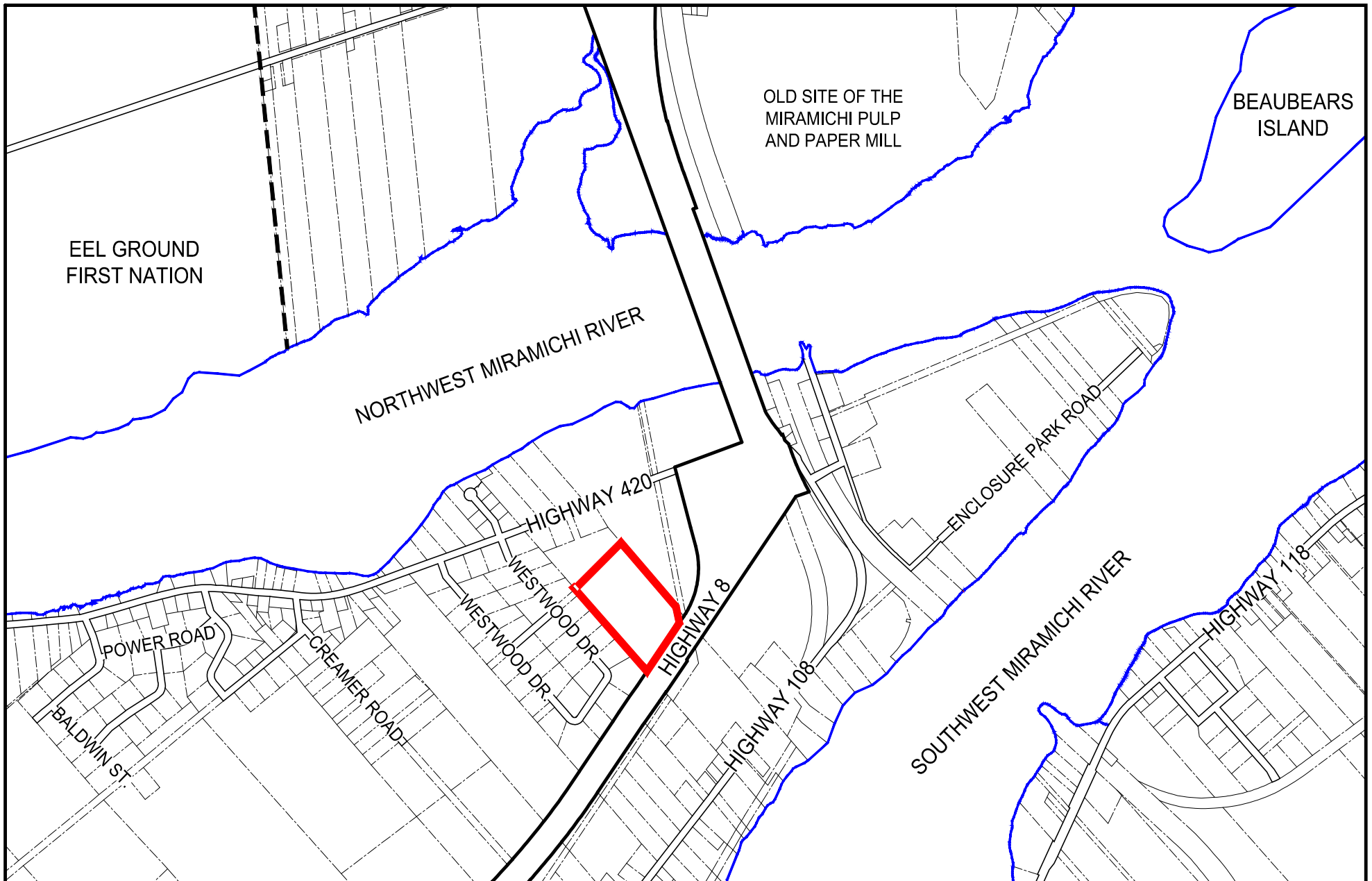
Community name: South Esk

Parish: Southesk

County: Northumberland

Latitude/Longitude: 46°57'28.27"N, 65°36'06.55"W





TITRE DU PLAN	<b>SITE LOCATION</b>
PROJECT	<b>EIA - VICTORY BAPTIST FELLOWSHIP INC. DEVELOPMENT</b>
	DRAWING TITLE
	PROJECT

EXPERT-CONSEIL



CONSULTANT

PROPRIÉTAIRE

**South Esk Miramichi Victory Living**

55 Highway 420  
South Esk, NB  
E1V 4R3

OWNER

NO. DE PROJET	20-02	ÉCHELLE	1 : 15 000
PROJECT NUMBER		SCALE	
DESSINÉ PAR	A.DUGUAY	VÉRIFIÉ PAR	M. BASQUE
DRAWN BY		CHECKED BY	
DATE	JUNE 4, 2020	NO. DU PLAN	FIGURE 1
DATE		DRAWING NUMBER	

## 2.5 SITING CONSIDERATIONS

The proposed location for the Victory Baptist Fellowship Development have been selected following these favorable elements:

- The property is owned by the proponent;
- There is a public road easement next to the property that could be used to connect the apartment access street to an existing street;
- The proximity with an existing residential area offer easy access to electrical and communication utilities;
- The area is a rural community near grocery stores, gas stations and commercial facilities;
- There is an existing drainage ditch next to the property that could be used for the evacuation of surface water.

Following the WSSA, the following additional considerations will also be examined:

- The wells are adequate for the supply of current and future uses;
- The water quality complies with the *New Brunswick Drinking Water Quality Guidelines* issued by the provincial Department of Health
- There are no potentially adverse impacts on the proposed water supply due to current or historical land uses within 500 meters;
- The water supply aquifer is considered to be sustainable;
- There is no risk of interference between wells.

## 2.6 PHYSICAL COMPONENTS AND DIMENSIONS OF THE PROJECT

The proposed development will include four (4) apartment buildings, i.e two (2) buildings of ten (10) units and two (2) buildings of eight (8) units. Size of the main components and areas to be disturbed are not available now since the project is still under conception. However, the final concept should include the following:

- In the event of positive results for the quality and quantity of water following the WSSA, water will be provided to the units from three (3) wells as shown on Figure 1 in the WSSA application form;
- Each unit will have its own sewage disposal system approved by the provincial Department of Public Safety;
- An asphalt parking lot will be constructed to accomodate tenants;
- A new public street will be constructed to access the buildings;
- A storm system pouring into the existing drainage ditch will be design to manage runoff water.

## **2.7 CONSTRUCTION DETAILS**

The anticipated activities for the construction of the buildings should be representative to this type of work and include clearing and grubbing, excavation, carpentry and landscaping. Excavation work will be required for the installation of the foundation, the connection to the wells, the parking lot, the on-site sewage disposal systems, the stormwater system and the electrical service entrance. If excavated materials are free from frost-sensitive materials, they will be reused for backfilling the trench. Bedding material, topsoil and fill materials (if required) will come from quarries and local producers. Estimated hours for the construction period are from 7 a.m. to 7 p.m., Monday to Friday.

A water well driller licensed in the Province of New Brunswick as per the standards outlined in the *Water Well and Potable Water Regulations – Clean Water Act* will construct the proposed wells. The water supply source assessment, which consist of a step testing and a constant rate pumping test in accordance with the water supply source assessment guidelines of the DEGL, will be carried out as soon as possible following the approval of the initial request.

## **2.8 OPERATION AND MAINTENANCE DETAILS**

The key features of the development's operation will include activities representative to the exploitation of apartment buildings. Activities will mainly cause an increase in vehicular traffic and generate household waste. Waste will be stored in closed containers and transported off site once a week to an authorized waste disposal site. The required power for energy requirements will be brought to the site by power line from existing line near the subject property.

The maintenance of the new development will include annual pruning of trees (if required), mowing the lawn, repairing buildings (if required), snow removal and any other general maintenance activities for buildings housing apartment. Maintenance activities will be carried out by an employee or by contract as required.

## **2.9 FUTURE MODIFICATIONS, EXTENSIONS OR ABANDONMENT**

For the moment, the proponent did not plan to make any future modifications, enlargements or abandonment on the subject property. However, the decision to build a common building of 1750 square feet including a gym and a social area may be taken later.

## **2.10 DOCUMENTS RELATED TO THE UNDERTAKING**

GEMTEC Ltd. has prepared a soil investigation report in January 2003 and Engineering Technologies Canada Ltd. has prepared a preliminary septic system report in September 2003. Both report has been included in Appendice A.

### **3.0 DESCRIPTION OF THE EXISTING ENVIRONMENT**

This section includes a description of all features that either are found at the proposed project site or are likely to be affected.

#### **3.1 EXISTING AND HISTORIC LAND USES**

In order to determine the historical uses of the subject property and the adjacent lands, aerial photographs from 1965, 1975, 1983, 1995 and 2005 (see Appendice B) were obtained through Service New Brunswick. These aerial photos show that the subject property and adjacent lands were used for residential activities and motor vehicles traffic.

It is also possible to perceive on the aerial photograph of 1963 that the residential development has started and that the roads are already present. The comparison of the aerial photographs also shows that the study area has not undergone any major change since 1995. It is possible to observe on the 1995 aerial photograph that the residential area adjacent to the subject property and the exit from highway are as they are today. Figure 2 shows a recent aerial view of the subject property and adjacent properties.



**Figure 2. Recent aerial view**

There is no known or suspected contamination resulting from previous uses of the subject property or adjacent properties. No records were returned in the Land Gazette repository for the subject property.

### 3.2 GEOLOGY AND TOPOGRAPHY

The subject property is located in the subdivision of the Maritime Plain. The Maritime Plain is dominated by grey-green Pennsylvanian sandstone bedrock with only minor locally occurring shale, siltstones and conglomerates. The Wisconsin Glaciation and the postglacial marine or fluvial deposition or both have shaped the landscape of the subject property region. The glacier may have been thin because with the exception of the glacial fluvial deposits, the glacial drift material (mainly ground moraine) is commonly less than two (2) meters and occasionally less than one (1) meter thick. The dominant parent material of the zone is lacustrine clay, with smaller but significant areas of glacial till and outwash materials. The lacustrine material is clayey, compact, weakly calcareous, and brownish in color. More information related to the bedrock geology can be found in the water supply source initial application form included in Appendice C.

According to the map 1594A “Surficial Geology” by V.N. Rampton, the surficial geology of the subject property area is composed of marine sediments that consist of blankets and plains, sand, silt, some gravel and clay generally 0.5m to 3m thick. The topography of the area is generally flat and causes a slow surface drainage. Surface water generally flows towards the Northwest Miramichi River to the northwest and towards the Southwest Miramichi River to the southeast by land flow or by drainage ditches.

### 3.3 AIR QUALITY

As per Figure 3, the winds are predominantly from the southwest and are blowing away any atmospheric emissions to the Gulf of St Lawrence. There are no major industrial sources of emissions located near the subject property since the closure of the former Miramichi Pulp and Paper Mill approximately ten (10) years ago. The nearest industrial emission source is located approximately 9.5 km northeast. The air quality is considered representative of a rural community since the main sources of atmospheric emissions come from home activities, vehicles, trains and boat traffic.

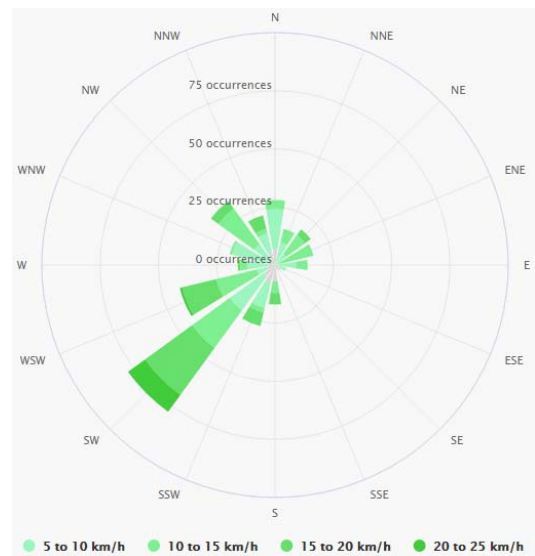


Figure 3. Wind rose (source : meteoblue)

It can therefore be concluded that the air quality of the region is good due to the absence of industrial emitters and the direction of the prevailing winds.

### **3.4 WILDLIFE AND WILDLIFE HABITAT**

The subject property is a wooded lot near a residential area and a highway dominated by red maple (*acer rubrum*), trembling aspen (*populus tremuloides*), eastern white cedar (*thuja occidentalis*), white birch (*betula papyrifera var. cordifolia*) and balsam fir (*abies balsamea*)

In the past fifty years, no major changes have been made to the property. The abundance of existing vegetation and the tranquility of the area provides a suitable habitat for the establishment of small mammals and common wild animals in New Brunswick such as white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), raccoon (*Procyon lotor*), North American porcupine (*Erethizon dorsata*), moose (*Alces alces*), eastern gray squirrel (*Sciurus carolinensis*) and many others. It is also likely that small mammals and wild animals use the property for foraging, migration or as a den.

### **3.5 MIGRATORY BIRDS**

The proponent recognizes the importance of migratory birds and that "migratory birds" as defined in Article 1 of the Convention are protected under the *Migratory Birds Convention Act* (MBCA). The MBCA is a law designed to protect migratory birds against an inconsiderate removal and destruction. In Canada, this law is governed by Environment and Climate Change Canada.

This law prohibits the disturbance, damage, disturbance, destruction, removal or possession of a migratory bird, a nest or an egg of a migratory bird and the purchase, sale, exchange or gift of a migratory bird or its nest, or make it the subject of a commercial transaction. The MBCA also states that it is prohibited to deposit a substance that is harmful to migratory birds, or to permit such a substance to be deposited, in waters or an area frequented by migratory birds or in a place from which the substance may enter such waters or such an area. A substance if the substance, in combination with one or more substances, results in a substance that is harmful to migratory birds is also prohibited to deposit or to permit such a substance to be deposited in waters or an area frequented by migratory birds or in a place from which it may enter such waters or such an area.

### **3.6 SPECIES AT RISK**

The Species at Risk Act (SARA) is one part of a three-part Government of Canada strategy for the protection of wildlife species at risk. The objective of the Act is to prevent Canadian indigenous species, subspecies, and distinct populations from becoming extirpated or extinct, to provide for the recovery of endangered or threatened species, and encourage the management of other species to prevent them from becoming at risk. It applies to all federal lands in Canada; all wildlife species listed as being at risk; and their critical habitat. New Brunswick also adopted a SARA, which complements the federal law to effectively manage and protect species that are in danger of disappearing in the province.

In order to determine if endangered species are present near the subject property, a request to the Atlantic Canada Conservation Data Centre (AC CDC) was presented to obtain a report containing a detailed observation data for all species of conservation concern known within 5 km of the subject property. Table 1 defines the terms used by various species at risk protection organizations mentioned in the report included in Appendice D.

**Table 1. Definition of terms related to species at risk**

<b>Sub-national (« S-Rank ») definitions</b> Source : <a href="http://accdc.com/en/rank-definitions.html">http://accdc.com/en/rank-definitions.html</a>	
SX	<b>Presumed Extirpated</b> - Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered
S1	<b>Critically Imperiled</b> - Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province
S2	<b>Imperiled</b> - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province
S3	<b>Vulnerable</b> - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation
S4	<b>Apparently Secure</b> - Uncommon but not rare; some cause for long-term concern due to declines or other factors
S5	<b>Secure</b> - Common, widespread, and abundant in the province
SNR	<b>Unranked</b> - Provincial conservation status not yet assessed
SU	<b>Unrankable</b> - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends
SNA	<b>Not Applicable</b> - A conservation status rank is not applicable because the species is not a suitable target for conservation activities
S#S#	<b>Range Rank</b> - numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4)
<b>Breeding status qualifiers definitions</b> Source : <a href="https://www.registrelep-sararegistry.gc.ca/">https://www.registrelep-sararegistry.gc.ca/</a>	
N	<b>Nonbreeding</b> - Conservation status refers to the non-breeding population of the species in the province
B	<b>Breeding</b> - Conservation status refers to the breeding population of the species in the province
M	<b>Migrant</b> - Conservation status refers to the aggregating transient population of the species in the province
?	<b>Inexact or Uncertain</b> - Denotes inexact or uncertain numeric rank.

<b>Conservation status definitions in the Canada's Species at Risk Act (SARA) and in the New Brunswick's Species at Risk Act (NBSARA)</b>	
Extirpated	Wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild
Endangered	Wildlife species that is facing imminent extirpation or extinction
Threatened	Wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction
Special concern	Wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats
<b>General status of wild species in New Brunswick definitions</b>	
1 At risk	Species for which a formal detailed risk assessment has been completed, and have been determined to be at risk of extirpation or extinction (i.e. endangered) or is likely to become at risk of extirpation or extinction if limiting factors are not reversed (i.e. threatened). To be described by this category, a species must be listed as either endangered or threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or the New Brunswick equivalent.
2 May be at risk	Species or populations that may be at risk of extirpation or extinction, and are therefore candidates for a detailed risk assessment by COSEWIC or the New Brunswick equivalent. It includes species that are of concern because of low numbers, population declines, or habitat pressures - often in combination with a lack of information concerning these factors. A detailed and comprehensive examination of these species would be required to determine if they truly are at risk.
3 Sensitive	Species that are not believed to be at risk of immediate extirpation or extinction, but which may require special attention or protection to prevent them from becoming at risk.
4 Secure	Species that are not believed to be at risk, may be at risk, sensitive, extirpated, extinct, accidental or exotic. Generally, these species are widespread and/or abundant. Although some secure species may be declining, their level of decline is not felt to be a threat to their status in the province.
5 Undetermined	Species for which there is insufficient data, information, or knowledge available to reliably evaluate their general status. These are usually species for which there are few documented occurrences in New Brunswick
<b>Committee on the Status of Endangered Wildlife in Canada (COSEWIC) definitions</b>	
<small>Source : <a href="http://cosewic.ca/index.php/en-ca/about-us/definitions-abbreviations">http://cosewic.ca/index.php/en-ca/about-us/definitions-abbreviations</a></small>	
Extinct (E)	A wildlife species that no longer exists
Threatened (T)	A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction
Special concern (SC)	A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats
Not at risk (NAR)	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances



### 3.6.1 RARE SPECIES – FLORA

The ACCDC identified seventeen (17) rare and endangered species of flora within a 5km radius from the study site. Table 2 below presents the species identified, their conservation status according to various organizations for the protection of species at risk, the number of observations recorded and the distance in kilometers from the study area centroid to the closest observation.

Table 2. Rare species of flora identified by AC CDC

Scientific name	Common name	COSEWIC Status	SARA Status	N.-B. Legal Prot.	Prov. Rarity rank	N.-B. GS Rank	# recs	Distance from site (km)
<b>Vascular plant</b>								
<i>Eriocaulon parkeri</i>	Parker's pipewort	Not At Risk		Endangered	S2	1 At Risk	1	2.1 ± 1.0
<i>Cyperus bipartitus</i>	Shining Flatsedge				S1	2 May Be At Risk	1	2.1±0.0
<i>Juncus greenei</i>	Greene's Rush				S1	2 May Be At Risk	1	0.4±1.0
<i>Zizania aquatic var. brevis</i>	St.Lawrence Wild Rice				S1	2 May Be At Risk	4	1.3±0.0
<i>Sagittaria montevidensis ssp. spongiosa</i>	Spongy Arrowhead				S2	4 Secure	15	1.1±0.0
<i>Zizania aquatic var. aquatic</i>	Eastern Wild Rice				S2	5 Undetermined	2	2.1±0.0
<i>Carex vacillans</i>	Eustarine Sedge				S2?	3 Sensitive	2	4.2±1.0
<i>Bidens hyperborea</i>	Eustary Beggarticks				S3	4 Secure	10	2.2±5.0
<i>Stellaria humifusa</i>	Saltmarch Starwort				S3	4 Secure	1	4.1±0.0
<i>Crassula aquatica</i>	Water Pygmyweed				S3	4 Secure	3	2.1±1.0
<i>Teucrium canadense</i>	Canada Germander				S3	3 Sensitive	1	3.6±5.0
<i>Persicana punctata</i>	Dotted Smartweed				S3	4 Secure	1	2.1±1.0
<i>Samolus parviflorus</i>	Seaside Brokweed				S3	4 Secure	9	3.4±0.0
<i>Rosa palustris</i>	Swamp Rose				S3	4 Secure	1	0.4±1.0
<i>Limosella australis</i>	Southern Mudwort				S3	4 Secure	3	2.1±0.0
<i>Zannichellia palustris</i>	Horned Pondweed				S3	4 Secure	2	3.0±0.0
<i>Eriophorum russeloum</i>	Russet Cottongrass				S3S4	4 Secure	1	1.2±1.0

Parker's pipewort (*Eriocaulon parkeri*)

Parker's pipewort is a species of flowering plant in the pipewort family. This plant grows in coastal habitat types, such as mudflats, estuaries, and marshes, but in freshwater or slightly brackish water. It may be submerged at times. It grows in mud or cobbly gravel or sand.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on Parker's pipewort.

Shining flatsedge (*Cyperus bipartitus*)

Shining flatsedge is a common species of sedge. Habitats of this species include sedge meadows, seeps, swamps, and low-lying areas along streams and lakes, including shorelines, sand bars, gravel bars, and muddy islands. This flatsedge is one of the pioneer species of disturbed wetlands, although it also occurs in higher quality wetlands

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on Shining flatsedge.

Greene's rush (*Juncus greenei*)

Greene's rush is a perennial plant with a stem round or oval in cross-section. The species can be found in the sandy soils of lake and pond shores, sand prairies, dunes and clearing. Usually dry, well-drained, sandy soil in pine lands, near lakeshores, or among sand dunes and often associated with disturbance.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on Greene's rush.

Estuarine sedge (*Carex vacillans*)

Estuarine sedge is an unusual case of a stable, fertile hybrid between smooth black sedge and chaffy sedge. Habitats of this species include saline, brackish shores, swales, salt and intertidal marshes (tidal non-forested wetland).

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on Estuarine sedge.

Canada germander (*Teucrium canadense*)

Canada germander is a perennial herb in the family Lamiaceae. It is a common plant, growing in moist grassland, at the edges of forests, in thickets, on river verges and at the edges of marshes. It also grows on wasteland, in poorly drained areas and beside roadside ditches.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on Canada germander.

### 3.6.2 RARE SPECIES– FAUNA

The ACCDC identified forty-six (46) rare and endangered species of fauna within a 5km radius from the study site. Table 3 below presents the species identified, their conservation status according to various organizations for the protection of species at risk, the number of observations recorded and the distance in kilometers from the study area centroid to the closest observation.

Table 3. Rare species of fauna identified by AC CDC

Scientific name	Common name	COSEWIC Status	SARA Status	N.-B. Legal Prot.	Prov. Rarity rank	N.-B. GS Rank	# recs	Distance from site (km)
<b>Vertebrate species</b>								
<i>Antrastomus vociferus</i>	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S2B,S2M	1 At Risk	2	3.2±7.0
<i>Hirundo rustica</i>	Barn Swallow	Threatened	Threatened	Threatened	S2B, S2M	3 Sensitive	6	3.2±7.0
<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened	Threatened	S2S3B, S2M	1 At Risk	4	3.2±7.0
<i>Riparia riparia</i>	Bank Swallow	Threatened	Threatened		S2S3B, S2S3M	3 Sensitive	2	3.2±7.0
<i>Cardellina canadensis</i>	Canada Warbler	Threatened	Threatened	Threatened	S3B, S3M	1 At Risk	1	3.2±7.0
<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened	Threatened	Threatened	S3B, S3M	3 Sensitive	7	3.2±7.0
<i>Limosa haemastica</i>	Hudsonian Godwit	Threatened			S3S4M	4 Secure	1	4.4±0.0
<i>Bucephala islandica (Eastern pop.)</i>	Barrow's Goldeneye – Eastern Pop	Special Concern	Special Concern	Special Concern	S2M, S2N	3 Sensitive	3	4.6±0.0
<i>Coccythraustes vespertinus</i>	Evening Grosbeak	Special Concern			S3B, S3S4N, SUM	3 Sensitive	1	3.2±7.0
<i>Chordeiles minor</i>	Common Nighthawk	Special Concern	Threatened	Threatened	S3B, S4M	1 At Risk	4	3.2±7.0
<i>Contopus virens</i>	Eastern Wood-pewee	Special Concern	Special Concern	Special Concern	S4B, S4M	4 Secure	6	1.1±1.0
<i>Morone saxatilis</i>	Striped Bass	E,E,SC			S3	2 May Be At Risk	1	2.8±10.0
<i>Tringa melanoleuca</i>	Greater Yellowlegs				S1?B,S5M	4 Secure	85	4.4±0.0
<i>Aythya affinis</i>	Lesser Scaup				S1B, S4M	4 Secure	2	4.4±1.0
<i>Empidonax traillii</i>	Willow Flycatcher				S1S2B, S1S2M	3 sensitive	2	3.2±7.0
<i>Troglodytes aedon</i>	House Wren				S1S2B, S1S2M	5 Undeterm.	2	3.2±7.0
<i>Mimus polyglottos</i>	Northern Mockingbird				S2B, S2M	3 Sensitive	1	3.2±7.0
<i>Toxostoma rufum</i>	Brown Trasher				S2B, S2M	3 Sensitive	1	3.2±7.0
<i>Mareca strepera</i>	Gadwall				S2B, S3M	4 Secure	1	4.6±0.0

<i>Tringa solitaria</i>	Solitary Sandpiper				S2B, S5M	4 Secure	9	4.4±0.0
<i>Anser caerulescens</i>	Snow Goose				S2M	4 Secure	2	3.5±0.0
<i>Larus hyperboreus</i>	Glaucous Gull				S2N, S2M	4 Secure	1	4.6±0.0
<i>Myiarchus crinitus</i>	Great Crested Flycatcher				S2S3B, S2S3M	3 Sensitive	2	3.2±7.0
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow				S2S3B, S2S3M	3 Sensitive	5	3.2±7.0
<i>Spinus pinus</i>	Pine Siskin				S3	4 Secure	3	3.2±7.0
<i>Cathartes aura</i>	Turkey Vulture				S3B, S3M	4 Secure	3	3.2±7.0
<i>Rallus limicola</i>	Virginia Rail				S3B, S3M	3 Sensitive	2	3.2±7.0
<i>Charadrius vociferus</i>	Killdeer				S3B, S3M	3 Sensitive	74	3.2±7.0
<i>Coccyzus erythrophthalmus</i>	Black-Billed Cuckoo				S3B, S3M	4 Secure	1	3.2±7.0
<i>Vireo gilvus</i>	Warbling Vireo				S3B, S3M	4 Secure	4	3.2±7.0
<i>Passerina Cyanea</i>	Indigo Bunting				S3B, S3M	4 Secure	1	3.2±7.0
<i>Molothrus ater</i>	Brown-Headed Cowbird				S3B, S3M	2 May Be At Risk	2	3.2±7.0
<i>Icterus galbula</i>	Baltimore Oriole				S3B, S3M	4 Secure	6	3.2±7.0
<i>Setophaga tigrina</i>	Cape May Warbler				S3SB, S4S5M	4 Secure	1	3.2±7.0
<i>Anas acuta</i>	Northern Pintail				S3B, S5M	3 Sensitive	1	3.2±7.0
<i>Mergus serrator</i>	Red-Breasted Merganser				S3B, S5M, S4S5N	4 Secure	2	3.2±7.0
<i>Arenaria interpres</i>	Ruddy Turnstone				S3M	4 Secure	4	4.4±0.0
<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B, S3S4M	3 Sensitive	4	3.2±7.0
<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B, S5M	4 Secure	123	3.2±7.0
<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B, S5M	4 Secure	27	3.2±7.0
<i>Larus delawarensis</i>	Red-billed Gull				S3S4B, S5M	4 Secure	4	3.8±0.0
<i>Setophaga striata</i>	Blackpoll Warbler				S3S4B, S5M	4 Secure	2	3.2±7.0
<i>Pluvialis squatarola</i>	Black-bellied Plover				S3S4M	4 Secure	11	4.4±0.0
<i>Calidris pusilla</i>	Semipalmated Sandpiper				S3S4M	4 Secure	51	4.4±0.0
<i>Calidris melanotos</i>	Pectoral Sandpiper				S3S4M	4 Secure	33	4.4±0.0
<i>Calidris alba</i>	Sanderling				S3S4M, S1N	3 Sensitive	6	4.4±0.0

Invertebrate species								
<i>Danaus Plexippus</i>	Monarch	Endangered	Special Concern	Special Concern	S3B, S3M	3 Sensitive	2	1.5±0.0
<i>Polygonia gracilis</i>	Hoary Comma				S3	4 Secure	1	3.2±7.0
<i>Cupido comynpas</i>	Eastern Tailed Blue				S3S4	4 Secure	1	3.8±0.0

Eastern whip-poor-will (*Antrostomus vociferus*)

The Eastern whip-poor-will is an insectivorous bird with cryptic plumage. Its breeding habitat is dependent upon forest structure rather than composition, although common tree associations are pine and oak. The species avoids both wide-open spaces and closed canopy forests. Semi-open forests or patchy forests with clearings, such as barrens or forests that are regenerating following major disturbances, are preferred as nesting habitat.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Eastern whip-poor-will.

Barn swallow (*Hirundo rustica*)

The Barn swallow is a medium-sized songbird. It is the most widespread species of swallow in the world, found on every continent except Antarctica. The species nest in and on artificial structures, including barns and other outbuildings, garages, houses, bridges, and road culverts. Barn swallows prefer various types of open habitats for foraging, including grassy fields, pastures, various kinds of agricultural crops, lake and river shorelines, cleared rights-of-way, cottage areas and farmyards, islands, wetlands, and subarctic tundra.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Barn swallow.

Chimney swift (*Chaetura pelagica*)

Chimney swift is an aerial insectivore and a long-distance migrant, the only swift regularly found in central and eastern North America. It is assumed that Chimney swift mainly used large hollow trees for nesting and roosting, before the arrival of Europeans in North America. It is now mainly associated with urban and rural areas where chimneys and similar structures are available, and where aerial insects are abundant for foraging.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Chimney swift.

Bank swallow (*Riparia riparia*)

The Bank swallow is a small insectivorous songbird. The species breeds in a wide variety of natural and artificial sites with vertical banks, including riverbanks, lake and ocean bluffs, aggregate pits, road cuts, and stock piles of soil. Sand-silt substrates are preferred for excavating nest burrows. Breeding sites are often situated near open terrestrial habitat used for aerial foraging (i.e. grasslands, meadows, pastures, and agricultural cropland).

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Bank swallow.

Canada warbler (*Cardellina canadensis*)

Canada warbler is a small forest songbird. It generally breeds in deciduous-coniferous mixed wood or deciduous forests with a dense, complex understory. Nests are built on or near the ground. They are placed on moss and raised hummocks, within holes of root masses, rotting tree stumps, clumps of grass, rock cavities, etc. Nests are generally placed in areas with coarse woody debris, high nest concealment, and dense stems from woody plants and ferns

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Canada warbler.

Bobolink (*Dolichonyx oryzivorus*)

The Bobolink is a medium-sized passerine. The Bobolink originally nested in the tall-grass prairie of the mid-western U.S. and south central Canada. Since the conversion of the prairie to cropland and the clearing of the eastern forests, the Bobolink has nested in forage crops. The Bobolink also occurs in various grassland habitats including wet prairie, graminoid peatlands and abandoned fields dominated by tall grasses, remnants of uncultivated virgin prairie (tall-grass prairie), no-till cropland, small-grain fields, restored surface mining sites and irrigated fields in arid regions

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Bobolink.

Hudsonian godwit (*Limosa haemastica*.)

Hudsonian godwit is a large, long-legged shorebird with a long, slightly upturned bill. The species breeds in wetland habitats in sub-Arctic and Boreal regions. It uses a wide variety of habitats on migration, including freshwater marshes, saline lakes, flooded fields, shallow ponds, coastal wetlands and mudflats. On the wintering grounds, Hudsonian godwit mainly forages in large shallow bays, lagoons, or estuaries with extensive intertidal mudflats, and roosts in a range of habitats, such as upper tidal flats, sand spits, rocky shorelines, salt marshes, and grasslands.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Hudsonian godwit.

Barrow's goldeneye – eastern population (*Bucephala islandica* - Eastern pop.)

The Barrow's goldeneye is a medium-sized diving duck. The eastern Canadian population of Barrow's goldeneyes is centered in Quebec in the black spruce feather moss and balsam fir-white birch forest regions. The species appears restricted to small, high elevation lakes north of the St. Lawrence Estuary and Gulf, often headwater lakes. In the non-breeding season, a large proportion of the population congregate in a few areas along the St. Lawrence corridor, which is a very important waterway for shipping.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Barrow's goldeneye (eastern population).

Evening grosbeak (*Coccothraustes vespertinus*)

Evening grosbeak is a stocky and boldly colored songbird. Optimal Evening grosbeak breeding habitat generally includes open, mature mixed wood forests, where fir species and/or white spruce are dominant, and spruce budworm is abundant. Outside the breeding season, the species seems to depend largely on seed crops from various trees such as firs and spruces in the boreal forest, but is also attracted to ornamental trees that produce seeds or fruit

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Evening grosbeak.

Common nighthawk (*Chordeiles minor*)

Common nighthawk is the most frequently seen member of the nightjar family. This species breeds in a range of open and partially open habitats, including forest openings and post-fire habitats, prairies, bogs, and rocky or sandy natural habitats, as well as disturbed areas. It is also found in settled areas that meet its habitat needs, those with open areas for foraging and bare or short-cropped surfaces for nesting.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Common nighthawk.

Eastern wood-pewee (*Contopus virens*)

The Eastern wood-pewee is a small forest bird. The species is mostly associated with the mid-canopy layer of forest clearings and edges of deciduous and mixed forests. It is most abundant in forest stands of intermediate age and in mature stands with little understory vegetation. During migration, a variety of habitats are used, including forest edges, early successional clearings, and primary and secondary lowland tropical forest, as well as cloud forest.

Based on the habitat requirements of this species and the distance between the closest observation and the subject property, which is 1.1km, the project could disturb the Eastern wood-pewee if the species establishes on the property before the construction phase.

Willow flycatcher (*Empidonax traillii*)

Willow flycatchers are small, slender flycatchers, but they are one of the larger members of the *Empidonax* genus. The species breed in shrubby areas with standing water or along streams. In some parts of their range, they also nest in woodland edges and dry, brushy thickets. In winter, they use tropical shrubby clearings, pastures, and woodland edges, often near water. They stick close to willows perching on the edge or up on top of the shrub to catch insects or sing.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Willow flycatcher.

Northern mockingbird (*Mimus polyglottos*)

Northern mockingbird is a medium-sized songbird. This species lives in thickets, woodland edges, parks and gardens, favoring areas that are more open, open grounds and shrubby vegetation. Nest is built low to the ground, in shrubs and trees, between 1 and 3 meters high and is lined with grasses, dead leaves and paper, foil, plastics and even shredded cigarettes filters.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Northern mockingbird.

Brown thrasher (*Toxostoma rufum*)

The Brown thrasher is a bird in the family Mimidae and resides in various habitats. It prefers to live in woodland edges, thickets and dense brush, often searching for food in dry leaves on the ground. It can also inhabit areas that are agricultural and near suburban areas, but is less likely to live near housing than other bird species. The Brown thrasher often vies for habitat and potential nesting grounds with other birds.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Brown thrasher.

Great crested flycatcher (*Myiarchus crinitus*)

The Great crested flycatcher is a large insect-eating bird of the tyrant flycatcher family. This species habitat selection may vary slightly with different populations, but can be most often found breeding in deciduous forests and at edges of clearings and mixed woodlands. They also show a tendency to favour landscapes with open canopy, such as second growth forests or woodlands that have been subjected to selective cutting.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Great crested flycatcher.



Cliff swallow (*Petrochelidon pyrrhonota*)

The Cliff swallow is an elegantly coloured swallow that breeds in North America and winters in South America. The Cliff swallow frequents open and semi-open areas, farmland, cliffs, usually near water such as rivers and lakes. It feeds mostly in open areas such as meadows, marshes and grasslands, but it roosts in wetland vegetation. It needs sheltered, vertical cliffs for breeding, or other sites such as bridges and buildings.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Cliff swallow.

Virginia rail (*Rallus limicola*)

The Virginia rail is a small water bird of the family Rallidae. It prefers to nest in fresh water, with abundant cattail and dense vegetation. It is found in freshwater, brackish marshes and wetlands. We can also find it in coastal salt marshes. It needs dense emergent vegetation. Nest is located in marshes, over water or on a clump of vegetation. It is a flat platform of reeds and grasses.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Virginia rail.

Killdeer (*Charadrius vociferus*)

Killdeer is a relatively large species compared to other shorebirds. It frequents open fields with short vegetation, and not necessarily close to the water, and it is seen in open cultivated areas. This species breeds in sparsely vegetated savannas, in grassy areas such as meadows and pastures, golf courses, bare gravel or roadside ditches, mainly in lowlands. During the migrations, the Killdeer can occur in estuaries and other wetland habitats, along rivers, beaches, mudflats and wet grasslands. This bird can be common near habitations, and some birds may nest on the flat, gravelled roofs.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Killdeer.

Brown-headed cowbird (*Molothrus ater*)

The Brown-headed cowbird is a small obligate brood parasitic icterid of temperate native to subtropical North America. It prefers habitat with low or scattered trees among grassland vegetation, such as woodland edges and brushy thickets, but also meadows, fields, pastures, orchards and residential areas. Brown-headed cowbird's habit to lay its eggs in the nests of others species lets it free to follow the peregrinations of the bison's herds, cow, cattle and horses.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Brown-headed cowbird.

Northern pintail (*Anas acuta*)

The Northern pintail is a duck with wide geographic distribution. This species breeds in open country with dense vegetal cover and shallow, seasonal wetlands including freshwater marshes, small lakes and rivers. During winter, it can be found on coastal lagoons with brackish or saltwater. It also occurs in farmland and rice fields where it can breed.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Northern pintail.

Eastern kingbird (*Tyrannus tyrannus*)

The Eastern kingbird is a large tyrant flycatcher. This species is common in woodland clearings, fields, farm, city parks, roadsides and forest edges. They are often seen near water, and in large flocks in orchards. It winters in wetland edges and tropical forests. The Eastern kingbird nest is an open cup situated on a horizontal tree or shrub branch, but this species may also nest in cavities and human-made structures. They usually nest in mid-story or in canopy, near or above water.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Eastern kingbird.

Sanderling (*Calidris alba*)

Sanderling is a medium-sized bird with relatively thick, heavy and short bill. This species breeds in stony tundra with scant vegetation, sparse growth of willow and saxifrage, and well-drained ridges. They need a good access to the shores for the young birds. Outside the breeding season, Sanderling frequents open sandy beaches and sandy outer areas of estuaries, rocky or muddy shores. During migrations, they can be found sometimes at inland waters

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Sanderling.

Monarch (*Danaus plexippus*)

The Monarch is a migratory butterfly of the subfamily *danainae*. This species requires different habitats depending on their life stage. Monarch caterpillars feed exclusively on milkweed plants and the breeding habitat is confined to places where milkweeds grow. Adult Monarchs feed at milkweed flowers but require other wildflowers for nectar, especially when milkweeds are not in bloom. In Canada, the most commonly used alternate nectar sources are goldenrods, asters, the non-native Purple Loosestrife and various clovers.

Based on the habitat requirements of this species, the project is not expected to have an adverse impact on the Monarch.

### 3.6.3 LOCATION SENSITIVE SPECIES

The New Brunswick Department of Natural Resources considers eight (8) species whose conservation is of concern and to be sensitive according to the location. Following the evaluation by the AC CDC, the Bald eagle (*Haliaeetus leucocephalus*) and the Wood turtle (*Glyptemys insculpta*) were indicated know within the project site

The Bald eagle is a distinctive bird of prey ranked as a regional endangered species under the NBSARA. However, it is not ranked as an endangered species under the SARA. The Bald eagle uses sticks and plant material to build its nest in the top of a tall tree (often a large white pine). The species can be found throughout the province, but is more common in the southwestern region near open water. Based on the habitat requirements of this species and the distance between the closest observation and the property under study which is 1.3km, the project could disturb the Bald eagle if the species becomes established on the property before the construction phase.

The Wood turtle is a medium-sized freshwater turtle with a broad flat shell ranked as a regional and national threatened species under the SARA and the NBSARA. The Wood turtle is semiaquatic and considerably more terrestrial than freshwater, although it rarely strays farther than 300 meters from water. Based on the habitat requirements of this species and the distance between the closest observation and the property under study, which is 0.9m, the project could disturb the Wood turtle if the species becomes established on the property before the construction phase.

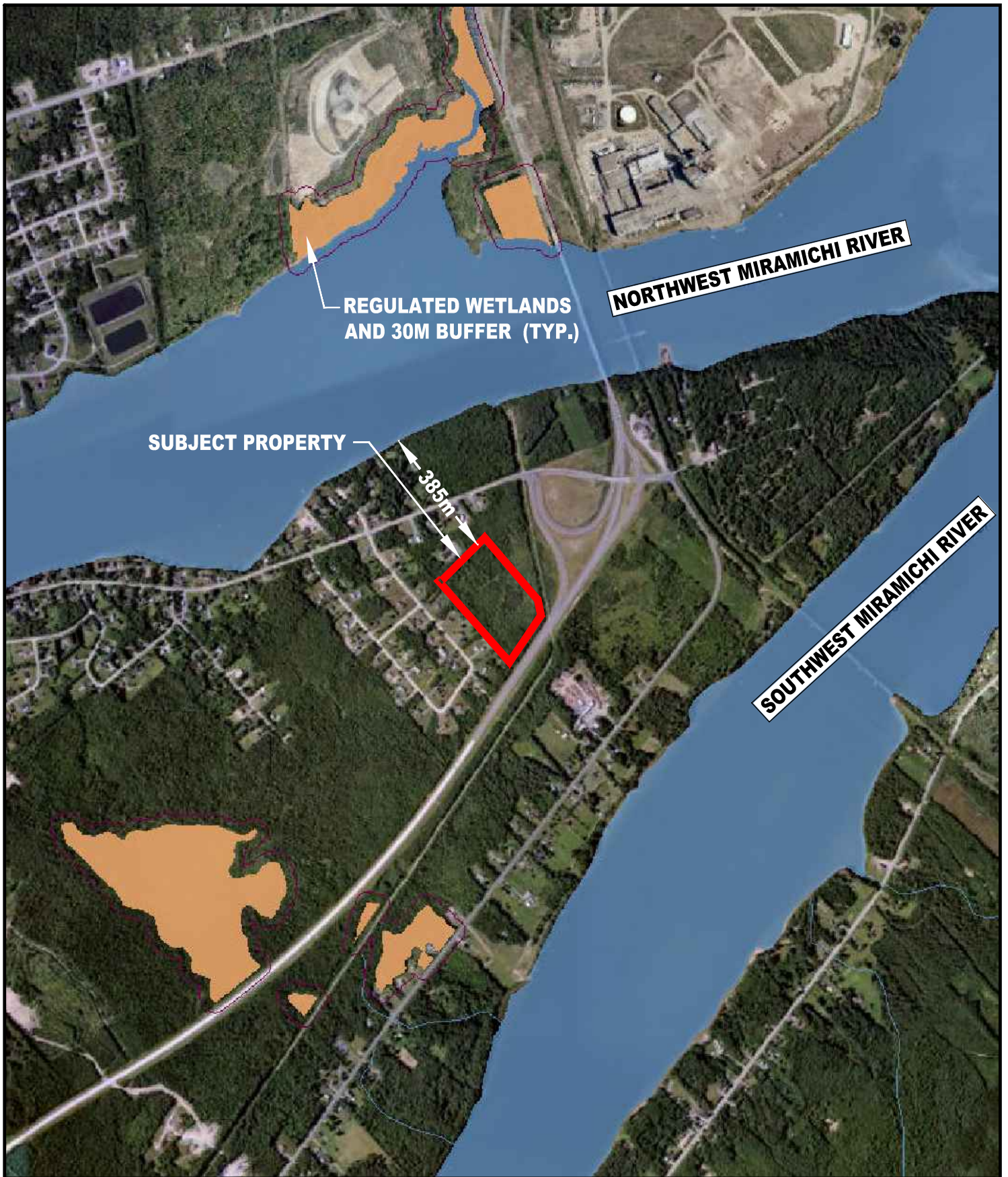
### 3.7 GROUNDWATER

The supply of drinking water near the proposed project site is obtained from individual private wells since there is no municipal water system in this region. A consultation of the DELG online well log system identified thirty-eight (38) water sources located within a 1 000 m radius of the property. More information related to groundwater supply can be found in the water supply source initial application form included in Appendice C.

The proposed location for the Victory Baptist Fellowship Development is not in a wellfield protected area as described in the New Brunswick's Wellfield Protection Program and is not in a protected watershed as described in the New Brunswick's Watershed Protection Program.

### 3.8 SURFACE WATER

A consultation of the DELG online "WAWA Reference Map" confirmed that there is no suspected wetland within 30m of the subject property as shown on Figure 4. The closest watercourse, the Northwest Miramichi River, is located 385m northeast. The Northwest Miramichi River flows into the Miramichi River, which then flows into the Miramichi Bay via the Miramichi Inner Bay.



TITRE DU PLAN <b>SURFACE WATER LOCATION</b> <small>DRAWING TITLE</small>	EXPERT-CONSEIL 	NO. DE PROJET 20-02 <small>PROJECT NUMBER</small>	ÉCHELLE 1 : 15 000 <small>SCALE</small>
PROJET <b>EIA - VICTORY BAPTIST FELLOWSHIP DEVELOPMENT</b> <small>PROJECT</small>	<small>CONSULTANT</small>	DESSINÉ PAR A. DUGUAY <small>DRAWN BY</small> DATE JUNE 1, 2020 <small>DATE</small>	VÉRIFIÉ PAR M. BASQUE <small>CHECKED BY</small> NO. DU PLAN FIGURE 4 <small>DRAWING NUMBER</small>

## **3.9 VALUED SPACES AND LOCATIONS**

### **3.9.1 ARCHAEOLOGICAL AND HERITAGE RESOURCES**

An information request to the Archaeological Services of the Department of Tourism, Heritage and Culture confirmed that the property is not identified as a registered archaeological site. However, there are seven (7) pre-contact sites (CfDj-13, CfDj-14, CfDj-17, CfDj-26, CfDj-27, CfDj-36, and CfDj-37) located within 1km of the property and many more located nearby. In addition, the area surrounding the confluence of the Northwest and Southwest Miramichi Rivers has been subject to significant activity and occupation throughout the Pre- and Post-European contact periods.

### **3.9.2 ENVIRONMENTALLY SIGNIFICANT AREAS**

The AC CDC identified three (3) environmentally significant areas (ESA) within a 5km radius from the subject property.

#### ESA #383 Jones Cove/Oxford Cove

The brook is narrow in the upper reaches, widening to a broad cove at the outlet. Vegetation type appears to vary along a moisture and salt gradient. The upper reaches, which are drier and less salty, are inhabited mostly by grasses and sedges.

#### ESA #390 Stewart Brook

Tidal flats containing several rare plant species. *Eriocaulon parkeri* Robins, *Scirpus smithii* Gray and *Cyperus rivularis* Kunth are also disjuncts.

#### ESA #389 Strawberry Point Marsh

Strawberry Marsh is a floodplain wetland with some tidal influence from the Miramichi River. It is a small site in the midst of major developments (new road and bridge), as well as urban uses (baseball diamond, parking, litter) but waterfowl use is evident.

### **3.9.3 MANAGED AREAS**

The AC CDC identified four (4) managed areas within a 5km radius from the study site.

#### Beaubears Island

Beaubears Island is the only untouched shipbuilding site left intact in Canada and is nationally recognized as one of the largest Acadian refuges in the province of New Brunswick. The island is also home to one of the only mature forests in the region.

#### Wilsons Point Refuge

Wilsons Point is a site with great significance to the history of Miramichi. Many of the earliest English-speaking settlers lived and buried in this area. In addition, Wilsons Point holds the history of Scottish ancestors.

### The Enclosure

This site served as a refugee camp following the expulsion of the Acadians in 1756 and later as a base for a salmon fishery established by early settler William Davidson. The Enclosure Park is a site with in situ historical and archaeological resources relating to Indigenous, Acadian and Scottish groups, including marked and unmarked graves

### Strawberry Marsh

The Strawberry Marsh was developed by the City of Miramichi in conjunction with Ducks Unlimited. This beautiful riverfront marsh teems with waterfowl and plant life, and hints at an important industrial past.

### 3.9.4 IMPORTANT BIRD AREAS

A search in the Canada's Important Bird and Biodiversity Areas (IBA) online directory confirmed that there is no IBA within a 5km radius of the study area as shown in red on Figure 5.

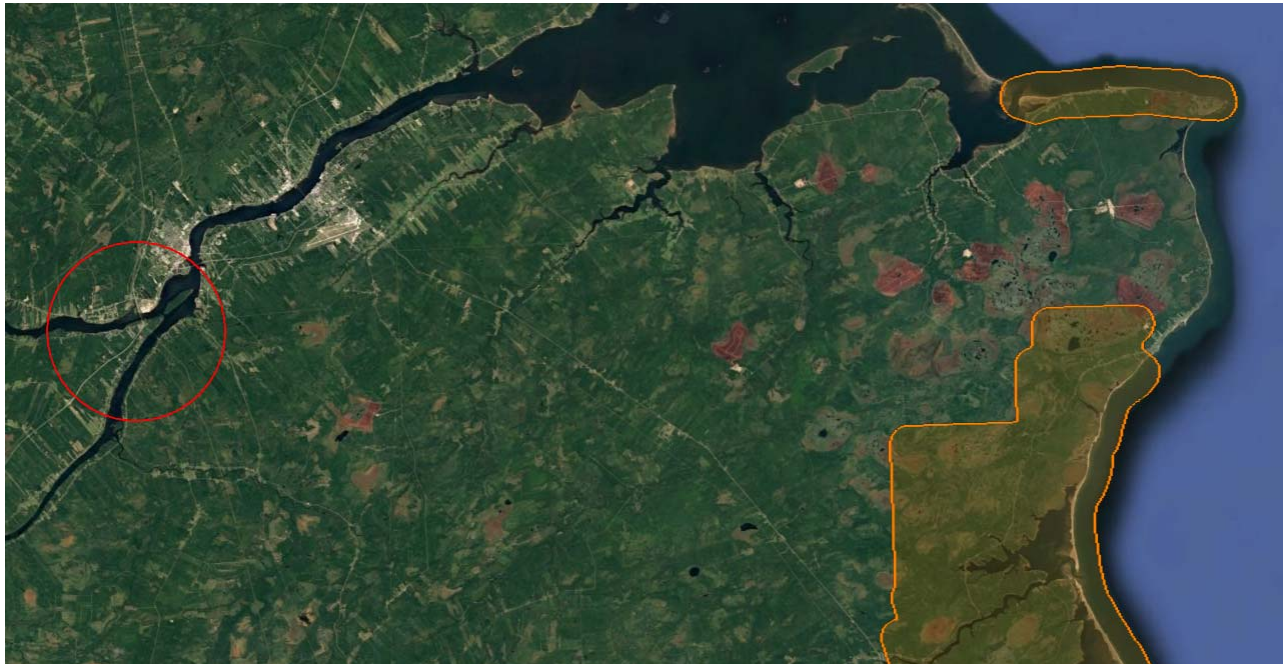


Figure 5. IBA within a 5km radius from the study site

### 3.10 LIFESTYLE AND QUALITY OF LIFE

The subject property is located in South Esk, a small community to the east of Miramichi. The lifestyle and quality of life in the area are considered representative of a rural community since there is no major commercial or industrial industries. A campground located north-east of the property, on the other side of the highway and a managed snowmobile trail by the New Brunswick Federation of Snowmobile Club located east of the property are the only recreational land use identified for the area.

## **4.0 IDENTIFICATION OF ENVIRONMENTAL IMPACTS**

The objective of this section is to identify anticipated impacts on the environmental features identified in the previous section. To do this, the impacts of construction and operation on the following environmental features will be assessed:

- Air quality
- Wildlife and wildlife habitat
- Migratory birds and species at risk
- Groundwater
- Surface water
- Valued spaces and locations
- Lifestyle and quality of life

### **4.1 AIR QUALITY**

The anticipated impact on groundwater are as follows:

#### Impacts related to construction

The use of vehicles and equipment during construction activities will cause emissions of traditional air contaminants and greenhouse gases. Construction activities could also generate dust. The anticipated impact on air quality during construction must therefore be considered.

#### Impacts related to operation

The operation of the development will not generate emissions other than what came normally from home activities or motor vehicles. Since the emissions will be from similar sources of atmospheric emissions, anticipated impact on air quality during operation is considered as nil.

### **4.2 WILDLIFE AND WILDLIFE HABITAT**

The anticipated impact on wildlife and wildlife habitat are as follows:

#### Impacts related to construction

Deforestation, the risk of impact with vehicles and motorized equipment as well as human activity are factors that could disturb wildlife and wildlife habitat during construction. In addition, waste (mainly composed of household and construction waste) will be generated by the activities and could attract wildlife to the site. The anticipated impact on wildlife and wildlife habitat during construction must therefore be considered.

#### Impacts related to operation

The activities related to the operation of new apartment will generate waste composed mainly of household waste and food debris that might attract to the property wild animals. However, the noise generated by users should scare species. The anticipated impact on wildlife during operation will still be considered.

### **4.3 MIGRATORY BIRDS AND SPECIES AT RISK**

The anticipated impact on migratory birds and species at risk are as follows:

#### Impacts related to construction

Deforestation, the risk of impact with vehicles and motorized equipment as well as human activity are factors that could disturb migratory birds and species at risk during construction. The anticipated impact on migratory birds and species at risk during construction must therefore be considered.

#### Impacts related to operation

The activities related to the operation of new apartment will be representative of usual home activities and vehicles traffic. The maintenance activities, i.e. pruning of trees and mowing the lawn, may destroy or alter migratory birds and species at risk habitat. The anticipated impact on migratory birds and species at risk during operation must therefore be considered.

### **4.4 GROUNDWATER**

The anticipated impact on groundwater are as follows:

#### Impacts related to pumping test

The execution of a constant rate pumping test for seventy-two (72) hours could affect private drinking water wells surrounding the subject property. The anticipated impact on groundwater during pumping test must therefore be considered.

#### Impacts related to construction

An accidental release of contaminants during construction could be release into groundwater resources. The anticipated impact on groundwater during construction must therefore be considered.

#### Impacts related to operation

If the pumping rate of the well exceeds its sustainable yield or is higher than the yield of the water supply aquifer, the quality and quantity of neighboring water users could be affected. The anticipated impact on the groundwater during operation must therefore be considered.



## 4.5 SURFACE WATER

The anticipated impact on surface water are as follows:

### Impacts related to construction

Construction activities could expose soil susceptible to erosion. Heavy rainfall on exposed soil could cause a migration of sediment. The risk of impact on surface water during construction must therefore be considered.

### Impacts related to pumping test

Pumping test could cause erosion and sedimentation since a significant volume of water will have to be removed from the pumped well. In addition, groundwater must be discharged to the ground surface at a sufficient distance from the wellheads to limit interference and recharge from the discharged water. The risk of impact on surface water during the pumping test must therefore be considered.

### Impacts related to operation

Operation of the development will require a storm system to drain away surface water.

## 4.6 VALUED SPACES AND LOCATIONS

The anticipated impact on valued spaces and locations are as follows:

### Impacts related to construction

Even if there is no archaeological or heritage sites located on the subject property, it is possible to make unplanned or spontaneous discoveries during construction since New Brunswick has been the home of countless generations and many have left tangible reminders of their presence. The archaeological items that can be discovered include the remains of human skeleton, projectile points (arrowheads), pottery or structures. These objects are valuable cultural resources and an uncontrolled disturbance could result in the loss or damage. The anticipated impact on archaeological or heritage resources during construction must therefore be considered.

Since there is no ESA, managed areas or IBA in a 500m buffer from the subject property, anticipated impacts during construction are considered as nil on those areas or zones.

### Impacts related to operation

Since there are no ESA, managed areas or IBA in a 500m buffer from the subject property and excavation is not planned during the operation of the development, anticipated impacts during operation are considered as nil on valued spaces and locations.

## **4.7 LIFESTYLE AND QUALITY OF LIFE**

The anticipated impact on lifestyle and quality of life are as follows:

### Impacts related to construction

The use of equipment during excavation activities will generate noise that may temporarily interfere with residents of adjacent properties. Noise is the only anticipated impact that could affect the lifestyle and quality of life of citizens since the work will not restrict land use, cause congestion or create a temporary obstacle to traffic vehicles. The risk of impact on existing lifestyle and quality of life during construction is therefore considered to be low.

### Impacts related to operation

The anticipated activities during the operation of the development are general maintenance of the buildings and vehicles circulation. Activities is therefore anticipated to be similar as now, i.e. representative of a rural community. Also, since senior's citizens are recognized to be quiet and peaceful neighbors, anticipated impacts during operation are considered as nil on lifestyle and quality of life.

## **4.8 MAINTENANCE ACTIVITIES**

The maintenance of the new development will include annual pruning of trees (if required), mowing the lawn, repairing buildings (if required), snow removal and any other general maintenance activities for buildings housing apartments. The risk of impact related to the maintenance activities on the environmental features identified is nil.

## **4.9 ACCIDENTAL EVENTS**

The implementation of the project does not require the storage or use of large amount of chemicals and / or hazardous materials. However, for any construction project there is a risk that an accidental incident occurs. The risk of impact following an accidental incident must therefore be considered.

#### 4.10 MATRIX SYNTHESIS

Table 4 shown in the form of a matrix synthesis the scope of the impacts anticipated on the existing environmental characteristics. To assess the scope of the anticipated impacts, a scale ranging from 1 to 5 was defined as follows:

- 1 = very high risk of impact on the environmental characteristic
- 2 = high risk of impact on the environmental characteristic
- 3 = moderate risk of impact on the environmental characteristic
- 4 = relatively low risk of impact on environmental characteristic
- 5 = very low or no risk of impact on the environmental characteristic

**Table 4. Matrix synthesis for the anticipated impact**

	Construction	Operation	Maintenance	Accidental events
Air quality	5	5	5	5
Wildlife and wildlife habitat	4	4	4	4
Migratory birds and species at risk	4	4	4	4
Groundwater	3	4	5	3
Surface water	4	5	5	4
Valued spaces and locations	3	5	5	5
Lifestyle and quality of life	4	4	5	5

## **5.0 SUMMARY OF PROPOSED MITIGATION**

The objective of this section is to describe the measures that will be used to reduce or eliminate the environmental impacts identified in the previous section. To do this, mitigation measures for the following environmental characteristics will be considered:

- Air quality
- Wildlife and wildlife habitat
- Migratory bird and species at risk
- Groundwater
- Surface water
- Valued spaces and locations
- Lifestyle and quality of life
- Accidental events.

### **5.1 AIR QUALITY**

The proposed mitigation measures to reduce impacts on air quality are as follows:

- Turn off the engine of unused diesel-powered construction machines and dump trucks that have been idling for 5 minutes or more to reduce the production of greenhouse gases and air pollutants;
- Turn off the engine of light motor vehicles when they are left unattended or are immobile for 5 minutes or more to reduce the production of greenhouse gases and air pollutants;
- Limit engine warm-up in the morning to a period of 3 to 5 minutes to reduce the production of greenhouse gases and air pollutants;
- Water should be the only dust suppressant used;
- If the standard dust suppression techniques are not effective in case of strong wind, the activities that generate fugitive dust must be limited.

### **5.2 WILDLIFE AND WILDLIFE HABITAT**

The proposed mitigation measures to reduce impacts on air quality are as follows:

- Food waste will be stored in closed containers and transported off site once a week to avoid attracting wildlife;
- In case of an unexpected contact with wildlife, staff present on site will not attempt to kill, pursue, capture, harm or harass in any manner whatsoever wildlife by vehicle or on foot;
- Motorized equipment and vehicles will yield the right of way to wildlife;
- If required, nuisance wildlife as defined in the *Nuisance Wildlife Control Regulation - Fish and Wildlife Act* will be hunted, trapped, snared, removed or relocated by a person who hold a nuisance wildlife control operator's licence.

### **5.3 MIGRATORY BIRDS AND SPECIES AT RISK**

The proposed mitigation measures to reduce impacts on migratory birds and species at risk are as follows:

- The project must not violate a prohibition of the Canada and New Brunswick *Species at Risk Act* or the *Migratory Birds Convention Act*;
- Species at risk, migratory birds and their nesting areas on and near the subject property must, with no exception, not be disturbed;
- If vegetation clearing must take place within the bird breeding season, a non-intrusive nesting survey of the subject property will be conducted by a bird expert;
- If an endangered species is identified on the site or nearby, activities in the area where the species was identified will be suspended and DELG should be consulted. The need for protective and mitigation measures as well as authorization to resume operations will be at the discretion of the DELG.

### **5.4 GROUNDWATER**

The proposed mitigation measures to reduce impacts on groundwater are as follows:

- The effects of the pumping test will be monitored from an observation well to assess the risk to neighboring drinking water wells;
- In the unlikely event that neighboring wells were to be affected by hydraulic testing, water will be supplied by other means to the affected residents;
- The WSSA will evaluate the sustainability of the water supply, assess the water quality and evaluate potential impacts to existing water users;
- A maximum pumping rate for the well will be established from the results of the WSSA, which will provide sustainable yield and be lower than the yield of the aquifer.

### **5.5 SURFACE WATER**

The proposed mitigation measures to reduce impacts on surface water are as follows:

- Install sediment fences before exposing any soil susceptible to erosion;
- Keep to the minimum required the exposed soil area that may be susceptible to erosion;
- Install sediment fences and hay bales to filter sediment that may be present in the surface water generated by the volume of water discharged during the pumping test;
- Monitor twice a day the condition of sediment fences and hay bales, maintain them and add additional fences or bales if it's required;
- Water discharged during the pumping test will be redirected toward the existing drainage channel, if possible.

## 5.6 VALUED SPACES AND LOCATIONS

The proposed mitigation measures to reduce impacts on valued spaces and locations are as follows:

- Immediately cease all work in the event of an unknown object discovery suspected to be an archaeological or heritage resource;
- Identify the location of the discovery by means of a fence or marking tape and prohibit access to this area;
- Report as soon as possible to the archaeological services authorities of the Department of Tourism, Heritage and Culture at 506-453-2738 for further instructions;
- Work near the discovery may not resume until the authorization of the archaeological services authorities.

## 5.7 LIFESTYLE AND QUALITY OF LIFE

The proposed mitigation measures to reduce impacts on lifestyle and quality of life are as follows:

- Construction equipment must be kept in good working order and equipped with mufflers in good condition;
- The engine of construction equipment and dump trucks that are not used and idling for five (5) minutes or more will be cut to minimize noise;
- Avoid as much as possible the slamming of the truck's dump bodies
- Wherever possible, construction activities will occur from 7:00 to 19:00 to limit noise inconvenience;
- Public complaints about noise will be resolved case by case, if necessary.

## 5.8 ACCIDENTAL EVENTS

The proposed mitigation measures to reduce the risk of accidental events are as follows:

- Refueling of equipment and machinery on site must be performed more than 30 meters from a watercourse, wetland or private water well;
- Take all necessary precautionary measures to avoid the spillage, displacement or loss of products during their handling or transfer that could contaminate the soil, surface water, or groundwater;
- The equipment used to undertake the project must be in good mechanical condition and must not have any fuel, lubricant or hydraulic fluid leaks;
- An appropriate emergency spills kit must be available on site and ready to be used when using motorized equipment;
- The storage and handling of hazardous materials must comply with the *Petroleum Product Storage and Handling Regulation* under the *Clean Environment Act* of New Brunswick.

## **6.0 PUBLIC AND FIRST NATIONS INVOLVEMENT**

The overall goal of public and First Nations involvement during the EIA review is to ensure that those potentially affected by a proposed undertaking are aware of the proposal, are able to obtain additional information about it and express any concerns they may have. The public and First Nations involvement activities proposed for this project will be carried out in accordance with the requirements of Appendix C of the “Guide to EIA in New Brunswick (2018)”. The public and First Nations involvement activities included in the process will therefore be the following:

1. Elected officials (i.e., the MLA and mayor), local service districts, community groups, environmental groups, and other key stakeholder groups (companies, agencies, interest groups etc.) and First Nations will be contacted directly as appropriate, enabling them to become familiar with the proposal and ask questions and/or raise concerns.
2. A direct written notification (letter, information flyer, etc.) about the undertaking and its location will be provide to potentially affected First Nations, area residents, and landowners and individuals (to be determined in consultation with the EIA Branch). The notification must include the following:
  - A brief description of the proposed undertaking;
  - Information on how to view the Registration Document;
  - A description of proposed location;
  - The status of the Provincial approvals process;
  - A statement indicating that people can ask questions or raise concerns with the proponent regarding the environmental impacts;
  - Proponent and/or consultant contact information;
  - The date by which comments must be received.
3. The EIA Branch will place notice of the registration and a copy of the registration document on its internet-based “projects under review” registry and will make the registration document (and any subsequent submissions in response to issues raised by the TRC) available for review at 20 McGloin Street, Fredericton (New Brunswick).
4. Copies of the project registration document (and any subsequent submissions in response to issues raised by the TRC) will be made available to any interested member of the public, stakeholder, or First Nation. A copy of the document and any subsequent revision will be deposited at the appropriate DELG regional office, where it will be available for review.
5. A report documenting public and First Nation involvement activities will be submit to DELG and available for review by the public and First Nations.

## **7.0 APPROVAL OF THE PROJECT**

The following permits, licenses, approvals, and other forms of authorization are anticipated for this project but are not necessarily be limited to:

### Local:

- Building permit, Greater Miramichi Regional Service Commission

### Provincial:

- Water Supply Source Assessment approval, MEGL
- On-Site Sewage Disposal System approval, Department of Public Safety
- Certificate of Determination, DEGL

### Federal:

- No federal approval or authorization is anticipated for this project

## **8.0 FUNDING**

No applications for a grant or loan of capital funds from any government agency have been or will be submitted for this project. Funding for the project will be fully assumed by the promoter.

## **9.0 SIGNATURE**

June 29/2020  
Date

Dewer Somers  
Dewer Somers, President  
Victory Baptist Fellowship Inc.



## **10.0 REFERENCES**

All About Birds, Bird Guide. 2019. [Online]. Accessed at: <https://www.allaboutbirds.org/guide/>

DEGL (New Brunswick Department of Environment and Local Government). 2018. Online well log system. [Online]. Accessed at: <https://www.elgegl.gnb.ca/0375-0001/>

DEGL (New Brunswick Department of Environment and Local Government). 2017. Environmental impact assessment - Water Supply Source Assessment Guidelines. [Online]. Accessed at: <https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/WaterSupplyAssessmentGuidelines.pdf>

DEGL (New Brunswick Department of Environment and Local Government). 2018. A guide to environmental impact assessment in New Brunswick. [Online]. Accessed at: <https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/GuideEnvironmentalImpactAssessment.pdf>

Environment and Climate Change Canada, Species at Risk Act: COSEWIC assessments and status reports. 2019. [Online]. Accessed at: <https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/cosewic-assessments-status-reports.html>

Environment and natural resources, 2018. Species at risk public registry. [Online]. Accessed at: <https://www.sararegistry.gc.ca/>

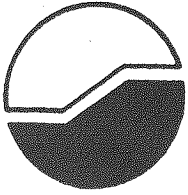
IBA Canada, 2018. Important Bird and Biodiversity Areas in Canada, [Online]. Accessed at: <https://www.ibacanada.org/>

Natural Resources and Energy Development, 2018. General Status of Wild Species. [Online]. Accessed at: [https://www2.gnb.ca/content/gnb/en/departments/erd/natural\\_resources/content/wildlife/content/GeneralStatusWildSpecies/definitions.html](https://www2.gnb.ca/content/gnb/en/departments/erd/natural_resources/content/wildlife/content/GeneralStatusWildSpecies/definitions.html)

Oiseau-Birds, 2018. [Online]. Accessed at: <http://www.oiseaux-birds.com>

**Appendice A**

**Documents related to the undertaking**



**GEMTEC** LIMITED/LTÉE

GÉOTECHNIQUE, ENVIRONNEMENT, MATÉRIAUX  
GROUND ENGINEERING & MATERIALS TECHNOLOGY

(506) 548-5064  
(506) 548-5426  
720 Thornton Avenue  
Bathurst, NB E2A 2W8

SOIL INVESTIGATION

“SENIOR CITIZEN’S APARTMENT BUILDING”

SOUTHESK, NEW BRUNSWICK

for

VICTORY FELLOWSHIP BAPTIST CHURCH

January, 2003  
File: 7407.01

Géotechnique • Matériaux • Ingénierie • Hydrogéologie

## SOIL INVESTIGATION

### “SENIOR CITIZEN’S APARTMENT BUILDING”

#### SOUTHESK, NEW BRUNSWICK

#### 1.0 INSTRUCTION

GEMTEC Limited was retained by Victory Fellowship Baptist Church to carry out a soil investigation at the site of the proposed Senior Citizen’s apartment building in Southesk, New Brunswick.

The purpose of the investigation was to describe the soils and ground water conditions at the site and provide recommendations for the foundation design.

Three test pits were put down at the site on January 15, 2003 by a CAT 420 D rubber tire backhoe under the supervision of one of our senior geo-technical engineers. The locations of the test pits were suggested by Gemtec and installed in the field by the client.

The elevations shown on the logs and discussed in the report are based on assumed elevation. The elevation of each test pits are in reference with the existing church entrance concrete pad with an assumed elevation of 30.00 m.

#### 2.0 SOILS CONDITIONS

The site of the proposed structure is a vacant wooded lot of young growth trees where the building will be built, at approximately 80 - 85 m south of the existing church.

The surface soil is a thin layer (approximately 300 - 400 mm) of humus, silty sand and roots.

The surface grade is covered in all test pits with loose, coarse to fine sand which thickness varied (between 300 and 800 mm thick). A sieve analysis was carried out on a recovered sample from test pit 1 and 5.7% gravel, 92% sand and 2.3% silt was found.

The sand layer is underlain in all test pit by a layer of light reddish brown silt, trace of sand. This layer is hard with pocket penetrometer readings varying between 3.0 and 4.5 ton/ft<sup>2</sup> and varied in thickness between 0.8 and 1.8 m thick. Two sieve analysis were carried out and between 0 and 0.8% gravel, 7.3 and 12.4% sand and 86.8 and 92.7% silt were found.

A layer of firm sandy silt, trace gravel was encountered in all test pits below the silt layer with pocket penetrometer readings varying between 2.0 and 2.5 ton/ft<sup>2</sup>. A sieve analysis was carried out and 0.5 % gravel, 34.0 % sand and 65.5 % silt were found.

The ground water was not encountered during the field work of January 15, 2003. However seepage water was flowing through the layer of sand.

### 3.0 CONCLUSION AND RECOMMENDATIONS

We understand that the building elevation is unknown but for the purpose of providing recommendations, it is assumed 600 mm higher than test pit 1 at assumed elevation 28.60 m with footing elevation at 27.00 m.

#### 3.1 Foundation

It is recommended to undercut 300 mm lower than the footing elevation and backfill to footing grade with a compacted well graded sand and gravel, with less than 8% passing sieve #200 or a small (size) sand/sandstone. The gradation of the backfill is defined in section 3.2 Slab on grade.

An allowable bearing pressure of 150 kPa may be used for design for footings founded on compacted to 95% modified proctor backfill material.

In all cases minimum footings dimensions of 1 m for square footings founded at a minimum of 1.0 m below the surface and 600 mm for strip footings should be used in design.

All interior pad footings should be founded a minimum of 1.8 m below the slab on grade elevation. The settlement for the foundation founded on structural fills is expected no more than 10 - 15 mm.

#### 3.2 Slab on Grade

All silty sand, humus and vegetation should be excavated and wasted. The slab on grade could be developed on the existing proof rolled sand. The interior of the building could be backfilled to the proposed slab on grade elevation with structural fill and compacted to 95 % of the maximum dry density determined in accordance with the latest revision of ASTM D-1557.

The grading of the backfill should be as follows:

<u>Sieve size, mm</u>	<u>Lower limit</u>	<u>Upper limit</u>
125	100	100
100	95	100
75	78	100
50	60	90
25	42	77
19	34	72
9.5	25	61
7.75	16	51
2.36	13	42
1.18	8	34
0.30	6	20
0.08	3	7

### 3.3 PARKING LOT

The parking lot should be developed by following recommendations stated in section 3.2 Slab on grade.

### 4.0 SUMMARY

The site as investigated is covered by young grown trees, silty sand, sand, silt and sandy silt. It can be suitable for the proposed construction provided some site preparation is undertaken as described in this report.

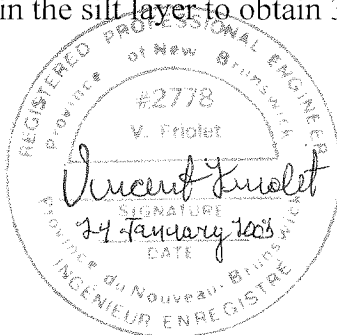
Conventional construction using perimeter frost walls founded on strip footings with an interior slab on grade may be considered for design provided the site foundation grade is prepared as outlined in Section 3.0 of this report.

It is recommended that the foundation grade be verified by a qualified engineer to localize any soft spots and that full-time inspection be carried out during backfill placement inside and around the building.

Should the building elevation be lower than 28.60 m, the 300 mm undercut and backfill under the footing elevation remain. For the building elevation higher than 28.60 m, the footings will be founded on the loose sand. In all cases, the loose sand layer is to be removed to expose the hard silt. Also, for sand excavation lesser than 300 mm under footing grade, the excavation should extent in the silt layer to obtain 300 mm backfill.

---

Vincent Friolet, P. Eng.







**CLIENT:** Victory Fellowship Baptist Church

**JOB No.:** 7407.01

**BORING:** 2

**PROJECT:** Senior Citizen's Apartment Building

**DATE:** 2003/01/15

**PAGE:**

**LOCATION:** Route 420 Southesk

**GROUND SFC. ELEV.** 27.97 m

**DATUM:** Assumed

DEPTH m.	SAMPLE			LOG	DESCRIPTION	ELEV. m.	W A T E R
	No.	TYPE	N				
0					Humus, root, silty SAND.	27.97	
					Fine SAND.	27.67	
						27.37	
1					Hard light reddish brown SILT, trace sand. P.P.=3.0-3.5 ton/ft <sup>2</sup>		
						26.47	
2					EOH at 1.5m		
3							
4							





**CLIENT:** Victory Fellowship Baptist Church

**JOB No.:** 7407.01

**BORING:** 3

**PROJECT:** Senior Citizen's Apartment Building

**DATE:** 2003/01/15

**PAGE:**

**LOCATION:** Route 420 Southesk

**GROUND SFC. ELEV.** 27.88 m

**DATUM:** Assumed

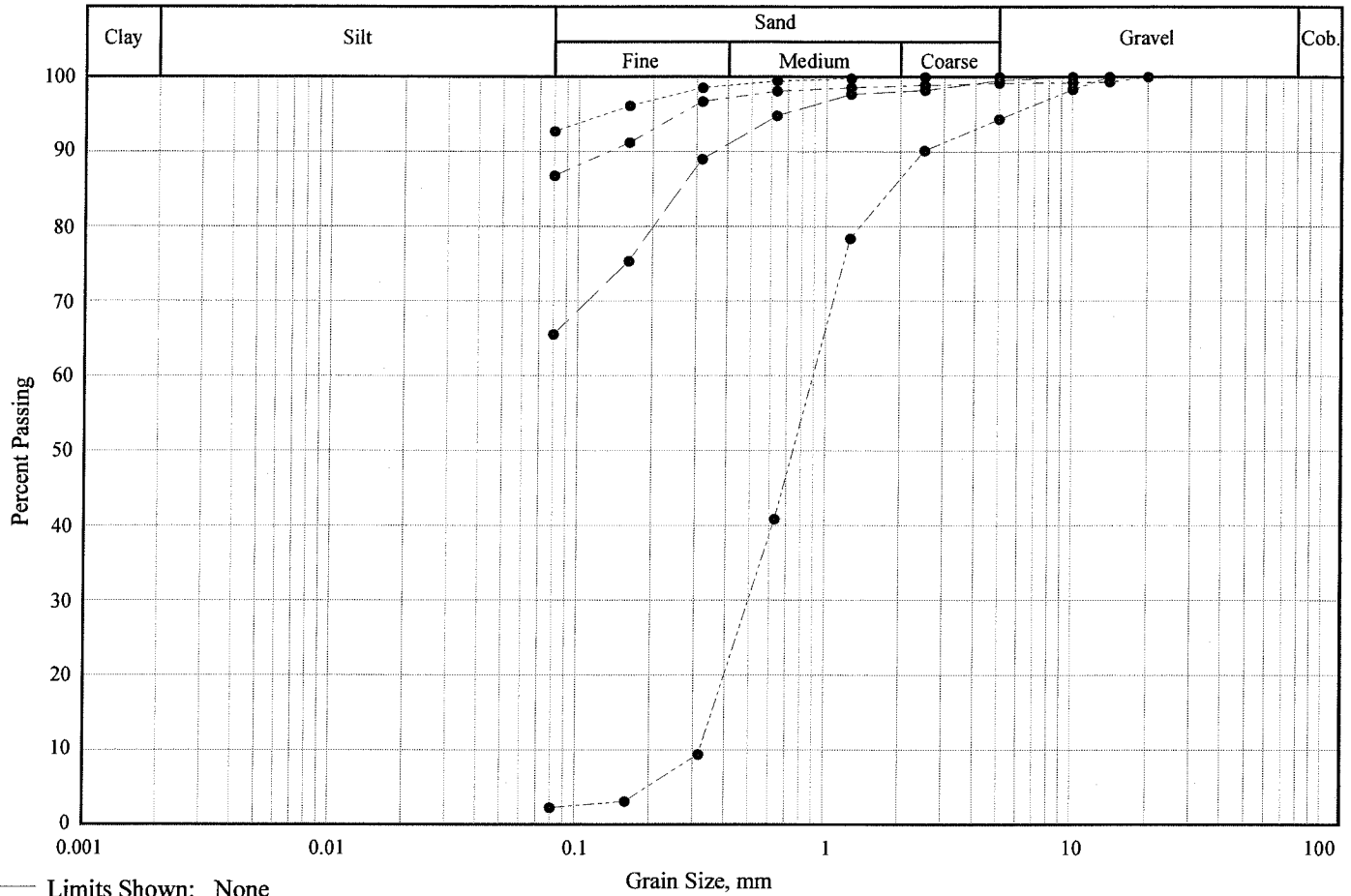
DEPTH m.	SAMPLE			LOG	DESCRIPTION	ELEV. m.	WATER
	No.	TYPE	N				
0					Humus, roots, silty SAND.	27.88	
					Coarse to fine SAND.	27.58	
						27.18	
1					Hard light reddish brown SILT, trace sand. P.P.=4.0-4.5 ton/ft <sup>2</sup>		
2							
					Firm brown sandy SILT P.P.=2.0-2.5 ton/ft <sup>2</sup>	25.38	
3						24.88	
					EOH at 3.0m		
4							



**GEMTEC** LIMITED  
GROUND ENGINEERING  
& MATERIALS TECHNOLOGY

Client: Victory Fellowship Baptist Church  
Project: Soils Investigation, Senior Citizen Apartment Building  
Project #: 740701

# Soils Grading Chart



Line Symbol	Description	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay	Date Sampled
-----	grabbed sample	3	2	3.0	0.5	34.0	65.5		03/01/15
-----	GRABBED SAMPLE	3	1	2.3	0.0	7.3	92.7		03/01/15
-----	grabbed sample	1	2	1.5	0.8	12.4	86.8		03/01/15
-----	grabbed sample	1	1	0.6	5.7	92.0	2.3		03/01/15

Line Symbol	Sample Description	D <sub>10</sub>	D <sub>15</sub>	D <sub>85</sub>	% 5-75µm
-----	Sandy silt , trace gravel	0.0000	0.0000	0.2584	---
-----	Silt , trace sand	0.0000	0.0000	0.0000	---
-----	Silt , some sand , trace gravel	0.0000	0.0000	0.0000	---
-----	Sand , trace gravel, trace silt	0.3191	0.3564	1.8474	---





**Engineering  
Technologies  
Canada Ltd.**

24 Humphrey Drive, Stratford, PE, Canada C1B 1K2

Tel (902) 628-1705 Fax (902) 628-1703

Toll Free 1-888-747-SOIL(7645)

Web site: [www.engtech.ca](http://www.engtech.ca)

September 3, 2003

ETC Job No.03182

Chief Medical Officer of Health  
Department of Health and Wellness  
Carlton Place  
PO Box 5100  
Fredericton, NB E3B 6G3

*Notes: This report + prelim.  
plan were not finalized  
because work was stopped on  
the project. Kelly.*

**Attention: Mr. Ivan L. Brophy, Project Manager, (Fax: 506-453-8702)**

**RE: Westwood Senior Citizen Complex, South Esk, NB.  
Design Brief for new on-site sewage system.**

**DRAFT**

Dear Mr. Brophy:

On behalf of Victory Baptist Fellowship Church, Engineering Technologies Canada Ltd. (ETC) has carried out a soils investigation and prepared a preliminary septic system layout for the new Westwood Senior Citizen Complex in South Esk, New Brunswick. It is proposed to install a Peatland™ treatment system to receive primary effluent from the new facility. This letter summarizes the assumptions and criteria on which we have based the conceptual layout and design.

Victor Sommers was interviewed to obtain information regarding the new facility and its services. The new facility will have sixteen 2-bedroom apartments, four 1-bedroom apartments, one 2-bedroom guest apartment, a kitchen, a hair salon and laundry.

***Wastewater Flows and Characteristics***

The analysis of sewage flows are based on the following information and assumptions:

- The expected occupancy of the guest apartment is only once a month, therefore its flow contribution was determined to be insignificant and excluded;
- The kitchen will serve only residents. As part of the rental agreement residents are provided three meals a day;

- The hair salon and laundry facilities service residents only;
- The new facility will be fitted with low flow plumbing fixtures;

The design flow was calculated using the estimated sewage flow for dwelling units listed in *Schedule B of the New Brunswick Health Act 88-200*. It is assumed this flow includes laundry. The NB Health Act does not have a sewage flow allowance for a hair salon, therefore the estimated flow listed for beauty salons in the *1997 Ontario Code and Guide for Sewage Systems* was used. Based on the above information, the design flow for each type of usage is projected as follows:

1-Bedroom Apartments:	4 apartments x 750 LPD/apt. ....	3000 LPD
2-Bedroom Apartments:	16 apartments x 1022 LPD/apt. ....	16,352 LPD
Hair Salon:	1 station x 650 LPD/station .....	650 LPD
Estimated Total Flow:		20,002 LPD

**DRAFT**

***Subsurface Conditions***

The conditions encountered at each test pit location are shown on the attached test pit logs. In summary, the subsurface conditions can be described as follows: The site is covered with approximately 0.5-1.4 feet of rootmat. The rootmat was underlain with coarse, orange-brown sand with trace gravel. This sand stratum was underlain with coarse, brown-grey sand. Both sand strata were typically moist to wet, and loose to compact. Grey silty clay loam was encountered below the sand stratum at depths ranging from 2.6-4.6 ft.

Minor to major inflow from rootmat and sand strata was encountered at every test pit location. Measured water levels varied from 3.0-6.0 ft. below ground surface. Test pits were not open long enough to permit observation of maximum stabilized groundwater levels.

***Recommendations***

Due to the poor surface drainage and a slowly permeable limited layer underlying the coarse sand stratum, this site is not well suited to a conventional septic tank and disposal field type system. It is proposed that the wastewater effluent be treated to advanced levels with a Peatland™ treatment system prior to surface discharge. The following is a summarized description of the proposed system:

The wastewater generated from the 20-unit senior citizen complex will flow into a septic tank with a minimum effective capacity equivalent to a retention time of 36 hours. The settled and skimmed wastewater from the septic tank then will flow or is pumped to a 3000 Igal. pump tank. The pump tank will periodically dose the peat filter through a perforated pipe network. By percolating through the peat, the wastewater is treated by two different processes: a biological process (organic matter consumption) and a physical process (filtration). At the bottom of the peat bed, the treated wastewater is collected by a series of collecting pipes and directed to a wetland. By flowing through the granular media and the roots of the wetland, the quality of the treated water is improved (total nitrogen removal and higher fecal coliforms reductions). (The attached Peatland™ technical supplement provides further detail on the system.) The treated effluent will be discharged into a sand mantle adjacent to the system. Due to the high (perched) water table the entire system will be installed above ground.

**DRAFT**

A preliminary layout for the Peatland™ treatment system is provided on the attached site plan. This plan is for review purposes only. Upon receiving approval for the design concept detailed drawings and specifications will be prepared.

ETC's warrants that its services are performed with the customary thoroughness and competence of the engineering profession, in accordance with the standard for professional services at the time and location those services are rendered. No other expressed or implied warranty or representation, is included or intended in our report with respect to the proper operation or functioning of the sewage disposal system.

A subsurface investigation involves a random sampling of site conditions. If during construction

conditions contrary to those described herein are encountered, we request immediate notification so that reassessment can be undertaken.

Please feel free to contact me if there are any questions on the above.

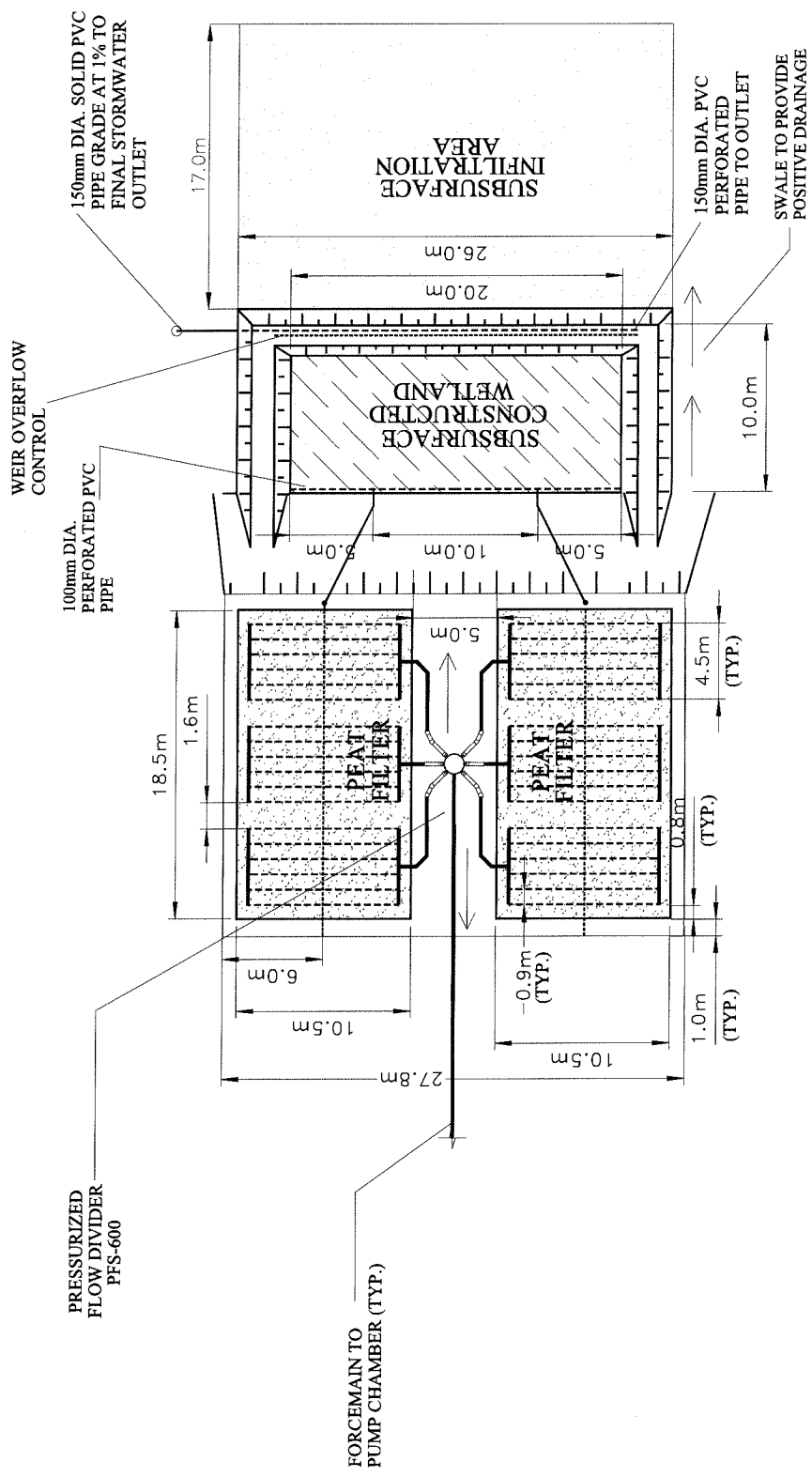
Sincerely,  
**ENGINEERING TECHNOLOGIES CANADA LTD.**

Kelly Galloway, P.Eng.  
Principal

**DRAFT**

attachments: Preliminary Septic System Site Plan  
Test Pit Records  
Peatland™ Technical Supplement

copy: Mr. Victor Sommers, Victory Baptist Fellowship Church, (fax: 506-622-4914)



DRAFT

 <p><b>Engineering Technologies Canada Ltd.</b></p>	<p>On-site Sewage Treatment Environmental Engineering Geotechnical Engineering</p>		<p>www.engtech.ca</p>	<p>PROJECT: Peatland Treatment System – South Esk, NB</p>	<p>JOB NO 03182</p>
	<p>1-888-747-SOIL (7645)</p>		<p>SCALE 1:400</p>	<p>TITLE Plan View</p>	<p>DATE September 3, 2003</p>
			<p>FILE Peatland-PlanView</p>	<p>CHK KAG</p>	<p>DRAWN BY KIL</p>





Engineering  
Technologies  
Canada Ltd.

On-site Sewage Treatment and Disposal  
Environmental Engineering  
Geotechnical Engineering

<http://www.engtech.ca>

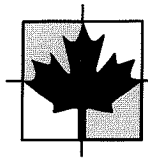
# TEST PIT RECORD

CLIENT: Victory Fellowship Baptist Church	JOB NUMBER: 03182	TEST PIT NO: 1
PROJECT: Septic Assessment	DATUM: Ground Surface	TEST PIT SIZE: 4ft x 6ft
LOCATION: South Esk, NB	DATE EXCAVATED: June 16, 2003	LOGGED BY: CEB/KIL

DEPTH (FEET)	DEPTH (METERS)	WATER LEVEL	SAMPLE TAKEN	STRATA PLOT	SOIL DESCRIPTION
0.0'	0.0m				GROUND SURFACE
1.0'					0.0 ft - 0.5 ft ROOTMAT Black humus, Roots, Loose, Moist
					0.5 ft - 0.8 ft White sand, Loose, Moist
					0.8 ft - 1.25 ft Black humus, Loose, Moist
2.0'	0.5m				1.25 ft - 1.85 ft Orange-brown sand with trace gravel Medium, Loose to compact, Moist to wet
3.0'		▼			1.85 ft - 4.25 ft Brown-grey sand with trace gravel Coarse to fine, Loose to compact, Moist to wet
4.0'	1.0m				
5.0'	1.5m				4.25 ft - 7.75 ft Grey silty clay loam with some gravel Dense, Moist
6.0'					
7.0'	2.0m				
8.0'					
	2.5m				7.75 ft Bottom of test pit
9.0'					
10.0'	3.0m				
11.0'					
	3.5m				
12.0'					

**DRAFT**

NOTES: Minor to major inflow from rootmat and sand stratum.  
Water level seemed to have stabilized prior to measuring.



Engineering  
Technologies  
Canada Ltd.

On-site Sewage Treatment and Disposal  
Environmental Engineering  
Geotechnical Engineering

<http://www.engtech.ca>

# TEST PIT RECORD

CLIENT: Victory Fellowship Baptist Church	JOB NUMBER: 03182	TEST PIT NO: 2
PROJECT: Septic Assessment	DATUM: Ground Surface	TEST PIT SIZE: 4ft x 6ft
LOCATION: South Esk, NB	DATE EXCAVATED: June 16, 2003	LOGGED BY: CEB/KIL

DEPTH (FEET)	DEPTH (METERS)	WATER LEVEL	SAMPLE TAKEN	STRATA PLOT	SOIL DESCRIPTION
0.0'	0.0m				GROUND SURFACE
1.0'					0.0 ft - 0.75 ft ROOTMAT Black humus, Roots, Loose, Moist Interbedded with 3 to 4 inch white sand layer, Loose, Moist
2.0'	0.5m				0.75 ft - 1.45 ft Orange-brown sand with trace gravel Medium, Loose to compact, Moist to wet
3.0'					1.45 ft - 2.95 ft Brown-grey sand Coarse to fine, Compact, Moist to wet
4.0'	1.0m				2.95 ft - 7.5 ft Grey silty clay loam with some gravel Dense, Moist
5.0'	1.5m	▼			
6.0'					
7.0'	2.0m				
8.0'	2.5m				7.5 ft Bottom of test pit
9.0'					
10.0'	3.0m				
11.0'					
12.0'	3.5m				

**DRAFT**

NOTES: Minor to major inflow from rootmat and sand stratum.  
Water level had not stabilized prior to measuring.



Engineering  
Technologies  
Canada Ltd.

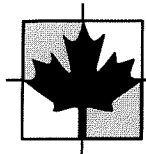
On-site Sewage Treatment and Disposal  
Environmental Engineering  
Geotechnical Engineering

<http://www.engtech.ca>

# TEST PIT RECORD

CLIENT: Victory Fellowship Baptist Church	JOB NUMBER: 03182	TEST PIT NO: 3
PROJECT: Septic Assessment	DATUM: Ground Surface	TEST PIT SIZE: 4ft x 6ft
LOCATION: South Esk, NB	DATE EXCAVATED: June 16, 2003	LOGGED BY: CEB/KIL

DEPTH (FEET)	DEPTH (METERS)	WATER LEVEL	SAMPLE TAKEN	STRATA PLOT	SOIL DESCRIPTION
0.0'	0.0m				GROUND SURFACE
1.0'					0.0 ft - 1.2 ft ROOTMAT Black humus, Roots, Loose, Moist
2.0'	0.5m				1.2 ft - 1.5 ft Orange-brown sand with trace gravel Medium, Loose to compact, Moist to wet
3.0'					1.5 ft - 2.6 ft Brown-grey sand Coarse to fine, Compact, Moist to wet Gravel component from 1.7 ft to 2.6 ft.
4.0'					2.6 ft - 7.75 ft Grey silty clay loam with some gravel Dense, Moist
5.0'	1.5m				
6.0'					
7.0'	2.0m				
8.0'					
9.0'					
10.0'	3.0m				
11.0'					
12.0'	3.5m				
7.75 ft Bottom of test pit					<b>DRAFT</b>
NOTES: Minor to major inflow from rootmat and sand stratum. Water level had not stabilized prior to measuring.					



Engineering  
Technologies  
Canada Ltd.

On-site Sewage Treatment and Disposal  
Environmental Engineering  
Geotechnical Engineering

<http://www.engtech.ca>

# TEST PIT RECORD

CLIENT: Victory Fellowship Baptist Church	JOB NUMBER: 03182	TEST PIT NO: 4
PROJECT: Septic Assessment	DATUM: Ground Surface	TEST PIT SIZE: 4ft x 6ft
LOCATION: South Esk, NB	DATE EXCAVATED: June 16, 2003	LOGGED BY: CEB/KIL

DEPTH (FEET)	DEPTH (METERS)	WATER LEVEL	SAMPLE TAKEN	STRATA PLOT	SOIL DESCRIPTION
0.0'	0.0m				GROUND SURFACE
1.0'					0.0 ft - 1.4 ft ROOTMAT Black humus, Roots, Loose, Moist
2.0'	0.5m				1.4 ft - 2.1 ft Orange-brown sand with trace gravel Medium, Loose to compact, Moist
3.0'					2.1 ft - 2.85 ft Brown-grey sand with trace gravel Coarse to fine, Loose to compact, Moist to wet
4.0'	1.0m				2.85 ft - 7.75 ft Grey silty clay loam with some gravel Dense, Moist
5.0'	1.5m	▼			
6.0'					
7.0'	2.0m				
8.0'					
9.0'	2.5m				
10.0'	3.0m				
11.0'					
12.0'	3.5m				

7.75 ft Bottom of test pit

**DRAFT**

NOTES: Minor to major inflow from rootmat and sand stratum.  
Water level had not stabilized prior to measuring.



Engineering  
Technologies  
Canada Ltd.

On-site Sewage Treatment and Disposal  
Environmental Engineering  
Geotechnical Engineering  
<http://www.engtech.ca>

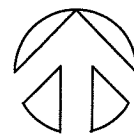
# TEST PIT RECORD

CLIENT: Victory Fellowship Baptist Church	JOB NUMBER: 03182	TEST PIT NO: 5
PROJECT: Septic Assessment	DATUM: Ground Surface	TEST PIT SIZE: 4ft x 6ft
LOCATION: South Esk, NB	DATE EXCAVATED: June 16, 2003	LOGGED BY: CEB/KIL

DEPTH (FEET)	DEPTH (METERS)	WATER LEVEL	SAMPLE TAKEN	STRATA PLOT	SOIL DESCRIPTION
0.0'	0.0m				GROUND SURFACE
1.0'					0.0 ft - 0.4 ft ROOTMAT Black humus, Roots, Loose, Moist
2.0'	0.5m				0.4 ft - 1.2 ft White sand Loose, Moist
3.0'					1.2 ft - 2.95 ft Orange-brown sand with trace gravel Medium, Loose to compact, Moist to wet
4.0'	1.0m				2.95 ft - 4.55 ft Brown-grey sand with trace gravel Coarse to fine, Compact, Moist to wet
5.0'	1.5m				4.55 ft - 7.0 ft Grey silty clay loam with some gravel Dense, Moist
6.0'		▼			
7.0'	2.0m				
8.0'					
9.0'	2.5m				
10.0'	3.0m				
11.0'					
12.0'	3.5m				

**DRAFT**

NOTES: Isolated minor to major inflow in sand stratum from 3.0 ft to 3.5 ft. Water level had not stabilized prior to measuring.



Proposed Location for Westwood Place

Existing Church

Proposed Access

G1  
G2  
G3

E1

E2

E3

E4

E5

182m (597ft)

■ G1 GEMTEC TEST PITS  
■ E1 ETC TEST PITS



Engineering  
Technologies  
Canada Ltd.

*On-site Sewage Treatment  
Environmental Engineering  
Geotechnical Engineering*

1-888-747-SOIL (7645)

[www.engtech.ca](http://www.engtech.ca)

### TEST PIT LOCATION PLAN

PROJECT

Westwood Place Seniors Complex

ETC JOB No.:

03182

DATE September 03, 2003

SCALE 1:2000

**Appendice B**  
**Aerial photographs**



TITRE DU PLAN <b>1965 AERIAL VIEW</b> <small>DRAWING TITLE</small>	EXPERT-CONSEIL 	NO. DE PROJET <b>20-02</b> <small>PROJECT NUMBER</small>	ÉCHELLE <b>P.À.É.</b> <small>SCALE</small>
PROJET <b>EIA VICTORY BAPTIST FELLOWSHIP INC. DEVELOPMENT</b> <small>PROJECT</small>	<small>CONSULTANT</small>	Dessiné par <b>A. DUGUAY</b> <small>DRAWN BY</small> DATE <b>JUNE 1, 2020</b> <small>DATE</small>	Vérifié par <b>M. BASQUE</b> <small>CHECKED BY</small> NO. DU PLAN <b>V-1965</b> <small>DRAWING NUMBER</small>





TITRE DU PLAN <b>1975 AERIAL VIEW</b> <small>DRAWING TITLE</small>	EXPERT-CONSEIL 	NO. DE PROJET <b>20-02</b> <small>PROJECT NUMBER</small>	ÉCHELLE <b>P.À.É.</b> <small>SCALE</small>
PROJET <b>EIA          VICTORY BAPTIST FELLOWSHIP INC.          DEVELOPMENT</b> <small>PROJECT</small>	<small>CONSULTANT</small>	DESSINÉ PAR <b>A. DUGUAY</b> <small>DRAWN BY</small> DATE <b>JUNE 1, 2020</b> <small>DATE</small>	VÉRIFIÉ PAR <b>M. BASQUE</b> <small>CHECKED BY</small> NO. DU PLAN <b>V-1975</b> <small>DRAWING NUMBER</small>



TITRE DU PLAN <b>1983 AERIAL VIEW</b> <small>DRAWING TITLE</small>	EXPERT-CONSEIL  <small>CONSULTANT</small>	NO. DE PROJET <b>20-02</b> <small>PROJECT NUMBER</small>	ÉCHELLE <b>P.À.É.</b> <small>SCALE</small>
PROJET <b>EIA VICTORY BAPTIST FELLOWSHIP INC. DEVELOPMENT</b> <small>PROJECT</small>		DESSINÉ PAR <b>A. DUGUAY</b> <small>DRAWN BY</small> DATE <b>JUNE 1, 2020</b> <small>DATE</small>	VÉRIFIÉ PAR <b>M. BASQUE</b> <small>CHECKED BY</small> NO. DU PLAN <b>V-1983</b> <small>DRAWING NUMBER</small>



TITRE DU PLAN <b>1995 AERIAL VIEW</b> <small>DRAWING TITLE</small>	EXPERT-CONSEIL  <small>CONSULTANT</small>	NO. DE PROJET <b>20-02</b> <small>PROJECT NUMBER</small>	ÉCHELLE <b>P.À.É.</b> <small>SCALE</small>
PROJET <b>EIA VICTORY BAPTIST FELLOWSHIP INC. DEVELOPMENT</b> <small>PROJECT</small>		DESSINÉ PAR <b>A. DUGUAY</b> <small>DRAWN BY</small> DATE <b>JUNE 1, 2020</b> <small>DATE</small>	VÉRIFIÉ PAR <b>M. BASQUE</b> <small>CHECKED BY</small> NO. DU PLAN <b>V-1995</b> <small>DRAWING NUMBER</small>



TITRE DU PLAN <b>2005 AERIAL VIEW</b> <small>DRAWING TITLE</small>	EXPERT-CONSEIL 	NO. DE PROJET <b>20-02</b> <small>PROJECT NUMBER</small>	ÉCHELLE <b>P.À.É.</b> <small>SCALE</small>
PROJET <b>EIA          VICTORY BAPTIST FELLOWSHIP INC.          DEVELOPMENT</b> <small>PROJECT</small>	<small>CONSULTANT</small>	DESSINÉ PAR <b>A. DUGUAY</b> <small>DRAWN BY</small>	VÉRIFIÉ PAR <b>M. BASQUE</b> <small>CHECKED BY</small>
		DATE <b>JUNE 1, 2020</b> <small>DATE</small>	NO. DU PLAN <b>V-2005</b> <small>DRAWING NUMBER</small>

**Appendice C**

**WSSA initial application**

# Water Supply Source Assessment

## WSSA Initial Application

1) *Name of proponent:* South Esk Miramichi Victory Living, 55 Hwy 420, South Esk, NB E1V 4R3.

2) *Location of Drill Targets (including property PID and purpose of the proposed water supply):* South Esk Victory Living is proposing the development of four apartment buildings for senior citizens on property (PID 40141418) south of Hwy. 420 in South Esk, NB. The site will be accessed via Westwood Drive off of Hwy 420. The property is approximately 7.4 hectares (18.3 acres) in size and the site plan is shown in attached Figure 1. It is proposed that each of the four apartment buildings will have its own well to provide potable water for the apartments. Tentative drill targets are shown in Figure 1. At this time in the exploration and development process it is not known how many individual production wells will be required for the potable water supply or for each building. There is an existing well at the church that can be used as an observation well. It is anticipated that, as the wells are drilled, it will become more apparent which wells can be used as production wells and which wells will be used as observation wells. Further information will be submitted at that time.

3) *Required water quantity (in m<sup>3</sup>/day) and/or required pumping rate:* The proposal is for the development two ten-unit and two eight-unit seniors' apartments on property (PID 40141418) of Hwy. 420 via Westwood Drive in South Esk, NB. The property is approximately 7.4 hectares (18.3 acres) in size and the site plan is shown in attached Figure 1. The developers plan on a total of 26 apartments with two bedrooms and 10 apartments with 3 bedrooms, providing a total population estimate of 118 persons (26\*3 + 10\*4). Assuming that these will be spread equally over the four buildings the total population estimate of 118 persons is equivalent to approximately 33 persons per 10-unit building and 27 persons per eight-unit building.

The NB Environment design guidelines are as follows:

“The per-person requirement shall be 450 liters per day. Peak demand occurs for a period of 120 minutes each day. This is equivalent to a peak demand rate of 3.75 liters/minute (0.82 igpm) for each person. The basic minimum pumping test rate is this rate multiplied by the “likely number of persons per well” which, for a single-family residence shall be the number of bedrooms plus one.”

For the 10-unit buildings with a population estimated at 33, the design peak demand pumping rate is 123.75 liters/minute (27 igpm). The peak demand only occurs for a short period of time (2 hours) each day, and the well can replenish its supplies during periods of lesser use over a 24-hour period. The total daily demand for the 10-unit buildings will be 14,850 liters per day (10.3 liters per min or 2.27 igpm over 24 hours).

For the 8-unit buildings with a population estimated at 27, the design peak demand pumping rate is 101.25 liters/minute (22.1 igpm). The peak demand only occurs for a short period of time (2 hours) each day, and the well can replenish its supplies during periods of lesser use over a 24-hour period. The total daily demand for the 8-unit buildings will be 12,150 liters per day (8.4 liters per min or 1.9 igpm over 24 hours).

It is anticipated that the estimated water requirement will be made up using a mixture of well yields and storage capacity to be based on the results of the groundwater exploration program. The above estimated water requirements probably represent a high estimate as the development will be geared towards retired “empty nesters” with an expected population of two persons per unit.

4) *List alternate water supply sources in area (including municipal systems):* The nearest municipal systems are in Miramichi (former Newcastle). The distance to this system makes it impractical as a potential water source. On site groundwater wells represent the safest and most economical of the potential potable water sources.

5) *Discuss area hydrogeology as it relates to the project requirements:* The proposal is for the development four separate apartment buildings on property (PID 40141418) of Hwy. 420 via Westwood Drive in South Esk, NB. The property is approximately 7.4 hectares (18.3 acres) in size and the site plan is shown in attached Figure 1. Based on an air photo review, the existing land use in the general area is rural residential, commercial, institutional, and woodland. The existing development in the area utilizes private wells and on-site septic systems.

**Geology and Hydrogeology:** A well log search was conducted using the NB Environment and Local Government well log database for wells constructed within a 100-meter radius of PID 40141418, the parent PID. The well log search provided nine well logs.

The surficial overburden at the site is brown clay till or sand of variable thickness. Based on the well logs, the overburden in the area ranges in thickness from 3.7 to approximately 8.5 meters (12 to 28 feet). Significant accumulations (> 5 meters thickness) of sand or gravel are not present in the general area and the overburden is not used for the ground water supply in the specific area of the proposed development. Thee well logs returned from the well log search represented wells that sourced groundwater from the bedrock aquifer.

The bedrock in the area is mapped as Pennsylvanian sandstone, shale and conglomerate which forms the local bedrock aquifer. The bedrock is known to be relatively transmissive (readily conducts the flow of ground water). The bedrock units or layers tend to be lenticular (i.e. of variable lateral extent and thickness) and are thought to have formed as a result of sedimentary particles deposited from flowing water (alluvial deposition). The sediments were deposited by meandering river systems, the river channel deposits being, in general, characterized by sands and gravels and the floodplain deposits being fine grained silts or clays. Many of the stratigraphic sub-units are of limited horizontal extent. It is not possible to extrapolate continuous sedimentary beds or layers over distances greater than 10 to 100 meters, except in general terms. The beds dip gently eastward. This mechanism of deposition has apparently resulted in locally (10 to 100 meters) variable well yields; however, over larger scales (1000 meters) the bedrock aquifer is quite uniform



Based on common knowledge of the area, the bedrock aquifer has been successfully developed for private residential wells by a number of individuals over the general area. Local well drillers with knowledge of the area confirmed the potential for water supply development in terms of private wells.

**NB Environment Well Log Database:** The review of the NB Environment well log database for wells constructed within a 100-meter radius of PID 40141418 provided the following information relating to the local groundwater aquifer (Table 1). A total of nine well logs were returned in the database search

Table 1: 100 Meters Search Radius

Well Depth (feet)	Estimated Yield (igpm)	Depth to Bedrock (feet)	Casing Length (feet)
Average: 93.9	Average: 13.4	Average: 20.1	Average: 38.2
Median: 96	Median: 12	Median: 21	Median: 41
Minimum: 80	Minimum: 10	Minimum: 12	Minimum: 26
Maximum: 105	Maximum: 30	Maximum: 28	Maximum: 45

As can be seen from the above information the nine well logs found in the database for wells in this area have an average depth of 93.9 feet with an estimated average yield of approximately 13.4 igpm. The average estimated yield of 13.4 igpm and the observed median yield of 12 igpm are in excess of the typical domestic well instantaneous needs of approximately 3 igpm. The minimum yield observed was 10 igpm in three wells with depths of 94, 96, and 100 feet. The maximum yield observed in the well logs was 30 igpm which was observed in a well 82 feet in depth. In general terms, the existing wells in this area have what can be considered to be above average yields compared to what is required for residential household wells. Low yield wells (i.e. less than 3 igpm) will be infrequent at this location. Out of the nine well logs located within 100 meters of PID 40141418, no well had an estimated safe yield of less than 3 igpm. Based

on the results of the well log database search it appears that a local groundwater supply source is feasible for the proposed development.

**NB Environment Well Water Chemistry Database:** A search of the NB Environment well chemistry database was conducted for a radius of 100 meters around PID 40141418. The precise locations of the wells from which the ground water chemistry was obtained are not available due to right to privacy considerations for the property owners. The results from the data available in the NB Environment database are provided in Table 2 which follows. A total of seven sample records were provided for inorganic chemistry as a result of the database search. The average value of the measured result and the New Brunswick Drinking Water Quality Guideline (NBDWQG) are included in the table for the purpose of comparison. Any parameter which exceeds the New Brunswick Drinking Water Quality Guideline concentration is bolded and shaded for ease of recognition in the data table.

Out of the seven well chemistry records available, one well exceeded the NBDWQG for sodium of 200 mg/L with a measured concentration of 231 mg/L. In addition, the water from that well had elevated TDS (Total Dissolved Solids). Waters containing elevated concentrations of sodium should not be consumed or used for cooking; however, they can be used for bathing. Higher than normal levels of sodium chloride would likely cause corrosion and shorten the life of plumbing, hot water heaters and any appliances that come in contact with the water. Treatment options for removing sodium include reverse osmosis and distillation. Such units are available from local suppliers and installers. Alternatively, water with elevated concentrations of sodium chloride can be replaced with bottled water for drinking and cooking.

Out of the seven groundwater chemistry sample results available, one had an elevated concentration of fluoride (8.58 mg/L) compared to the New Brunswick Drinking Water Guideline of 1.5 mg/L. This was the same well that had the elevated concentration of sodium. Fluoride occurs naturally in minerals and soils. According to the Guidelines for Canadian Drinking Water Quality, sixth edition, 1996, the optimum concentration of fluoride in drinking water for the reduction of dental caries is 1.0 mg per liter. The appearance of dental fluorosis (mottling of teeth) may be objectionable at fluoride concentrations above 1.5 mg per liter. The US EPA has a health-

South Esk PID 40141418

NBDWQG = New Brunswick Drinking Water Quality Guideline

**Table 2**

**NBDELG Groundwater Chemistry Database**

Parameter	ALK_T (mg/L)	Al (mg/L)	As (µg/L)	B (mg/L)	Ba (mg/L)	Br (mg/L)	COND (µSIE/cm)	Ca (mg/L)	Cd (µg/L)
	123	0.025	1.5	0.012	0.049	0.1	264	37.2	0.5
	111	0.025	1.5	0.013	0.215	0.1	215	30	0.5
	113	0.025	1.5	0.01	0.115	0.1	230	28	0.5
	109	0.025	1.5	0.012	0.203	0.1	221	32	0.5
	110	0.003	1	0.011	0.327	0.02	228	30.4	0.01
	467	0.057	1.5	0.052	0.034	0.1	1090	7.53	0.5
	115	0.025	1.5	0.01	0.262	0.1	226	29.9	0.5
<b>Mean</b>	<b>164.0</b>	<b>0.026</b>	<b>1.4</b>	<b>0.017</b>	<b>0.172</b>	<b>0.1</b>	<b>353</b>	<b>27.9</b>	<b>0.4</b>
<b>NBDWQG</b>			<b>&lt;10</b>	<b>&lt;5.0</b>	<b>&lt;1.0</b>				<b>&lt;5.0</b>

Parameter	Cl (mg/L)	Cr (µg/L)	Cu (µg/L)	E_coli P/A (P/A)	F (mg/L)	Fe (mg/L)	HARD (mg/L)	K (mg/L)	Mg (mg/L)
	4.83	15	10	Ab	0.124	0.114	116	1.33	5.63
	1.69	10	10	Ab	0.16	0.01	102	2.02	6.51
	1.7	13	10	Ab	0.219	0.096	93	1.75	5.6
	2.09	18	10	Ab	0.216	0.087	104	1.8	5.96
	2.5	1	1	0	0.18	0.04	99.6	1.99	5.76
	9.7	10	10	Ab	<b>8.58</b>	0.186	27.9	0.939	2.21
	1.38	13	10	Ab	0.16	0.034	101	2.34	6.32
<b>Mean</b>	<b>3.4</b>	<b>11</b>	<b>9</b>		<b>1.38</b>	<b>0.081</b>	<b>91.9</b>	<b>1.74</b>	<b>5.43</b>
<b>NBDWQG</b>	<b>&lt;250</b>	<b>&lt;50</b>	<b>&lt;1000</b>		<b>&lt;1.5</b>	<b>&lt;0.3</b>			

South Esk PID 40141418

NBDWQG = New Brunswick Drinking Water Quality Guideline

**Table 2**

**NBDELG Groundwater Chemistry Database**

Parameter	Mn (mg/L)	NO2 (mg/L)	NO3 (mg/L)	NOX (mg/L)	Na (mg/L)	PH (pH)	Pb (µg/L)	SO4 (mg/L)	Sb (µg/L)
	0.607	0.05	0.05	0.05	5.97	7.79	1	4.91	1
	0.234	0.05	0.05	0.05	7.9	7.93	1	3.99	1
	0.296	0.05	0.05	0.05	5.62	7.93	1	3.61	1
	0.32	0.05	0.05	0.05	6.17	8.12	1	3.31	1
	0.362			0.05	6.6	8.2	0.2	3	0.1
	0.15	0.05	0.05	0.05	231	8.61	1	88.8	1
	0.294	0.05	0.05	0.05	7.18	8.01	2.35	3.92	1
<b>Mean</b>	<b>0.323</b>	<b>0.05</b>	<b>0.05</b>	<b>0.05</b>	<b>38.63</b>	<b>8.08</b>	<b>1.1</b>	<b>15.93</b>	<b>0.87</b>
<b>NBDWQG</b>	<b>&lt;0.05</b>	<b>&lt;10</b>	<b>&lt;10</b>	<b>&lt;10</b>	<b>&lt;200</b>	<b>7.0-10.5</b>	<b>&lt;10</b>	<b>&lt;500</b>	<b>6</b>

Parameter	Se (µg/L)	TC-P/A (P/A)	TURB (NTU)	TI (µg/L)	U (µg/L)	Zn (µg/L)	TDS (mg/L)
	1.5	Ab	1.27	1	0.5	10	135
	1.5	Pr	0.7	1	0.5	5	119
	1.5	Ab	1.38	1	0.5	5	115
	1.5	Ab	0.47	1	0.5	5	118
	1	0	0.2	0.1	0.3	2	118
	1.5	Pr	19	1	6.38	5	630
	1.5	Ab	0.44	1	0.5	26	121
<b>Mean</b>	<b>1.4</b>		<b>3.4</b>	<b>1</b>	<b>1.3</b>	<b>8</b>	<b>194</b>
<b>NBDWQG</b>	<b>&lt;10</b>		<b>&lt;1.0</b>		<b>&lt;20</b>		

based criterion for fluoride of 4.0 mg/L and a secondary criterion of 2.0 mg/L for cosmetic effects as referenced above for the Canadian Drinking Water Guideline. Elevated fluoride concentrations can be treated with reverse osmosis systems in order to provide water for drinking or cooking. The water is suitable for bathing. Bottled water can be used to replace this water for drinking or cooking if desired. The observed exceedance of 8.58 mg/L exceeds the 4.0 mg/L health-based criteria. The US EPA criteria is based on 70 years of exposure.

Elevated concentrations of iron and manganese are common in many groundwater aquifers in New Brunswick and some elevated concentrations are present in this bedrock aquifer in this general location. Out of the seven chemistry sample results available, none exceeded the guideline for iron and seven samples exceeded the guideline for manganese. Such elevated concentrations are generally due to natural conditions within the aquifer. The New Brunswick Drinking Water Guidelines for iron and manganese are aesthetic objectives, not based on health considerations. Iron and manganese can cause staining of plumbing fixtures and laundry and may be associated with smells imparted to the water. Iron and manganese can usually be readily removed by commercially available water treatment systems at the hardness observed in this water.

A total of three out of the seven chemistry records available had elevated turbidity present in the samples. The elevated levels of turbidity may be related to the relative newness of the wells and they may not have had sufficient time, or use, to clear naturally. The water samples in the database are provided from the water well testing certificates which are provided by the well drilled immediately after the well has been drilled. As a result, the vast majority of the analytical results come from new wells. Most new wells clear naturally with time and use. At levels in excess of 5 NTUs turbidity may become noticeable to consumers and therefore, objectionable. The turbidity may be the result of elevated concentrations of iron and or manganese or the presence of particulate in the water. In either case, turbidity can be treated by water softeners and/or particulate filters.

**Microbiological Results:** A total of seven sample results were available in the data set for E. coli analysis. Out of these results, no well had a detection of E. coli. A total of seven sample results were available for total coliform analysis and out of these seven results, two wells had detections of total coliform. Total coliforms are natural soil bacteria and are commonly present in

well water systems, particularly associated with elevated turbidities. Such detections are usually easily treated by shock chlorination of the wells and associated plumbing systems.

In general terms the groundwater chemistries found in the NBDELG database are not unusual for this area and reflect natural aquifer conditions. The elevated levels of turbidity observed in some of the wells were probably related to the newness of the wells. All other parameters measured, other than those discussed above, had concentrations below the New Brunswick Drinking Water Quality Guidelines.

6) *Outline proposed hydrogeological testing and work schedule:* The intent is to proceed as soon as possible following approval of the Initial Application, with well drilling and testing to occur as soon as possible this summer.

7) *Identify any existing pollution or contamination hazards within a minimum radius of 500 m from the proposed drill targets. Historical land use that might pose a contamination hazard (i.e. tannery, industrial, disposal, etc.) should also be discussed:* . The site itself was woodland formerly.

8) *Identify any groundwater use problems (quantity or quality) that have occurred in the area.* None known at current time.

9) *Identify any watercourse(s) (stream, brook, river, wetland, etc.) within 60 m of the proposed drill targets.* Please see attached drawing, there are no surface watercourses within 60 meters of any of the proposed wells.

10) *Identify site supervisory personnel involved in the source development (municipal officials, consultants and drillers:* Mr. Doug Craig (Craig Hydrogeologic Inc., 506-659-3064),

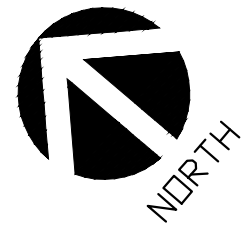
Mr. Donald Green, Greens Well Drilling Ltd. 506-369-2603), and Mr. Antoine LeGresley, P. Eng. (Breakwater Consulting Ltd., 506-622-0617).

- 11) *Attach a 1:10000 map and/or recent air photo clearly identifying the following:*
- *proposed location of drill targets and property PID*
  - *Domestic or production wells within a 500-m radius from the drill target(s)*
  - *Any potential hazards identified in question 7.*

Please see attached drawing.

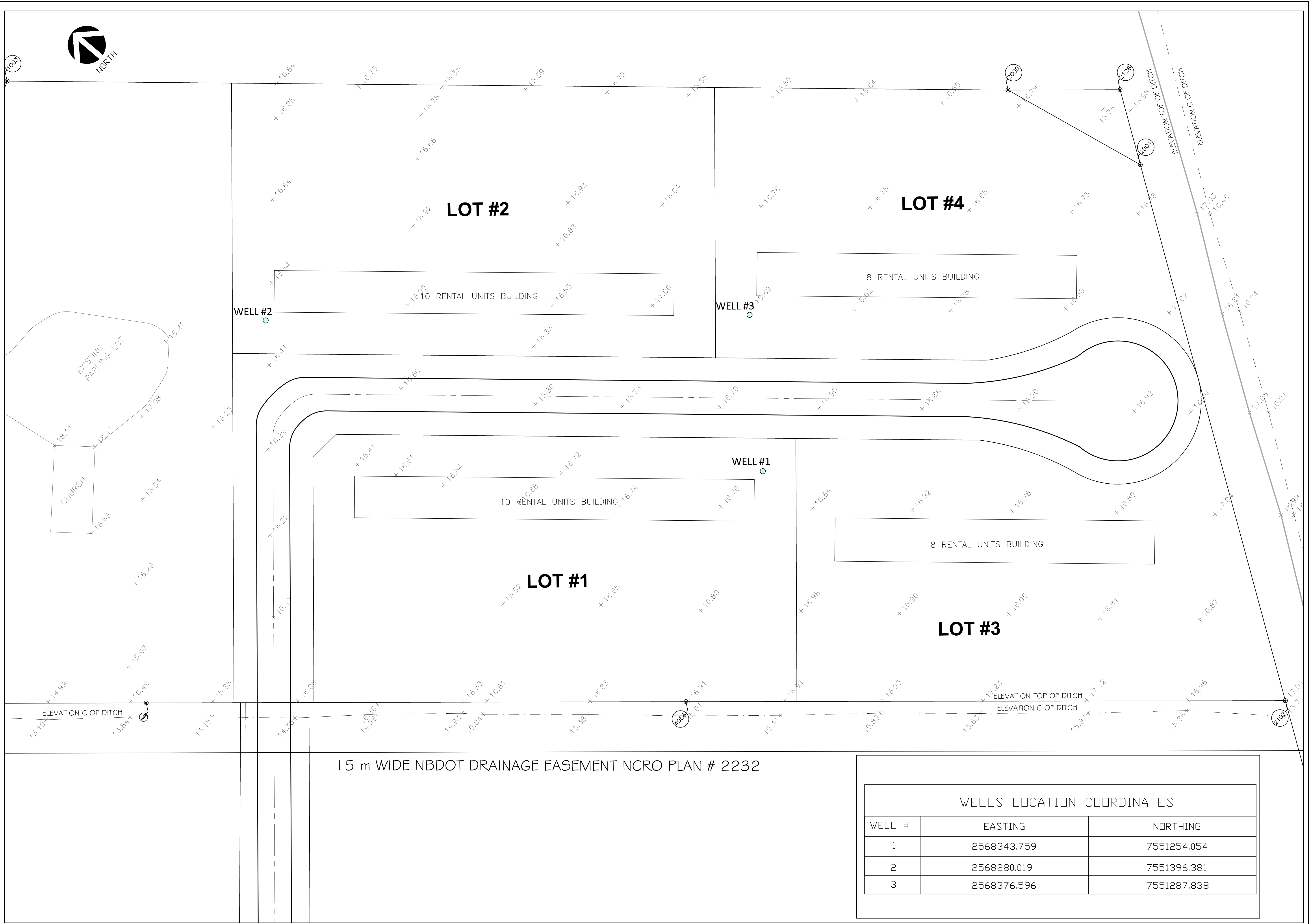
12) *Attach a land use/zoning map of the area (if any). Superimpose drill targets on this map:* Unable to locate zoning map, area appears un-zoned.

13) *Contingency plan for open loop earth energy systems:* Not Applicable



DRAWINGS AND SPECIFICATIONS, AS INSTRUMENTS OF SERVICE ARE THE PROPERTY OF BREAKWATER CONSULTANTS. THE COPYRIGHT IN THE SAME BEING RESERVED TO THEM, NO REPRODUCTION MAY BE MADE WITHOUT THE PERMISSION OF BREAKWATER AND WHEN MADE, MUST BEAR THE NAME, ALL PRINTS TO BE RETURNED TO BREAKWATER CONSULTANTS.

THE CONTRACTOR SHALL VERIFY DIMENSIONS AND DATA NOTED HEREIN WITH CONDITIONS ON THE SITE AND IS HELD RESPONSIBLE FOR REPORTING ANY DISCREPANCY TO BREAKWATER CONSULTING PRIOR TO COMMENCEMENT OF THE WORK.



NOTES



VICTORY BAPTIST FELLOWSHIP INC  
HIGHWAY 420 SOUTHEAST NB

PROJECT TITLE: 2019-074

SCALE	AS SHOWN
DATE	JAN 2020
DRAWN BY	AL
CHECK BY	AL

04	03/25/2020	FOR REVIEW #4
03	03/16/2020	FOR REVIEW #3
02	03/09/2020	FOR REVIEW #2
01	01/17/2020	FOR REVIEW

DATE PRINTED

SET NUMBER

SITE PLAN  
WELLS LOCATION

DRAWING NO. CI

15 m WIDE NBDOT DRAINAGE EASEMENT NCRO PLAN # 2232

WELLS LOCATION COORDINATES

WELL #	EASTING	NORTHING
1	2568343.759	7551254.054
2	2568280.019	7551396.381
3	2568376.596	7551287.838

SITE PLAN  
SCALE: 1:500

(A)  
CI



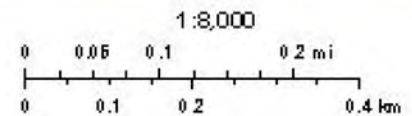


2020-06-18, 1:59:19 p.m.

● Probable Well

□ parcels

Municipal Areas below 32k



Government of New Brunswick / Gouvernement du Nouveau-Brunswick

GeoNB

This map is a graphical representation which approximates the size, configuration and location of features. This map is not intended to be used for legal descriptions or to calculate exact dimensions or area.

South Esk Victory Baptist Fellowship Inc.

100 meter radius around PID 40141418

Well Depth (Feet)	Estimated Yield (igpm)	Depth to Bedrock (Feet)	Casing Length (Feet)
105	12	25	42
96	10	21	44
94	10	15	44
104	12	28	45
100	10	28	30
82	30	18	40
80	13	12	32
84	12	22	26
100	12	12	41
Well Depth (Feet)	Estimated Yield (igpm)	Depth to Bedrock (Feet)	Casing Length (Feet)

Median	96	12	21	41	Median
average	93.9	13.4	20.1	38.2	AVERAGI
max	105	30	28	45	max
min	80	10	12	26	min
count	9				

**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Work Type	Drill Method	Work Completed
Well Use Drinking Water, Domestic	New Well	Rotary	06/05/2003

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
221	Steel	6 inch	0ft	42ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Air	25ft <i>(BTC - Below top of casing)</i>	12 igpm	0hr	0ft	12 igpm	No	0 igpm

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 80ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
221	0ft	25ft	Brown	Clay and Sand
221	25ft	35ft	Brown	Sandstone
221	35ft	105ft	Grey	Sandstone

Overall Well Depth  
105ft  
Bedrock Level  
25ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
221	70ft	4 igpm
221	90ft	8 igpm

Setbacks		
Well Log	Distance	Setback From
221	85ft	Septic Tank
221	100ft	Leach Field
221	110ft	Right of any Public Way Road

**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Well Use	Work Type	Drill Method	Work Completed
	Drinking Water, Domestic	New Well	Cable Tool	06/10/2003

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
6419	Steel	5 inch	0ft	44ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Bailer	25ft	10 igpm	1hr	25ft	10 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

<b>Well Grouting</b>
There is no Grout information.

Drilling Fluids Used	Disinfectant	Pump Installed
None	Bleach (Javex)	N/A
	Qty 0 ig	Intake Setting (BTC) 80ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
6419	0ft	2ft	Brown	Fill
6419	2ft	3ft	Brown	Topsoil
6419	3ft	12ft	Grey	Clay and Sand
6419	12ft	21ft	Brown	Clay
6419	21ft	41ft	Brown	Sandstone
6419	41ft	96ft	Grey	Sandstone

Overall Well Depth  
96ft  
Bedrock Level  
21ft

<b>Water Bearing Fracture Zone</b>
There is no water bearing fracture zone information.

Setbacks		
Well Log	Distance	Setback From
6419	50ft	Septic Tank
6419	70ft	Leach Field

**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Well Use	Work Type	Drill Method	Work Completed
	Drinking Water, Domestic	New Well	Cable Tool	07/02/2003

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
6424	Steel	5 inch	0ft	44ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Bailer	32ft	10 igpm	1hr	32ft	10 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting			
Well Log	Grout Type	From	End
6424	Clay(cuttings)	5ft	46ft

Drilling Fluids Used	Disinfectant	Pump Installed
None	Bleach (Javex)	N/A
	Qty 0 ig	Intake Setting (BTC)
		80ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
6424	0ft	3ft	Brown	Fill
6424	3ft	5ft	Brown	Soil
6424	5ft	12ft	Red	Clay
6424	12ft	15ft	Brown	Sand and Gravel
6424	15ft	40ft	Brown	Sandstone
6424	40ft	94ft	Grey	Sandstone

Overall Well Depth  
94ft  
Bedrock Level  
15ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
6424	65ft	2 igpm
6424	90ft	10 igpm

Setbacks		
Well Log	Distance	Setback From
6424	20ft	Septic Tank
6424	70ft	Leach Field

**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Well Use	Work Type	Drill Method	Work Completed
	Drinking Water, Domestic	New Well		10/21/2002

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
6544	Steel	5 inch	0ft	45ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
	35ft	12 igpm	1hr	86ft	0 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting
There is no Grout information.

Drilling Fluids Used	Disinfectant	Pump Installed
None	N/A	N/A
	Qty 0 ig	Intake Setting (BTC) 86ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
6544	0ft	28ft	Brown	Clay
6544	28ft	42ft	Brown	Sandstone
6544	42ft	43ft	Brown	Granite
6544	43ft	63ft	Brown	Sandstone
6544	63ft	104ft	Grey	Sandstone

Overall Well Depth  
104ft  
Bedrock Level  
28ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
6544	104ft	12 igpm

Setbacks		
Well Log	Distance	Setback From
6544	150ft	Right of any Public Way Road

**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Well Use	Work Type	Drill Method	Work Completed
	Drinking Water, Domestic	New Well	Cable Tool	10/25/2006

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
15097	Steel	5 1/2 Inch	0ft	30ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Bailer	26ft	10 igpm	1hr	26ft	10 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting			
Well Log	Grout Type	From	End
15097	Clay(cuttings)	5ft	30ft

Drilling Fluids Used	Disinfectant	Pump Installed
None	Bleach (Javex)	N/A
	Qty 0 ig	Intake Setting (BTC) 70ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
15097	24ft	28ft	Brown	Clay
15097	0ft	2ft	Brown	Fill
15097	2ft	4ft	Red	Clay
15097	4ft	24ft	Grey	Clay
15097	28ft	68ft	Brown	Sandstone
15097	68ft	100ft	Grey	Sandstone

Overall Well Depth  
100ft  
Bedrock Level  
28ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
15097	45ft	1 igpm
15097	95ft	10 igpm

Setbacks		
Well Log	Distance	Setback From
15097	50ft	Septic Tank
15097	76ft	Leach Field

**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Well Use	Work Type	Drill Method	Work Completed
	Drinking Water, Domestic	New Well	Rotary	10/04/2016

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
38796	Steel	6 inch	0ft	40ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
	40ft	30 igpm	1hr	40ft	30 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting
There is no Grout information.

Drilling Fluids Used	Disinfectant	Pump Installed
None	12% NaOCl	Submersible
	Qty 0 ig	Intake Setting (BTC)
		70ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
38796	34ft	82ft	Grey	Sandstone
38796	0ft	18ft	Brown	Clay
38796	18ft	34ft	Brown	Sandstone

Overall Well Depth  
82ft  
Bedrock Level  
18ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
38796	55ft	3 igpm
38796	74ft	21 igpm

Setbacks		
Well Log	Distance	Setback From
38796	120ft	Right of any Public Way Road
38796	80ft	Septic Tank
38796	95ft	Leach Field
38796	125ft	Right of any Public Way Road



**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Work Type	Drill Method	Work Completed
Well Use	New Well (NEW WELL)	Cable Tool (CABLE TOOL)	08/15/1995
Drinking Water, Domestic			

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
90410200	Steel	5 inch	0ft	32ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Bailer	0ft	10 igpm	1hr	25ft	13 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting	Drilling Fluids Used	Disinfectant	Pump Installed
There is no Grout information.	None	N/A	N/A
		Qty 0 ig	Intake Setting (BTC) 70ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
90410200	0ft	4ft	Brown	Fill
90410200	4ft	12ft	Brown	Clay
90410200	12ft	28ft	Brown	Sandstone
90410200	28ft	52ft	Grey	Sandstone
90410200	52ft	80ft	Brown	Sandstone

Overall Well Depth  
80ft  
Bedrock Level  
12ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
90410200	52ft	3 igpm
90410200	76ft	10 igpm

Setbacks
There is no Setback information.

**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Well Use	Work Type	Drill Method	Work Completed
	Drinking Water, Domestic	New Well (NEW WELL)	Cable Tool (CABLE TOOL)	06/18/1998

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
91141400	Steel	5 inch	0ft	26ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Bailer	25ft	12 igpm	1hr	25ft	12 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting
There is no Grout information.

Drilling Fluids Used	Disinfectant	Pump Installed
None	Bleach (Javex)	N/A
	Qty 0 ig	Intake Setting (BTC) 60ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
91141400	0ft	4ft	Brown	Fill
91141400	4ft	18ft	Brown	Sand
91141400	18ft	24ft	Brown	Sandstone
91141400	24ft	84ft	Grey	Sandstone

Overall Well Depth  
84ft  
Bedrock Level  
22ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
91141400	48ft	2 igpm
91141400	80ft	12 igpm

Setbacks
There is no Setback information.

**Well Driller's Report**

Date printed 6/17/2020

Drilled by	Well Use	Work Type	Drill Method	Work Completed
	Drinking Water, Domestic	New Well	Cable Tool	05/19/2001

Casing Information		Casing above ground			Drive Shoe Used?
Well Log	Casing Type	Diameter	From	End	Slotted?
92035700	Steel	5 inch	0ft	41ft	

Aquifer Test/Yield							
Method	Initial Water Level (BTC)	Pumping Rate	Duration	Final Water Level (BTC)	Estimated Safe Yield	Flowing Well?	Rate
Bailer	20ft	12 igpm	0hr	18ft	12 igpm	No	0 igpm
<i>(BTC - Below top of casing)</i>							

Well Grouting
There is no Grout information.

Drilling Fluids Used	Disinfectant	Pump Installed
None	Bleach (Javex)	N/A
	Qty 0.5 ig	Intake Setting (BTC) 70ft

Driller's Log				
Well Log	From	End	Colour	Rock Type
92035700	12ft	36ft	Brown	Sandstone
92035700	0ft	4ft	Brown	Fill
92035700	4ft	12ft	Brown	Clay
92035700	36ft	72ft	Grey	Sandstone
92035700	72ft	100ft	Brown	Sandstone

Overall Well Depth  
100ft  
Bedrock Level  
12ft

Water Bearing Fracture Zone		
Well Log	Depth	Rate
92035700	96ft	12 igpm
92035700	72ft	3 igpm

Setbacks
There is no Setback information.

**Appendice D**

**Atlantic Canada Conservation  
Data Centre report**

# DATA REPORT 6581: Miramichi, NB

Prepared 1 April 2020  
by C. Robicheau, Data Manager

## CONTENTS OF REPORT

### 1.0 Preface

- 1.1 Data List
- 1.2 Restrictions
- 1.3 Additional Information
- Map 1: Buffered Study Area

### 2.0 Rare and Endangered Species

- 2.1 Flora
- 2.2 Fauna
- Map 2: Flora and Fauna

### 3.0 Special Areas

- 3.1 Managed Areas
- 3.2 Significant Areas
- Map 3: Special Areas

### 4.0 Rare Species Lists

- 4.1 Fauna
- 4.2 Flora
- 4.3 Location Sensitive Species
- 4.4 Source Bibliography

### 5.0 Rare Species within 100 km

- 5.1 Source Bibliography



**Map 1.** A 100 km buffer around the study area

## 1.0 PREFACE

The Atlantic Canada Conservation Data Centre (AC CDC; [www.accdc.com](http://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:

<u>Filename</u>	<u>Contents</u>
MiramichiNB_6581ob.xls	Rare and legally protected Flora and Fauna in your study area
MiramichiNB_6581ob100km.xls	A list of Rare and legally protected Flora and Fauna within 100 km of your study area
MiramichiNB_6581ma.xls	Managed Areas in your study area
MiramichiNB_6581sa.xls	Significant Natural Areas in your study area
MiramichiNB_6581ff.xls	Rare and common 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

Tel: (506) 364-2658

[sean.blaney@accdc.ca](mailto:sean.blaney@accdc.ca)

### Animals (Fauna)

John Klymko, Zoologist

Tel: (506) 364-2660

[john.klymko@accdc.ca](mailto:john.klymko@accdc.ca)

### Plant Communities

Sarah Robinson, Community Ecologist

Tel: (506) 364-2664

[sarah.robinson@accdc.ca](mailto:sarah.robinson@accdc.ca)

### Data Management, GIS

James Churchill, Data Manager

Tel: (902) 679-6146

[james.churchill@accdc.ca](mailto:james.churchill@accdc.ca)

### Billing

Jean Breau

Tel: (506) 364-2657

[jean.breau@accdc.ca](mailto:jean.breau@accdc.ca)

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

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

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

**Western:** Emma Vost  
(902) 670-8187

[Duncan.Bayne@novascotia.ca](mailto:Duncan.Bayne@novascotia.ca)

**Western:** Sarah Spencer  
(902) 634-7555

[Sarah.Spencer@novascotia.ca](mailto:Sarah.Spencer@novascotia.ca)

**Central:** Shavonne Meyer  
(902) 893-6350

[Shavonne.Meyer@novascotia.ca](mailto:Shavonne.Meyer@novascotia.ca)

**Central:** Kimberly George  
(902) 890-1046

[Kimberly.George@novascotia.ca](mailto:Kimberly.George@novascotia.ca)

**Eastern:** Lisa Doucette  
(902) 863-4513

[Lisa.Doucette@novascotia.ca](mailto:Lisa.Doucette@novascotia.ca)

**Eastern:** Terry Power  
(902) 563-3370

[Terrance.Power@novascotia.ca](mailto:Terrance.Power@novascotia.ca)

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

## 2.0 RARE AND ENDANGERED SPECIES

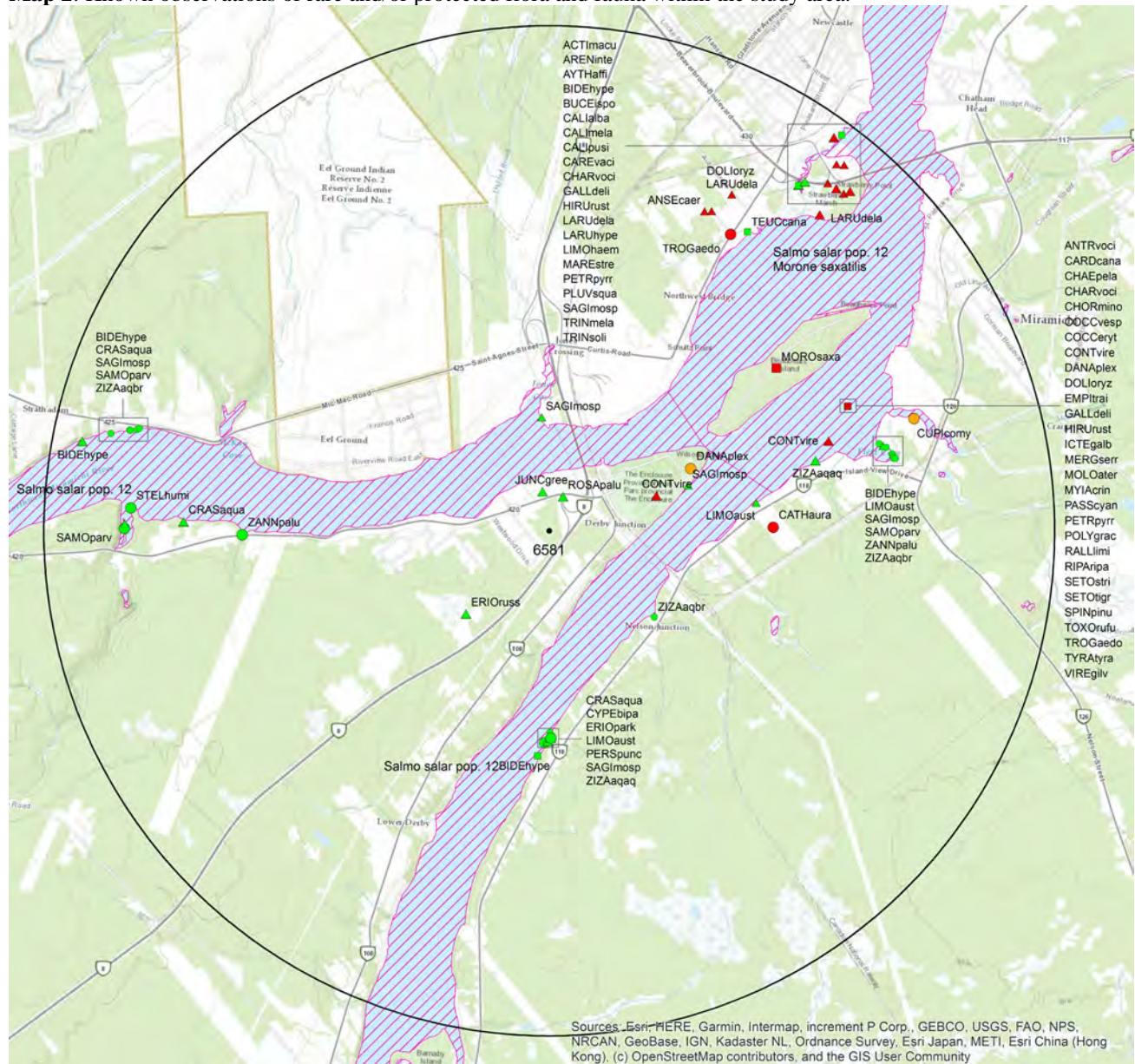
### 2.1 FLORA

The study area contains 58 records of 17 vascular and no records of nonvascular flora (Map 2 and attached: \*ob.xls).

### 2.2 FAUNA

The study area contains 514 records of 46 vertebrate and 4 records of 3 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 4 managed areas in the vicinity of the study area (Map 3 and attached file: \*ma\*.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: \*sa\*.xls).

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



**MANAGED AREAS      SIGNIFICANT AREAS**

-  boundary
-  boundary
-  approximate
-  approximate
-  point location



## 4.0 RARE SPECIES LISTS

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

### 4.1 FLORA

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	<i>Eriocaulon parkeri</i>	Parker's Pipewort	Not At Risk		Endangered	S2	1 At Risk	1	2.1 $\pm$ 1.0
P	<i>Cyperus bipartitus</i>	Shining Flatsedge				S1	2 May Be At Risk	1	2.1 $\pm$ 0.0
P	<i>Juncus greenei</i>	Greene's Rush				S1	2 May Be At Risk	1	0.4 $\pm$ 1.0
P	<i>Zizania aquatica</i> var. <i>brevis</i>	St. Lawrence Wild Rice				S1	2 May Be At Risk	4	1.3 $\pm$ 0.0
P	<i>Sagittaria montevidensis</i> ssp. <i>spongiosa</i>	Spongy Arrowhead				S2	4 Secure	15	1.1 $\pm$ 0.0
P	<i>Zizania aquatica</i> var. <i>aquatica</i>	Eastern Wild Rice				S2	5 Undetermined	2	2.1 $\pm$ 0.0
P	<i>Carex vacillans</i>	Estuarine Sedge				S2?	3 Sensitive	2	4.2 $\pm$ 1.0
P	<i>Bidens hyperborea</i>	Estuary Beggarticks				S3	4 Secure	10	2.2 $\pm$ 5.0
P	<i>Stellaria humifusa</i>	Saltmarsh Starwort				S3	4 Secure	1	4.1 $\pm$ 0.0
P	<i>Crassula aquatica</i>	Water Pygmyweed				S3	4 Secure	3	2.1 $\pm$ 1.0
P	<i>Teucrium canadense</i>	Canada Germander				S3	3 Sensitive	1	3.6 $\pm$ 5.0
P	<i>Persicaria punctata</i>	Dotted Smartweed				S3	4 Secure	1	2.1 $\pm$ 1.0
P	<i>Samolus parviflorus</i>	Seaside Brookweed				S3	4 Secure	9	3.4 $\pm$ 0.0
P	<i>Rosa palustris</i>	Swamp Rose				S3	4 Secure	1	0.4 $\pm$ 1.0
P	<i>Limosella australis</i>	Southern Mudwort				S3	4 Secure	3	2.1 $\pm$ 0.0
P	<i>Zannichellia palustris</i>	Horned Pondweed				S3	4 Secure	2	3.0 $\pm$ 0.0
P	<i>Eriophorum russeolum</i>	Russet Cottongrass				S3S4	4 Secure	1	1.2 $\pm$ 1.0

### 4.2 FAUNA

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
x	x	x	x	x	x	x	x	x	x
A	<i>Antrostomus vociferus</i>	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S2B,S2M	1 At Risk	2	3.2 $\pm$ 7.0
A	<i>Hirundo rustica</i>	Barn Swallow	Threatened	Threatened	Threatened	S2B,S2M	3 Sensitive	6	3.2 $\pm$ 7.0
A	<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	1 At Risk	4	3.2 $\pm$ 7.0
A	<i>Riparia riparia</i>	Bank Swallow	Threatened	Threatened		S2S3B,S2S3M	3 Sensitive	2	3.2 $\pm$ 7.0
A	<i>Cardellina canadensis</i>	Canada Warbler	Threatened	Threatened	Threatened	S3B,S3M	1 At Risk	1	3.2 $\pm$ 7.0
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened	Threatened	Threatened	S3B,S3M	3 Sensitive	7	3.2 $\pm$ 7.0
A	<i>Limosa haemastica</i>	Hudsonian Godwit	Threatened			S3S4M	4 Secure	1	4.4 $\pm$ 0.0
A	<i>Bucephala islandica</i> (Eastern pop.)	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern	Special Concern	S2M,S2N	3 Sensitive	3	4.6 $\pm$ 0.0
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Special Concern			S3B,S3S4N,SUM	3 Sensitive	1	3.2 $\pm$ 7.0
A	<i>Chordeiles minor</i>	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	1 At Risk	4	3.2 $\pm$ 7.0
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S4B,S4M	4 Secure	6	1.1 $\pm$ 1.0
A	<i>Morone saxatilis</i>	Striped Bass	E,E,SC			S3	2 May Be At Risk	1	2.8 $\pm$ 10.0
A	<i>Tringa melanoleuca</i>	Greater Yellowlegs				S1?B,S5M	4 Secure	85	4.4 $\pm$ 0.0
A	<i>Aythya affinis</i>	Lesser Scaup				S1B,S4M	4 Secure	2	4.4 $\pm$ 1.0
A	<i>Empidonax traillii</i>	Willow Flycatcher				S1S2B,S1S2M	3 Sensitive	2	3.2 $\pm$ 7.0
A	<i>Troglodytes aedon</i>	House Wren				S1S2B,S1S2M	5 Undetermined	2	3.2 $\pm$ 7.0
A	<i>Mimus polyglottos</i>	Northern Mockingbird				S2B,S2M	1 Sensitive	1	3.2 $\pm$ 7.0
A	<i>Toxostoma rufum</i>	Brown Thrasher				S2B,S2M	3 Sensitive	1	3.2 $\pm$ 7.0
A	<i>Mareca strepera</i>	Gadwall				S2B,S3M	4 Secure	1	4.6 $\pm$ 0.0
A	<i>Tringa solitaria</i>	Solitary Sandpiper				S2B,S5M	4 Secure	9	4.4 $\pm$ 0.0
A	<i>Anser caerulescens</i>	Snow Goose				S2M	4 Secure	2	3.5 $\pm$ 0.0
A	<i>Larus hyperboreus</i>	Glaucous Gull				S2N,S2M	4 Secure	1	4.6 $\pm$ 0.0
A	<i>Myiarchus crinitus</i>	Great Crested Flycatcher				S2S3B,S2S3M	3 Sensitive	2	3.2 $\pm$ 7.0

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow				S2S3B,S2S3M	3 Sensitive	5	3.2 ± 7.0
A	<i>Spinus pinus</i>	Pine Siskin				S3	4 Secure	3	3.2 ± 7.0
A	<i>Cathartes aura</i>	Turkey Vulture				S3B,S3M	4 Secure	1	2.2 ± 0.0
A	<i>Rallus limicola</i>	Virginia Rail				S3B,S3M	3 Sensitive	2	3.2 ± 7.0
A	<i>Charadrius vociferus</i>	Killdeer				S3B,S3M	3 Sensitive	74	3.2 ± 7.0
A	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo				S3B,S3M	4 Secure	1	3.2 ± 7.0
A	<i>Vireo gilvus</i>	Warbling Vireo				S3B,S3M	4 Secure	4	3.2 ± 7.0
A	<i>Passerina cyanea</i>	Indigo Bunting				S3B,S3M	4 Secure	1	3.2 ± 7.0
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B,S3M	2 May Be At Risk	2	3.2 ± 7.0
A	<i>Icterus galbula</i>	Baltimore Oriole				S3B,S3M	4 Secure	6	3.2 ± 7.0
A	<i>Setophaga tigrina</i>	Cape May Warbler				S3B,S4S5M	4 Secure	1	3.2 ± 7.0
A	<i>Anas acuta</i>	Northern Pintail				S3B,S5M	3 Sensitive	1	3.2 ± 7.0
A	<i>Mergus serrator</i>	Red-breasted Merganser				S3B,S5M,S4S5N	4 Secure	2	3.2 ± 7.0
A	<i>Arenaria interpres</i>	Ruddy Turnstone				S3M	4 Secure	4	4.4 ± 0.0
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B,S3S4M	3 Sensitive	4	3.2 ± 7.0
A	<i>Actitis macularia</i>	Spotted Sandpiper				S3S4B,S5M	4 Secure	123	3.2 ± 7.0
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B,S5M	4 Secure	27	3.2 ± 7.0
A	<i>Larus delawarensis</i>	Ring-billed Gull				S3S4B,S5M	4 Secure	4	3.8 ± 0.0
A	<i>Setophaga striata</i>	Blackpoll Warbler				S3S4B,S5M	4 Secure	2	3.2 ± 7.0
A	<i>Pluvialis squatarola</i>	Black-bellied Plover				S3S4M	4 Secure	11	4.4 ± 0.0
A	<i>Calidris pusilla</i>	Semipalmated Sandpiper				S3S4M	4 Secure	51	4.4 ± 0.0
A	<i>Calidris melanotos</i>	Pectoral Sandpiper				S3S4M	4 Secure	33	4.4 ± 0.0
A	<i>Calidris alba</i>	Sanderling				S3S4M,S1N	3 Sensitive	6	4.4 ± 0.0
I	<i>Danaus plexippus</i>	Monarch	Endangered	Special Concern	Special Concern	S3B,S3M	3 Sensitive	2	1.5 ± 0.0
I	<i>Polygonia gracilis</i>	Hoary Comma				S3	4 Secure	1	3.2 ± 7.0
I	<i>Cupido comyntas</i>	Eastern Tailed Blue				S3S4	4 Secure	1	3.8 ± 0.0

### 4.3 LOCATION SENSITIVE SPECIES

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

#### New Brunswick

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

<sup>1</sup> *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
410	Morrison, Guy. 2011. Maritime Shorebird Survey (MSS) database. Canadian Wildlife Service, Ottawa, 15939 surveys. 86171 recs.
46	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs.
37	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
19	eBird. 2014. eBird Basic Dataset. Version: EBD_relNov-2014. Ithaca, New York. Nov 2014. Cornell Lab of Ornithology, 25036 recs.
17	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2003.
17	Coursol, F. 2005. Dataset from New Brunswick fieldwork for <i>Eriocaulon parkeri</i> COSEWIC report. Coursol, Pers. comm. to C.S. Blaney, Aug 26. 110 recs.
9	Hinds, H.R. 1986. Notes on New Brunswick plant collections. Connell Memorial Herbarium, unpubl, 739 recs.
4	Benedict, B. Connell Herbarium Specimens (Data) . University New Brunswick, Fredericton. 2003.
4	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.
4	Dept of Fisheries & Oceans. 2001. Atlantic Salmon Maritime provinces overview for 2000. DFO.
3	Tims, J. & Craig, N. 1995. Environmentally Significant Areas in New Brunswick (NBESA). NB Dept of Environment & Nature Trust of New Brunswick Inc, 6042 recs.
3	Tims, J. & Craig, N. 1995. Environmentally Significant Areas in New Brunswick (NBESA). NB Dept of Environment & Nature Trust of New Brunswick Inc.
2	Dept of Fisheries & Oceans. 2001. Atlantic Salmon Maritime provinces overview for 2000. DFO.
2	Klymko, J. 2018. Maritimes Butterfly Atlas database. Atlantic Canada Conservation Data Centre.
2	Newell, R.E. 2000. E.C. Smith Herbarium Database. Acadia University, Wolfville NS, 7139 recs.
2	Thomas, A.W. 1996. A preliminary atlas of the butterflies of New Brunswick. New Brunswick Museum.
1	Atlantic Canada Conservation Area Database (ARCAD)
1	Benedict, B. Connell Herbarium Specimen Database Download 2004. Connell Memorial Herbarium, University of New Brunswick. 2004.
1	Bradford, R.G. et al. 1999. Update on the Status of Striped bass ( <i>Morone saxatilis</i> ) in eastern Canada in 1998.
1	Cdn Gazeteer
1	Dept of Fisheries & Oceans. 1999. Status of Wild Striped Bass, & Interaction between Wild & Cultured Striped Bass in the Maritime Provinces. , Science Stock Status Report D3-22. 13 recs.
1	EMR Place Names
1	Federal Lands db
1	Goltz, J.P. 2012. Field Notes, 1989-2005. , 1091 recs.
1	New York Botanical Garden. 2006. Virtual Plant Herbarium - Vascular Plant Types Catalog. Sylva, S.; Kallunki, J. (ed.) International Plant Science Centre, Web site: <a href="http://sciweb.nybg.org/science2/vii2.asp">http://sciweb.nybg.org/science2/vii2.asp</a> . 4 recs.

## 5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 23,251 records of 131 vertebrate and 963 records of 62 invertebrate fauna; 5433 records of 274 vascular and 278 records of 83 nonvascular flora (attached: \*ob100km.xls).

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

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>Myotis lucifugus</i>	Little Brown Myotis	Endangered	Endangered	Endangered	S1	1 At Risk	1	52.7 $\pm$ 1.0	NB
A	<i>Charadrius melodus melodus</i>	Piping Plover <i>melodus</i> ssp	Endangered	Endangered	Endangered	S1B,S1M	1 At Risk	2614	25.7 $\pm$ 0.0	NB
A	<i>Dermodochelys coriacea</i> (Atlantic pop.)	Leatherback Sea Turtle - Atlantic pop.	Endangered	Endangered	Endangered	S1S2N	1 At Risk	4	50.9 $\pm$ 1.0	NB
A	<i>Salmo salar pop. 1</i>	Atlantic Salmon - Inner Bay of Fundy pop.	Endangered	Endangered	Endangered	S2	2 May Be At Risk	425	84.0 $\pm$ 0.0	NB
A	<i>Calidris canutus rufa</i>	Red Knot <i>rufa</i> ssp	Endangered	Endangered	Endangered	S2M	1 At Risk	229	32.8 $\pm$ 0.0	NB
A	<i>Rangifer tarandus pop. 2</i>	Woodland Caribou (Atlantic-Gasp /-sie pop.)	Endangered	Endangered	Extirpated	SX	0.1 Extirpated	6	16.7 $\pm$ 5.0	NB
A	<i>Sturnella magna</i>	Eastern Meadowlark	Threatened	Threatened	Threatened	S1B,S1M	2 May Be At Risk	6	6.0 $\pm$ 7.0	NB
A	<i>Ixobrychus exilis</i>	Least Bittern	Threatened	Threatened	Threatened	S1S2B,S1S2M	1 At Risk	1	97.9 $\pm$ 0.0	NB
A	<i>Hylocichla mustelina</i>	Wood Thrush	Threatened	Threatened	Threatened	S1S2B,S1S2M	2 May Be At Risk	56	10.8 $\pm$ 7.0	NB
A	<i>Antrostomus vociferus</i>	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S2B,S2M	1 At Risk	49	3.2 $\pm$ 7.0	NB
A	<i>Hirundo rustica</i>	Barn Swallow	Threatened	Threatened	Threatened	S2B,S2M	3 Sensitive	654	3.2 $\pm$ 7.0	NB
A	<i>Catharus bicknelli</i>	Bicknell's Thrush	Threatened	Special Concern	Threatened	S2B,S2M	1 At Risk	551	39.6 $\pm$ 7.0	NB
A	<i>Glyptemys insculpta</i>	Wood Turtle	Threatened	Threatened	Threatened	S2S3	1 At Risk	778	0.9 $\pm$ 0.0	NB
A	<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	1 At Risk	243	3.2 $\pm$ 7.0	NB
A	<i>Riparia riparia</i>	Bank Swallow	Threatened	Threatened	Threatened	S2S3B,S2S3M	3 Sensitive	376	3.2 $\pm$ 7.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>Cardellina canadensis</i>	Canada Warbler	Threatened	Threatened	Threatened	S3B,S3M	1 At Risk	492	3.2 ± 7.0	NB
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened	Threatened	Threatened	S3B,S3M	3 Sensitive	531	3.2 ± 7.0	NB
A	<i>Limosa haemastica</i>	Hudsonian Godwit	Threatened			S3S4M	4 Secure	162	4.4 ± 0.0	NB
A	<i>Anguilla rostrata</i>	American Eel	Threatened		Threatened	S4	4 Secure	33	20.6 ± 1.0	NB
A	<i>Histrionicus histrionicus pop. 1</i>	Harlequin Duck - Eastern pop.	Special Concern	Special Concern	Endangered	S1B,S1S2N,S2M	1 At Risk	4	65.0 ± 0.0	NB
A	<i>Falco peregrinus pop. 1</i>	Peregrine Falcon - anatum/tundrius	Special Concern	Special Concern	Endangered	S1B,S3M	1 At Risk	11	6.8 ± 20.0	NB
A	<i>Asio flammeus</i>	Short-eared Owl	Special Concern	Special Concern	Special Concern	S2B,S2M	3 Sensitive	8	48.6 ± 0.0	NB
A	<i>Bucephala islandica (Eastern pop.)</i>	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern	Special Concern	S2M,S2N	3 Sensitive	57	4.6 ± 0.0	NB
A	<i>Chelydra serpentina</i>	Snapping Turtle	Special Concern	Special Concern	Special Concern	S3	3 Sensitive	2	8.6 ± 0.0	NB
A	<i>Euphagus carolinus</i>	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S3B,S3M	2 May Be At Risk	198	7.2 ± 7.0	NB
A	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S3B,S3M	1 At Risk	613	7.2 ± 7.0	NB
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Special Concern			S3B,S3S4N,SUM	3 Sensitive	387	3.2 ± 7.0	NB
A	<i>Chordeiles minor</i>	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	1 At Risk	398	3.2 ± 7.0	NB
A	<i>Phalaropus lobatus</i>	Red-necked Phalarope	Special Concern			S3M	3 Sensitive	3	81.8 ± 1.0	NB
A	<i>Chrysemys picta picta</i>	Eastern Painted Turtle	Special Concern			S4	4 Secure	11	48.6 ± 0.0	NB
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S4B,S4M	4 Secure	416	1.1 ± 1.0	NB
A	<i>Podiceps auritus</i>	Horned Grebe	Special Concern		Special Concern	S4N,S4M	4 Secure	1	74.0 ± 3.0	NB
A	<i>Bubo scandiacus</i>	Snowy Owl	Not At Risk			S1N,S2S3M	4 Secure	13	62.4 ± 29.0	NB
A	<i>Accipiter cooperii</i>	Cooper's Hawk	Not At Risk			S1S2B,S1S2M	2 May Be At Risk	3	80.6 ± 1.0	NB
A	<i>Fulica americana</i>	American Coot	Not At Risk			S1S2B,S1S2M	3 Sensitive	7	13.4 ± 1.0	NB
A	<i>Aegolius funereus</i>	Boreal Owl	Not At Risk			S1S2B,SUM	2 May Be At Risk	12	19.7 ± 0.0	NB
A	<i>Sorex dispar</i>	Long-tailed Shrew	Not At Risk	Special Concern		S2	3 Sensitive	16	70.5 ± 1.0	NB
A	<i>Buteo lineatus</i>	Red-shouldered Hawk	Not At Risk	Special Concern		S2B,S2M	2 May Be At Risk	8	11.4 ± 0.0	NB
A	<i>Chlidonias niger</i>	Black Tern	Not At Risk			S2B,S2M	3 Sensitive	6	49.7 ± 7.0	NB
A	<i>Globicephala melas</i>	Long-finned Pilot Whale	Not At Risk			S2S3		1	43.6 ± 1.0	NB
A	<i>Lynx canadensis</i>	Canadian Lynx	Not At Risk		Endangered	S3	1 At Risk	41	23.3 ± 0.0	NB
A	<i>Sterna hirundo</i>	Common Tern	Not At Risk			S3B,SUM	3 Sensitive	615	31.2 ± 1.0	NB
A	<i>Podiceps grisegena</i>	Red-necked Grebe	Not At Risk			S3M,S2N	3 Sensitive	7	12.9 ± 0.0	NB
A	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Not At Risk		Endangered	S4	1 At Risk	354	1.3 ± 0.0	NB
A	<i>Canis lupus</i>	Gray Wolf	Not At Risk		Extirpated	SX	0.1 Extirpated	1	43.7 ± 100.0	NB
A	<i>Puma concolor pop. 1</i>	Eastern Cougar	Data Deficient		Endangered	SNA	5 Undetermined	48	5.9 ± 1.0	NB
A	<i>Morone saxatilis</i>	Striped Bass	E,E,SC			S3	2 May Be At Risk	16	2.8 ± 10.0	NB
A	<i>Odobenus rosmarus pop. 5</i>	Atlantic Walrus - Nova Scotia-Newfoundland-Gulf of St. Lawrence population (DU3)	X			SX		3	48.8 ± 1.0	NB
A	<i>Salvelinus alpinus</i>	Arctic Char				S1	3 Sensitive	10	68.6 ± 1.0	NB
A	<i>Synaptomys borealis sphagnicola</i>	Northern Bog Lemming				S1		3	51.8 ± 1.0	NB
A	<i>Tringa melanoleuca</i>	Greater Yellowlegs				S1?B,S5M	4 Secure	816	4.4 ± 0.0	NB
A	<i>Aythya americana</i>	Redhead				S1B,S1M	8 Accidental	1	81.8 ± 1.0	NB
A	<i>Antigone canadensis</i>	Sandhill Crane				S1B,S1M	8 Accidental	6	24.2 ± 1.0	NB
A	<i>Bartramia longicauda</i>	Upland Sandpiper				S1B,S1M	3 Sensitive	14	59.0 ± 7.0	NB
A	<i>Phalaropus tricolor</i>	Wilson's Phalarope				S1B,S1M	3 Sensitive	11	81.0 ± 7.0	NB
A	<i>Leucophaeus atricilla</i>	Laughing Gull				S1B,S1M	3 Sensitive	1	52.7 ± 0.0	NB
A	<i>Progne subis</i>	Purple Martin				S1B,S1M	2 May Be At Risk	20	21.8 ± 7.0	NB
A	<i>Thryothorus ludovicianus</i>	Carolina Wren				S1B,S1M	8 Accidental	1	10.4 ± 0.0	NB
A	<i>Oxyura jamaicensis</i>	Ruddy Duck				S1B,S2S3M	4 Secure	11	49.9 ± 0.0	NB
A	<i>Uria aalge</i>	Common Murre				S1B,S3N,S3M	4 Secure	3	96.3 ± 0.0	NB
A	<i>Aythya affinis</i>	Lesser Scaup				S1B,S4M	4 Secure	68	4.4 ± 1.0	NB
A	<i>Aythya marila</i>	Greater Scaup				S1B,S4M,S2N	4 Secure	17	49.7 ± 12.0	NB
A	<i>Eremophila alpestris</i>	Horned Lark				S1B,S4N,S5M	2 May Be At Risk	107	10.8 ± 7.0	NB
A	<i>Sterna paradisaea</i>	Arctic Tern				S1B,SUM	2 May Be At Risk	34	31.2 ± 0.0	NB
A	<i>Chroicocephalus ridibundus</i>	Black-headed Gull				S1N,S2M	3 Sensitive	6	80.5 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>Branta bernicla</i>	Brant				S1N,S2S3M	4 Secure	55	49.0 ± 10.0	NB
A	<i>Butorides virescens</i>	Green Heron				S1S2B,S1S2M	3 Sensitive	2	81.0 ± 7.0	NB
A	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron				S1S2B,S1S2M	3 Sensitive	72	19.5 ± 1.0	NB
A	<i>Empidonax traillii</i>	Willow Flycatcher				S1S2B,S1S2M	3 Sensitive	19	3.2 ± 7.0	NB
A	<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow				S1S2B,S1S2M	2 May Be At Risk	5	53.5 ± 1.0	NB
A	<i>Troglodytes aedon</i>	House Wren				S1S2B,S1S2M	5 Undetermined	4	3.2 ± 7.0	NB
A	<i>Rissa tridactyla</i>	Black-legged Kittiwake				S1S2B,S4N,S5M	4 Secure	19	90.5 ± 0.0	NB
A	<i>Calidris bairdii</i>	Baird's Sandpiper				S1S2M	3 Sensitive	13	49.6 ± 0.0	NB
A	<i>Microtus chrotorrhinus</i>	Rock Vole				S2?	5 Undetermined	29	85.5 ± 1.0	NB
A	<i>Cistothorus palustris</i>	Marsh Wren				S2B,S2M	3 Sensitive	1	97.5 ± 0.0	NB
A	<i>Mimus polyglottos</i>	Northern Mockingbird				S2B,S2M	3 Sensitive	49	3.2 ± 7.0	NB
A	<i>Toxostoma rufum</i>	Brown Thrasher				S2B,S2M	3 Sensitive	39	3.2 ± 7.0	NB
A	<i>Poocetes gramineus</i>	Vesper Sparrow				S2B,S2M	2 May Be At Risk	82	17.1 ± 7.0	NB
A	<i>Mareca strepera</i>	Gadwall				S2B,S3M	4 Secure	48	4.6 ± 0.0	NB
A	<i>Alca torda</i>	Razorbill				S2B,S3N,S3M	4 Secure	7	95.5 ± 14.0	NB
A	<i>Pinicola enucleator</i>	Pine Grosbeak				S2B,S4S5N,S4S5M	3 Sensitive	72	21.8 ± 7.0	NB
A	<i>Tringa solitaria</i>	Solitary Sandpiper				S2B,S5M	4 Secure	95	4.4 ± 0.0	NB
A	<i>Anser caerulescens</i>	Snow Goose				S2M	4 Secure	19	3.5 ± 0.0	NB
A	<i>Phalacrocorax carbo</i>	Great Cormorant				S2N,S2M	4 Secure	25	54.0 ± 1.0	NB
A	<i>Somateria spectabilis</i>	King Eider				S2N,S2M	4 Secure	2	74.0 ± 1.0	NB
A	<i>Larus hyperboreus</i>	Glaucous Gull				S2N,S2M	4 Secure	17	4.6 ± 0.0	NB
A	<i>Asio otus</i>	Long-eared Owl				S2S3	5 Undetermined	9	20.3 ± 1.0	NB
A	<i>Picoides dorsalis</i>	American Three-toed Woodpecker				S2S3	3 Sensitive	69	24.9 ± 0.0	NB
A	<i>Salmo salar</i>	Atlantic Salmon				S2S3	2 May Be At Risk	2110	20.6 ± 1.0	NB
A	<i>Spatula clypeata</i>	Northern Shoveler				S2S3B,S2S3M	4 Secure	61	6.7 ± 0.0	NB
A	<i>Myiarchus crinitus</i>	Great Crested Flycatcher				S2S3B,S2S3M	3 Sensitive	28	3.2 ± 7.0	NB
A	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow				S2S3B,S2S3M	3 Sensitive	303	3.2 ± 7.0	NB
A	<i>Pluvialis dominica</i>	American Golden-Plover				S2S3M	3 Sensitive	61	21.5 ± 2.0	NB
A	<i>Calcarius lapponicus</i>	Lapland Longspur				S2S3N,SUM	3 Sensitive	9	11.9 ± 0.0	NB
A	<i>Cephus grylle</i>	Black Guillemot				S3	4 Secure	33	72.5 ± 3.0	NB
A	<i>Loxia curvirostra</i>	Red Crossbill				S3	4 Secure	114	5.4 ± 0.0	NB
A	<i>Spinus pinus</i>	Pine Siskin				S3	4 Secure	292	3.2 ± 7.0	NB
A	<i>Prosopium cylindraceum</i>	Round Whitefish				S3	4 Secure	2	98.2 ± 0.0	NB
A	<i>Salvelinus namaycush</i>	Lake Trout				S3	3 Sensitive	4	83.4 ± 0.0	NB
A	<i>Sorex maritimensis</i>	Maritime Shrew				S3	4 Secure	39	32.0 ± 0.0	NB
A	<i>Eptesicus fuscus</i>	Big Brown Bat				S3	3 Sensitive	1	91.2 ± 0.0	NB
A	<i>Cathartes aura</i>	Turkey Vulture				S3B,S3M	4 Secure	15	2.2 ± 0.0	NB
A	<i>Rallus limicola</i>	Virginia Rail				S3B,S3M	3 Sensitive	16	3.2 ± 7.0	NB
A	<i>Charadrius vociferus</i>	Killdeer				S3B,S3M	3 Sensitive	596	3.2 ± 7.0	NB
A	<i>Tringa semipalmata</i>	Willet				S3B,S3M	3 Sensitive	286	24.4 ± 0.0	NB
A	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo				S3B,S3M	4 Secure	71	3.2 ± 7.0	NB
A	<i>Vireo gilvus</i>	Warbling Vireo				S3B,S3M	4 Secure	54	3.2 ± 7.0	NB
A	<i>Piranga olivacea</i>	Scarlet Tanager				S3B,S3M	4 Secure	90	13.0 ± 7.0	NB
A	<i>Passerina cyanea</i>	Indigo Bunting				S3B,S3M	4 Secure	23	3.2 ± 7.0	NB
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B,S3M	2 May Be At Risk	162	3.2 ± 7.0	NB
A	<i>Icterus galbula</i>	Baltimore Oriole				S3B,S3M	4 Secure	64	3.2 ± 7.0	NB
A	<i>Somateria mollissima</i>	Common Eider				S3B,S4M,S3N	4 Secure	111	48.1 ± 14.0	NB
A	<i>Setophaga tigrina</i>	Cape May Warbler				S3B,S4S5M	4 Secure	219	3.2 ± 7.0	NB
A	<i>Anas acuta</i>	Northern Pintail				S3B,S5M	3 Sensitive	123	3.2 ± 7.0	NB
A	<i>Mergus serrator</i>	Red-breasted Merganser				S3B,S5M,S4S5N	4 Secure	261	3.2 ± 7.0	NB
A	<i>Arenaria interpres</i>	Ruddy Turnstone				S3M	4 Secure	627	4.4 ± 0.0	NB
A	<i>Phalaropus fulicarius</i>	Red Phalarope				S3M	3 Sensitive	6	32.8 ± 0.0	NB
A	<i>Melanitta americana</i>	Black Scoter				S3M,S1S2N	3 Sensitive	128	31.2 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>Bucephala albeola</i>	Bufflehead				S3M,S2N	3 Sensitive	43	6.6 ± 0.0	NB
A	<i>Calidris maritima</i>	Purple Sandpiper				S3M,S3N	4 Secure	3	77.4 ± 0.0	NB
A	<i>Synaptomys cooperi</i>	Southern Bog Lemming				S3S4	4 Secure	12	32.0 ± 0.0	NB
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B,S3S4M	3 Sensitive	247	3.2 ± 7.0	NB
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B,S5M	4 Secure	1052	3.2 ± 7.0	NB
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B,S5M	4 Secure	379	3.2 ± 7.0	NB
A	<i>Larus delawarensis</i>	Ring-billed Gull				S3S4B,S5M	4 Secure	358	3.8 ± 0.0	NB
A	<i>Setophaga striata</i>	Blackpoll Warbler				S3S4B,S5M	4 Secure	705	3.2 ± 7.0	NB
A	<i>Pluvialis squatarola</i>	Black-bellied Plover				S3S4M	4 Secure	570	4.4 ± 0.0	NB
A	<i>Calidris pusilla</i>	Semipalmated Sandpiper				S3S4M	4 Secure	880	4.4 ± 0.0	NB
A	<i>Calidris melanotos</i>	Pectoral Sandpiper				S3S4M	4 Secure	127	4.4 ± 0.0	NB
A	<i>Calidris alba</i>	Sanderling				S3S4M,S1N	3 Sensitive	445	4.4 ± 0.0	NB
A	<i>Morus bassanus</i>	Northern Gannet				SHB,S5M	4 Secure	169	7.8 ± 0.0	NB
C	<i>Leucoraja ocellata pop. 1</i>	Winter Skate - Southern Gulf of St Lawrence pop.			Endangered			2	81.9 ± 0.0	NB
I	<i>Coenonympha nipisiquit</i>	Maritime Ringlet	Endangered	Endangered	Endangered	S1	1 At Risk	84	71.3 ± 7.0	NB
I	<i>Gomphus ventricosus</i>	Skillet Clubtail	Endangered		Endangered	S1S2	2 May Be At Risk	1	83.1 ± 0.0	NB
I	<i>Danaus plexippus</i>	Monarch	Endangered	Special Concern	Special Concern	S3B,S3M	3 Sensitive	26	1.5 ± 0.0	NB
I	<i>Ophiogomphus howei</i>	Pygmy Snaketail	Special Concern	Special Concern	Special Concern	S2	2 May Be At Risk	26	29.3 ± 0.0	NB
I	<i>Alasmidonta varicosa</i>	Brook Floater	Special Concern		Special Concern	S2	3 Sensitive	35	16.1 ± 0.0	NB
I	<i>Lampsilis cariosa</i>	Yellow Lampmussel	Special Concern	Special Concern	Special Concern	S2	3 Sensitive	4	83.0 ± 0.0	NB
I	<i>Bombus terricola</i>	Yellow-banded Bumblebee	Special Concern			S3?	3 Sensitive	17	45.7 ± 0.0	NB
I	<i>Coccinella transversoguttata richardsoni</i>	Transverse Lady Beetle	Special Concern			SH	2 May Be At Risk	9	53.8 ± 1.0	NB
I	<i>Appalachina sayana</i>	Spike-lip Crater	Not At Risk			S3?		1	90.6 ± 1.0	NB
I	<i>Erora laeta</i>	Early Hairstreak				S1	2 May Be At Risk	3	75.7 ± 7.0	NB
I	<i>Somatochlora septentrionalis</i>	Muskeg Emerald				S1	2 May Be At Risk	3	79.7 ± 0.0	NB
I	<i>Leucorrhinia patricia</i>	Canada Whiteface				S1	2 May Be At Risk	8	52.7 ± 1.0	NB
I	<i>Plebejus saepiolus</i>	Greenish Blue				S1S2	4 Secure	17	24.9 ± 7.0	NB
I	<i>Cicindela ancociscconensis</i>	Appalachian Tiger Beetle				S2	5 Undetermined	1	49.4 ± 0.0	NB
I	<i>Satyrrium calanus</i>	Banded Hairstreak				S2	3 Sensitive	1	47.2 ± 7.0	NB
I	<i>Strymon melinus</i>	Grey Hairstreak				S2	4 Secure	11	35.9 ± 1.0	NB
I	<i>Aeshna juncea</i>	Rush Darner				S2	3 Sensitive	1	79.7 ± 0.0	NB
I	<i>Somatochlora brevicincta</i>	Quebec Emerald				S2	5 Undetermined	8	80.0 ± 0.0	NB
I	<i>Somatochlora tenebrosa</i>	Clamp-Tipped Emerald				S2	5 Undetermined	5	31.1 ± 0.0	NB
I	<i>Ladona exusta</i>	White Corporal				S2	5 Undetermined	1	63.4 ± 0.0	NB
I	<i>Coenagrion interrogatum</i>	Subarctic Bluet				S2	3 Sensitive	12	20.9 ± 0.0	NB
I	<i>Chrysops delicatulus</i>	a Horse Fly				S2S3	3 Sensitive	1	38.6 ± 1.0	NB
I	<i>Callophrys henrici</i>	Henry's Elfin				S2S3	4 Secure	22	10.4 ± 3.0	NB
I	<i>Desmocerus palliatus</i>	Elderberry Borer				S3		2	39.6 ± 0.0	NB
I	<i>Hippodamia parenthesis</i>	Parenthesis Lady Beetle				S3	4 Secure	1	53.8 ± 1.0	NB
I	<i>Xylotrechus quadrimaculatus</i>	a Longhorned Beetle				S3		1	81.2 ± 1.0	NB
I	<i>Xylotrechus undulatus</i>	a Longhorned Beetle				S3		1	89.0 ± 1.0	NB
I	<i>Calathus gregarius</i>	a Ground Beetle				S3	4 Secure	1	84.1 ± 1.0	NB
I	<i>Hesperia sassacus</i>	Indian Skipper				S3	4 Secure	11	14.1 ± 0.0	NB
I	<i>Euphyes bimacula</i>	Two-spotted Skipper				S3	4 Secure	21	17.5 ± 0.0	NB
I	<i>Papilio brevicauda</i>	Short-tailed Swallowtail				S3	4 Secure	1	66.4 ± 0.0	NB
I	<i>Papilio brevicauda bretonensis</i>	Short-tailed Swallowtail				S3	4 Secure	99	48.4 ± 0.0	NB
I	<i>Lycaena hyllus</i>	Bronze Copper				S3	3 Sensitive	15	13.4 ± 0.0	NB
I	<i>Lycaena dospassosi</i>	Salt Marsh Copper				S3	4 Secure	127	23.8 ± 0.0	NB
I	<i>Satyrrium acadica</i>	Acadian Hairstreak				S3	4 Secure	6	71.3 ± 7.0	NB
I	<i>Callophrys polios</i>	Hoary Elfin				S3	4 Secure	43	7.9 ± 0.0	NB
I	<i>Callophrys eryphon</i>	Western Pine Elfin				S3	4 Secure	25	41.6 ± 10.0	NB
I	<i>Plebejus idas empetri</i>	Crowberry Blue				S3	4 Secure	27	52.2 ± 0.0	NB
I	<i>Speyeria aphrodite</i>	Aphrodite Fritillary				S3	4 Secure	6	21.8 ± 2.0	NB
I	<i>Boloria eunomia</i>	Bog Fritillary				S3	5 Undetermined	16	52.3 ± 2.0	NB
I	<i>Boloria bellona</i>	Meadow Fritillary				S3	4 Secure	13	26.3 ± 2.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
I	<i>Boloria chariclea</i>	Arctic Fritillary				S3	4 Secure	42	24.9 ± 7.0	NB
I	<i>Boloria chariclea grandis</i>	Purple Lesser Fritillary				S3	4 Secure	2	41.6 ± 10.0	NB
I	<i>Polygonia satyrus</i>	Satyr Comma				S3	4 Secure	15	26.3 ± 2.0	NB
I	<i>Polygonia gracilis</i>	Hoary Comma				S3	4 Secure	50	3.2 ± 7.0	NB
I	<i>Nymphalis l-album</i>	Compton Tortoiseshell				S3	4 Secure	5	18.0 ± 10.0	NB
I	<i>Gomphus abbreviatus</i>	Spine-crowned Clubtail				S3	4 Secure	14	17.4 ± 0.0	NB
I	<i>Dorocordulia lepida</i>	Petite Emerald				S3	4 Secure	5	82.9 ± 0.0	NB
I	<i>Somatochlora albicincta</i>	Ringed Emerald				S3	4 Secure	8	56.2 ± 1.0	NB
I	<i>Somatochlora cingulata</i>	Lake Emerald				S3	4 Secure	13	48.4 ± 0.0	NB
I	<i>Somatochlora forcipata</i>	Forcinate Emerald				S3	4 Secure	12	20.9 ± 0.0	NB
I	<i>Williamsonia fletcheri</i>	Ebony Boghaunter				S3	4 Secure	8	20.8 ± 0.0	NB
I	<i>Lestes eurinus</i>	Amber-Winged Spreadwing				S3	4 Secure	18	38.5 ± 1.0	NB
I	<i>Enallagma geminatum</i>	Skimming Bluet				S3	5 Undetermined	4	87.5 ± 0.0	NB
I	<i>Enallagma signatum</i>	Orange Bluet				S3	4 Secure	1	87.5 ± 0.0	NB
I	<i>Stylurus scudderii</i>	Zebra Clubtail				S3	4 Secure	3	30.8 ± 0.0	NB
I	<i>Alasmidonta undulata</i>	Triangle Floater				S3	3 Sensitive	5	45.7 ± 1.0	NB
I	<i>Leptodea ochracea</i>	Tidewater Mucket				S3	4 Secure	1	89.4 ± 0.0	NB
I	<i>Pantala hymenaea</i>	Spot-Winged Glider				S3B,S3M	4 Secure	1	98.8 ± 0.0	NB
I	<i>Satyrium liparops</i>	Striped Hairstreak				S3S4	4 Secure	31	5.6 ± 0.0	NB
I	<i>Satyrium liparops strigosum</i>	Striped Hairstreak				S3S4	4 Secure	2	45.6 ± 15.0	NB
I	<i>Cupido comyntas</i>	Eastern Tailed Blue				S3S4	4 Secure	10	3.8 ± 0.0	NB
N	<i>Pannaria lurida</i>	Wrinkled Shingle Lichen	Threatened			S1?	2 May Be At Risk	1	73.4 ± 1.0	NB
N	<i>Fuscopannaria leucosticta</i>	Rimmed Shingles Lichen	Threatened			S2	2 May Be At Risk	123	18.2 ± 0.0	NB
N	<i>Aulacomnium heterostichum</i>	One-sided Groove Moss				S1	2 May Be At Risk	1	49.0 ± 0.0	NB
N	<i>Campylostelium saxicola</i>	a Moss				S1	2 May Be At Risk	1	48.2 ± 0.0	NB
N	<i>Syntrichia ruralis</i>	a Moss				S1	2 May Be At Risk	1	95.3 ± 0.0	NB
N	<i>Zygodon viridissimus var. viridissimus</i>	a Moss				S1	2 May Be At Risk	1	47.0 ± 0.0	NB
N	<i>Leptogium hirsutum</i>	Jellyskin Lichen				S1	5 Undetermined	1	95.6 ± 0.0	NB
N	<i>Lathagium auriforme</i>	a tarpaper lichen				S1		1	95.2 ± 0.0	NB
N	<i>Phaeophyscia hispidula</i>	Whiskered Shadow Lichen				S1		1	95.6 ± 0.0	NB
N	<i>Cinclidium stygium</i>	Sooty Cupola Moss				S1?	2 May Be At Risk	1	92.5 ± 0.0	NB
N	<i>Dicranum bonjeanii</i>	Bonjean's Broom Moss				S1?	2 May Be At Risk	1	61.6 ± 1.0	NB
N	<i>Homomallium adnatum</i>	Adnate Hairy-gray Moss				S1?	2 May Be At Risk	1	47.1 ± 0.0	NB
N	<i>Paludella squarrosa</i>	Tufted Fen Moss				S1?	2 May Be At Risk	1	92.5 ± 0.0	NB
N	<i>Seligeria recurvata</i>	a Moss				S1?	2 May Be At Risk	1	96.0 ± 15.0	NB
N	<i>Rhizomnium pseudopunctatum</i>	Felted Leafy Moss				S1?	2 May Be At Risk	1	52.1 ± 0.0	NB
N	<i>Cetraria arenaria</i>	Sand-loving Icelandmoss Lichen				S1?		1	50.1 ± 0.0	NB
N	<i>Cephaloziella spinigera</i>	Spiny Threadwort				S1S2	6 Not Assessed	2	79.2 ± 0.0	NB
N	<i>Odontoschisma sphagni</i>	Bog-Moss Flapwort				S1S2	6 Not Assessed	1	52.3 ± 0.0	NB
N	<i>Pallavicinia lyellii</i>	Lyell's Ribbonwort				S1S2	6 Not Assessed	1	42.9 ± 1.0	NB
N	<i>Reboulia hemisphaerica</i>	Purple-margined Liverwort				S1S2	6 Not Assessed	2	94.8 ± 0.0	NB
N	<i>Drummondia prorepens</i>	a Moss				S1S2	2 May Be At Risk	1	48.7 ± 0.0	NB
N	<i>Seligeria brevifolia</i>	a Moss				S1S2	3 Sensitive	4	47.1 ± 0.0	NB
N	<i>Calypogeia neesiana</i>	Nees' Pouchwort				S1S3	6 Not Assessed	1	72.7 ± 1.0	NB
N	<i>Meesia triquetra</i>	Three-ranked Cold Moss				S2	2 May Be At Risk	1	87.8 ± 10.0	NB
N	<i>Platydictya jungermannioides</i>	False Willow Moss				S2	3 Sensitive	1	96.0 ± 15.0	NB
N	<i>Pohlia elongata</i>	Long-necked Nodding Moss				S2	3 Sensitive	4	48.2 ± 0.0	NB
N	<i>Pohlia sphagnicola</i>	a moss				S2	3 Sensitive	1	52.3 ± 0.0	NB
N	<i>Sphagnum lindbergii</i>	Lindberg's Peat Moss				S2	3 Sensitive	1	53.0 ± 0.0	NB
N	<i>Sphagnum flexuosum</i>	Flexuous Peatmoss				S2	3 Sensitive	2	42.9 ± 0.0	NB
N	<i>Tayloria serrata</i>	Serrate Trumpet Moss				S2	3 Sensitive	1	99.5 ± 1.0	NB
N	<i>Tetradontium brownianum</i>	Little Georgia				S2	3 Sensitive	5	48.2 ± 0.0	NB
N	<i>Nephroma laevigatum</i>	Mustard Kidney Lichen				S2	2 May Be At Risk	1	54.9 ± 0.0	NB
N	<i>Peltigera lepidophora</i>	Scaly Pelt Lichen				S2	5 Undetermined	3	96.5 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
N	<i>Barbilophozia lycopodioides</i>	Greater Pawwort				S2?	6 Not Assessed	1	77.5 ± 1.0	NB
N	<i>Anacamptodon splachnoides</i>	a Moss				S2?	3 Sensitive	1	61.5 ± 1.0	NB
N	<i>Bryum pallescens</i>	Pale Bryum Moss				S2?	5 Undetermined	1	46.5 ± 100.0	NB
N	<i>Sphagnum angermanicum</i>	a Peatmoss				S2?	3 Sensitive	2	50.1 ± 0.0	NB
N	<i>Trichodon cylindricus</i>	Cylindric Hairy-teeth Moss				S2?	3 Sensitive	1	96.0 ± 15.0	NB
N	<i>Collema leptaleum</i>	Crumpled Bat's Wing Lichen				S2?	5 Undetermined	1	48.6 ± 0.0	NB
N	<i>Orthotrichum speciosum</i>	Showy Bristle Moss				S2S3	5 Undetermined	5	47.1 ± 0.0	NB
N	<i>Pohlia prolifera</i>	Cottony Nodding Moss				S2S3	3 Sensitive	9	48.2 ± 0.0	NB
N	<i>Saetania glaucescens</i>	Blue Dew Moss				S2S3	3 Sensitive	5	94.8 ± 0.0	NB
N	<i>Scorpidium scorpioides</i>	Hooked Scorpion Moss				S2S3	3 Sensitive	2	70.4 ± 1.0	NB
N	<i>Sphagnum subfulvum</i>	a Peatmoss				S2S3	2 May Be At Risk	2	52.3 ± 0.0	NB
N	<i>Zygodon viridissimus</i>	a Moss				S2S3	2 May Be At Risk	1	47.1 ± 0.0	NB
N	<i>Dendriscoaulon umhausense</i>	a lichen				S2S3	3 Sensitive	1	48.1 ± 0.0	NB
N	<i>Schistidium maritimum</i>	a Moss				S3	4 Secure	1	52.1 ± 0.0	NB
N	<i>Collema nigrescens</i>	Blistered Tarpaper Lichen				S3	3 Sensitive	1	48.1 ± 0.0	NB
N	<i>Solorina saccata</i>	Woodland Owl Lichen				S3	5 Undetermined	6	95.3 ± 0.0	NB
N	<i>Ahtiana aurescens</i>	Eastern Candlewax Lichen				S3	5 Undetermined	1	51.2 ± 0.0	NB
N	<i>Leptogium lichenoides</i>	Tattered Jellyskin Lichen				S3	5 Undetermined	1	94.9 ± 0.0	NB
N	<i>Nephroma resupinatum</i>	a lichen				S3	3 Sensitive	4	97.8 ± 0.0	NB
N	<i>Cladonia deformis</i>	Lesser Sulphur-cup Lichen				S3	4 Secure	1	100.0 ± 0.0	NB
N	<i>Aulacomnium androgynum</i>	Little Groove Moss				S3?	4 Secure	5	49.1 ± 0.0	NB
N	<i>Dicranella rufescens</i>	Red Forklet Moss				S3?	5 Undetermined	1	73.0 ± 7.0	NB
N	<i>Barbula convoluta</i>	Lesser Bird's-claw Beard Moss				S3S4	4 Secure	1	70.5 ± 15.0	NB
N	<i>Dicranum majus</i>	Greater Broom Moss				S3S4	4 Secure	4	49.2 ± 0.0	NB
N	<i>Dicranum leioneuron</i>	a Dicranum Moss				S3S4	4 Secure	1	57.5 ± 10.0	NB
N	<i>Encalypta ciliata</i>	Fringed Extinguisher Moss				S3S4	3 Sensitive	1	97.1 ± 0.0	NB
N	<i>Fissidens bryoides</i>	Lesser Pocket Moss				S3S4	4 Secure	1	57.7 ± 5.0	NB
N	<i>Heterocladium dimorphum</i>	Dimorphous Tangle Moss				S3S4	4 Secure	2	47.1 ± 0.0	NB
N	<i>Isopterygiopsis muelleriana</i>	a Moss				S3S4	4 Secure	1	94.8 ± 0.0	NB
N	<i>Myurella julacea</i>	Small Mouse-tail Moss				S3S4	4 Secure	1	97.1 ± 0.0	NB
N	<i>Pogonatum dentatum</i>	Mountain Hair Moss				S3S4	4 Secure	1	48.7 ± 0.0	NB
N	<i>Sphagnum compactum</i>	Compact Peat Moss				S3S4	4 Secure	1	48.2 ± 1.0	NB
N	<i>Sphagnum torreyanum</i>	a Peatmoss				S3S4	4 Secure	1	72.2 ± 0.0	NB
N	<i>Sphagnum contortum</i>	Twisted Peat Moss				S3S4	4 Secure	1	72.2 ± 0.0	NB
N	<i>Tetraphis geniculata</i>	Geniculate Four-tooth Moss				S3S4	4 Secure	3	55.5 ± 0.0	NB
N	<i>Tetraplodon angustatus</i>	Toothed-leaved Nitrogen Moss				S3S4	4 Secure	1	49.1 ± 0.0	NB
N	<i>Abietinella abietina</i>	Wiry Fern Moss				S3S4	4 Secure	1	95.4 ± 0.0	NB
N	<i>Rauvella scita</i>	Smaller Fern Moss				S3S4	3 Sensitive	1	49.1 ± 0.0	NB
N	<i>Pannaria rubiginosa</i>	Brown-eyed Shingle Lichen				S3S4	3 Sensitive	1	89.5 ± 0.0	NB
N	<i>Cladonia floerkeana</i>	Gritty British Soldiers Lichen				S3S4	4 Secure	1	98.0 ± 0.0	NB
N	<i>Vahliella leucophaea</i>	Shelter Shingle Lichen				S3S4	5 Undetermined	4	94.8 ± 0.0	NB
N	<i>Montanelia panniformis</i>	Shingled Camouflage Lichen				S3S4	5 Undetermined	1	99.9 ± 0.0	NB
N	<i>Nephroma parile</i>	Powdery Kidney Lichen				S3S4	4 Secure	3	94.9 ± 0.0	NB
N	<i>Protopannaria pezizoides</i>	Brown-gray Moss-shingle Lichen				S3S4	4 Secure	5	94.9 ± 0.0	NB
N	<i>Pseudocyphellaria holarctica</i>	Yellow Specklebelly Lichen				S3S4	3 Sensitive	4	48.6 ± 0.0	NB
N	<i>Stereocaulon paschale</i>	Easter Foam Lichen				S3S4	5 Undetermined	1	75.3 ± 1.0	NB
N	<i>Pannaria conoplea</i>	Mealy-rimmed Shingle Lichen				S3S4	3 Sensitive	2	55.8 ± 0.0	NB
N	<i>Dermatocarpon luridum</i>	Brookside Stippleback Lichen				S3S4	4 Secure	1	97.1 ± 0.0	NB
N	<i>Leucodon brachypus</i>	a Moss				SH	2 May Be At Risk	9	47.0 ± 0.0	NB
N	<i>Splachnum luteum</i>	Yellow Collar Moss				SH	5 Undetermined	1	46.5 ± 100.0	NB
P	<i>Juglans cinerea</i>	Butternut	Endangered	Endangered	Endangered	S1	1 At Risk	27	41.0 ± 0.0	NB
P	<i>Symphotrichum</i>	Gulf of St Lawrence Aster	Threatened	Threatened	Endangered	S1	1 At Risk	51	53.8 ± 0.0	NB



Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>laurentianum</i> <i>Symphotrichum subulatum</i> (Bathurst pop)	Bathurst Aster - Bathurst pop.	Special Concern	Special Concern	Endangered	S2	1 At Risk	201	18.4 ± 0.0	NB
P	<i>Isoetes prototypus</i>	Prototype Quillwort	Special Concern	Special Concern	Endangered	S2	1 At Risk	1	87.0 ± 0.0	NB
P	<i>Lechea maritima</i> var. <i>subcylindrica</i>	Beach Pinweed	Special Concern			S2	3 Sensitive	444	47.7 ± 0.0	NB
P	<i>Eriocaulon parkeri</i>	Parker's Pipewort	Not At Risk		Endangered	S2	1 At Risk	82	2.1 ± 1.0	NB
P	<i>Pterospora andromedea</i>	Woodland Pinedrops			Endangered	S1	1 At Risk	1	99.6 ± 0.0	NB
P	<i>Cryptotaenia canadensis</i>	Canada Honewort				S1	2 May Be At Risk	1	49.4 ± 1.0	NB
P	<i>Bidens discoidea</i>	Swamp Beggarticks				S1	2 May Be At Risk	1	95.2 ± 0.0	NB
P	<i>Bidens eatonii</i>	Eaton's Beggarticks				S1	2 May Be At Risk	7	6.2 ± 0.0	NB
P	<i>Pseudognaphalium obtusifolium</i>	Eastern Cudweed				S1	2 May Be At Risk	4	47.9 ± 0.0	NB
P	<i>Hieracium robinsonii</i>	Robinson's Hawkweed				S1	3 Sensitive	1	99.6 ± 0.0	NB
P	<i>Symphotrichum laeve</i>	Smooth Aster				S1	5 Undetermined	2	85.8 ± 5.0	NB
P	<i>Betula glandulosa</i>	Glandular Birch				S1	2 May Be At Risk	22	67.7 ± 0.0	NB
P	<i>Betula michauxii</i>	Michaux's Dwarf Birch				S1	2 May Be At Risk	3	51.4 ± 0.0	NB
P	<i>Andersonglossum boreale</i>	Northern Wild Comfrey				S1	2 May Be At Risk	3	58.6 ± 0.0	NB
P	<i>Cardamine parviflora</i>	Small-flowered Bittercress				S1	2 May Be At Risk	1	48.7 ± 0.0	NB
P	<i>Moehringia macrophylla</i>	Large-Leaved Sandwort				S1	2 May Be At Risk	1	95.6 ± 0.0	NB
P	<i>Stellaria crassifolia</i>	Fleshy Stitchwort				S1	2 May Be At Risk	1	32.4 ± 10.0	NB
P	<i>Stellaria longipes</i>	Long-stalked Starwort				S1	2 May Be At Risk	1	98.0 ± 1.0	NB
P	<i>Hypericum virginicum</i>	Virginia St. John's-wort				S1	2 May Be At Risk	1	16.0 ± 0.0	NB
P	<i>Vaccinium boreale</i>	Northern Blueberry				S1	2 May Be At Risk	17	67.7 ± 0.0	NB
P	<i>Vaccinium uliginosum</i>	Alpine Bilberry				S1	2 May Be At Risk	4	71.9 ± 0.0	NB
P	<i>Euphorbia polygonifolia</i>	Seaside Spurge				S1	2 May Be At Risk	5	55.5 ± 5.0	NB
P	<i>Hylodesmum glutinosum</i>	Large Tick-trefoil				S1	2 May Be At Risk	1	84.9 ± 0.0	NB
P	<i>Bartonia virginica</i>	Yellow Bartonia				S1	2 May Be At Risk	3	62.5 ± 0.0	NB
P	<i>Coptidium lapponicum</i>	Lapland Buttercup				S1	2 May Be At Risk	1	96.8 ± 0.0	NB
P	<i>Ranunculus sceleratus</i>	Cursed Buttercup				S1	2 May Be At Risk	4	79.3 ± 0.0	NB
P	<i>Crataegus jonesiae</i>	Jones' Hawthorn				S1	2 May Be At Risk	1	73.2 ± 1.0	NB
P	<i>Potentilla canadensis</i>	Canada Cinquefoil				S1	5 Undetermined	1	90.5 ± 0.0	NB
P	<i>Salix serissima</i>	Autumn Willow				S1	2 May Be At Risk	4	91.7 ± 0.0	NB
P	<i>Saxifraga paniculata</i> ssp. <i>laestadii</i>	Laestadius' Saxifrage				S1	2 May Be At Risk	3	96.2 ± 0.0	NB
P	<i>Agalinis purpurea</i> var. <i>parviflora</i>	Small-flowered Purple False Foxglove				S1	2 May Be At Risk	11	17.6 ± 0.0	NB
P	<i>Viola canadensis</i>	Canada Violet				S1	2 May Be At Risk	1	86.1 ± 0.0	NB
P	<i>Carex glareosa</i> ssp. <i>glareosa</i>	Gravel Sedge				S1	2 May Be At Risk	2	96.4 ± 1.0	NB
P	<i>Carex viridula</i> var. <i>elatior</i>	Greenish Sedge				S1	2 May Be At Risk	11	91.6 ± 0.0	NB
P	<i>Carex saxatilis</i>	Russet Sedge				S1	2 May Be At Risk	6	89.0 ± 0.0	NB
P	<i>Carex bigelowii</i>	Bigelow's Sedge				S1	2 May Be At Risk	1	67.8 ± 0.0	NB
P	<i>Cyperus diandrus</i>	Low Flatsedge				S1	2 May Be At Risk	2	9.3 ± 0.0	NB
P	<i>Cyperus bipartitus</i>	Shining Flatsedge				S1	2 May Be At Risk	13	2.1 ± 0.0	NB
P	<i>Scirpus pendulus</i>	Hanging Bulrush				S1	2 May Be At Risk	1	99.4 ± 0.0	PE
P	<i>Schoenoplectiella smithii</i> var. <i>leviseta</i>	Smith's Bulrush				S1	2 May Be At Risk	18	6.1 ± 0.0	NB
P	<i>Juncus greenei</i>	Greene's Rush				S1	2 May Be At Risk	2	0.4 ± 1.0	NB
P	<i>Juncus stygius</i> ssp. <i>americanus</i>	Moor Rush				S1	2 May Be At Risk	4	32.8 ± 0.0	NB
P	<i>Juncus subtilis</i>	Creeping Rush				S1	2 May Be At Risk	3	57.1 ± 1.0	NB
P	<i>Oreojuncus trifidus</i>	Highland Rush				S1	2 May Be At Risk	9	67.7 ± 0.0	NB
P	<i>Allium canadense</i>	Canada Garlic				S1	2 May Be At Risk	1	19.5 ± 1.0	NB
P	<i>Malaxis monophyllos</i> var. <i>brachypoda</i>	North American White Adder's-mouth				S1	2 May Be At Risk	2	91.6 ± 0.0	NB
P	<i>Malaxis monophyllos</i>	White Adder's-mouth				S1	2 May Be At Risk	1	96.7 ± 0.0	NB
P	<i>Platanthera flava</i>	Southern Rein-Orchid				S1	2 May Be At Risk	1	96.7 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>Platanthera macrophylla</i>	Large Round-Leaved Orchid				S1	2 May Be At Risk	1	51.2 ± 0.0	NB
P	<i>Bromus pubescens</i>	Hairy Wood Brome Grass				S1	5 Undetermined	1	53.2 ± 0.0	NB
P	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	Slim-stemmed Reed Grass				S1	2 May Be At Risk	1	54.6 ± 0.0	NB
P	<i>Dichantherium xanthophyllum</i>	Slender Panic Grass				S1	2 May Be At Risk	9	61.5 ± 0.0	NB
P	<i>Zizania aquatica</i> var. <i>brevis</i>	St. Lawrence Wild Rice				S1	2 May Be At Risk	16	1.3 ± 0.0	NB
P	<i>Potamogeton nodosus</i>	Long-leaved Pondweed				S1	2 May Be At Risk	2	17.7 ± 0.0	NB
P	<i>Cystopteris laurentiana</i>	Laurentian Bladder Fern				S1	2 May Be At Risk	1	75.3 ± 0.0	NB
P	<i>Hyperzia selago</i>	Northern Firmoss				S1	2 May Be At Risk	3	67.8 ± 0.0	NB
P	<i>Bidens heterodoxa</i>	Connecticut Beggar-Ticks				S1?	2 May Be At Risk	2	53.9 ± 0.0	NB
P	<i>Cuscuta campestris</i>	Field Dodder				S1?	2 May Be At Risk	3	20.0 ± 0.0	NB
P	<i>Polygonum aviculare</i> ssp. <i>neglectum</i>	Narrow-leaved Knotweed				S1?	5 Undetermined	4	32.6 ± 1.0	NB
P	<i>Carex laxiflora</i>	Loose-Flowered Sedge				S1?	5 Undetermined	1	83.0 ± 2.0	NB
P	<i>Carex crawei</i>	Crawe's Sedge				S1S2	2 May Be At Risk	1	68.7 ± 0.0	NB
P	<i>Thelypteris simulata</i>	Bog Fern				S1S2	2 May Be At Risk	14	14.1 ± 1.0	NB
P	<i>Cuscuta cephalanthi</i>	Buttonbush Dodder				S1S3	2 May Be At Risk	22	19.9 ± 0.0	NB
P	<i>Neottia bifolia</i>	Southern Twayblade			Endangered	S2	1 At Risk	36	32.1 ± 0.0	NB
P	<i>Osmorhiza depauperata</i>	Blunt Sweet Cicely				S2	3 Sensitive	3	27.0 ± 1.0	NB
P	<i>Osmorhiza longistylis</i>	Smooth Sweet Cicely				S2	3 Sensitive	4	33.2 ± 0.0	NB
P	<i>Ionactis linariifolia</i>	Flax-leaved Aster				S2	3 Sensitive	71	7.1 ± 1.0	NB
P	<i>Symphotrichum subulatum</i>	Annual Saltmarsh Aster				S2	1 At Risk	152	18.7 ± 0.0	NB
P	<i>Pseudognaphalium macounii</i>	Macoun's Cudweed				S2	3 Sensitive	30	48.9 ± 5.0	NB
P	<i>Betula minor</i>	Dwarf White Birch				S2	3 Sensitive	16	67.7 ± 0.0	NB
P	<i>Boechea stricta</i>	Drummond's Rockcress				S2	3 Sensitive	5	8.2 ± 1.0	NB
P	<i>Sagina nodosa</i>	Knotted Pearlwort				S2	3 Sensitive	1	78.9 ± 1.0	NB
P	<i>Stellaria longifolia</i>	Long-leaved Starwort				S2	3 Sensitive	4	51.1 ± 0.0	NB
P	<i>Atriplex glabriuscula</i> var. <i>franktonii</i>	Frankton's Saltbush				S2	4 Secure	2	48.9 ± 5.0	NB
P	<i>Oxybasis rubra</i>	Red Goosefoot				S2	3 Sensitive	13	48.1 ± 0.0	NB
P	<i>Hypericum x dissimulatum</i>	Disguised St. John's-wort				S2	3 Sensitive	1	69.7 ± 1.0	NB
P	<i>Astragalus eucosmus</i>	Elegant Milk-vetch				S2	2 May Be At Risk	1	17.7 ± 0.0	NB
P	<i>Oxytropis campestris</i> var. <i>johannensis</i>	Field Locoweed				S2	3 Sensitive	1	55.7 ± 10.0	NB
P	<i>Gentiana linearis</i>	Narrow-Leaved Gentian				S2	3 Sensitive	21	47.8 ± 5.0	NB
P	<i>Myriophyllum humile</i>	Low Water Milfoil				S2	3 Sensitive	1	57.1 ± 1.0	NB
P	<i>Nuphar x rubrodiscalis</i>	Red-disk Yellow Pond-lily				S2	3 Sensitive	6	51.4 ± 0.0	NB
P	<i>Aphyllon uniflorum</i>	One-flowered Broomrape				S2	3 Sensitive	3	30.5 ± 1.0	NB
P	<i>Persicaria amphibia</i> var. <i>emersa</i>	Long-root Smartweed				S2	3 Sensitive	1	17.7 ± 0.0	NB
P	<i>Persicaria careyi</i>	Carey's Smartweed				S2	3 Sensitive	3	96.9 ± 0.0	NB
P	<i>Podostemum ceratophyllum</i>	Horn-leaved Riverweed				S2	3 Sensitive	9	19.3 ± 1.0	NB
P	<i>Hepatica americana</i>	Round-lobed Hepatica				S2	3 Sensitive	3	24.4 ± 0.0	NB
P	<i>Crataegus scabrada</i>	Rough Hawthorn				S2	3 Sensitive	3	61.5 ± 1.0	NB
P	<i>Rosa acicularis</i> ssp. <i>sayi</i>	Prickly Rose				S2	2 May Be At Risk	133	48.2 ± 0.0	NB
P	<i>Galium kamtschaticum</i>	Northern Wild Licorice				S2	3 Sensitive	7	86.9 ± 5.0	NB
P	<i>Salix candida</i>	Sage Willow				S2	3 Sensitive	21	76.9 ± 0.0	NB
P	<i>Castilleja septentrionalis</i>	Northeastern Paintbrush				S2	3 Sensitive	3	89.0 ± 0.0	NB
P	<i>Viola novae-angliae</i>	New England Violet				S2	3 Sensitive	2	84.2 ± 1.0	NB
P	<i>Sagittaria montevidensis</i> ssp. <i>spongiosa</i>	Spongy Arrowhead				S2	4 Secure	144	1.1 ± 0.0	NB
P	<i>Carex granularis</i>	Limestone Meadow Sedge				S2	3 Sensitive	7	56.7 ± 5.0	NB
P	<i>Carex gynocrates</i>	Northern Bog Sedge				S2	3 Sensitive	9	91.6 ± 0.0	NB
P	<i>Carex hirtifolia</i>	Pubescent Sedge				S2	3 Sensitive	16	17.8 ± 0.0	NB
P	<i>Carex rostrata</i>	Narrow-leaved Beaked Sedge				S2	3 Sensitive	6	61.5 ± 5.0	NB
P	<i>Carex salina</i>	Saltmarsh Sedge				S2	3 Sensitive	7	63.6 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>Carex sprengelii</i>	Longbeak Sedge				S2	3 Sensitive	1	54.9 ± 0.0	NB
P	<i>Carex tenuiflora</i>	Sparse-Flowered Sedge				S2	2 May Be At Risk	2	53.2 ± 0.0	NB
P	<i>Carex albicans</i>	White-tinged Sedge				S2	3 Sensitive	1	84.4 ± 1.0	NB
P	<i>Carex albicans</i> var. <i>emmonsii</i>	White-tinged Sedge				S2	3 Sensitive	9	41.6 ± 0.0	NB
P	<i>Eriophorum gracile</i>	Slender Cottongrass				S2	2 May Be At Risk	2	58.6 ± 10.0	NB
P	<i>Blysmopsis rufa</i>	Red Bulrush				S2	3 Sensitive	56	56.2 ± 0.0	NB
P	<i>Juncus vaseyi</i>	Vasey Rush				S2	3 Sensitive	37	5.5 ± 10.0	NB
P	<i>Galearis rotundifolia</i>	Small Round-leaved Orchid				S2	2 May Be At Risk	11	70.3 ± 0.0	NB
P	<i>Calypso bulbosa</i> var. <i>americana</i>	Calypso				S2	2 May Be At Risk	7	24.4 ± 0.0	NB
P	<i>Coeloglossum viride</i>	Long-bracted Frog Orchid				S2	2 May Be At Risk	4	92.7 ± 5.0	NB
P	<i>Cypripedium parviflorum</i> var. <i>makasin</i>	Small Yellow Lady's-Slipper				S2	2 May Be At Risk	3	14.9 ± 5.0	NB
P	<i>Goodyera oblongifolia</i>	Menzies' Rattlesnake-plantain				S2	3 Sensitive	17	27.9 ± 1.0	NB
P	<i>Spiranthes lucida</i>	Shining Ladies'-Tresses				S2	3 Sensitive	8	19.4 ± 1.0	NB
P	<i>Agrostis mertensii</i>	Northern Bent Grass				S2	2 May Be At Risk	68	48.3 ± 0.0	NB
P	<i>Dichanthelium linearifolium</i>	Narrow-leaved Panic Grass				S2	3 Sensitive	5	20.5 ± 0.0	NB
P	<i>Piptatheropsis canadensis</i>	Canada Ricegrass				S2	3 Sensitive	7	61.3 ± 0.0	NB
P	<i>Poa glauca</i>	Glaucous Blue Grass				S2	4 Secure	4	75.2 ± 0.0	NB
P	<i>Puccinellia nutkaensis</i>	Alaska Alkaligrass				S2	3 Sensitive	5	47.1 ± 0.0	NB
P	<i>Zizania aquatica</i> var. <i>aquatica</i>	Eastern Wild Rice				S2	5 Undetermined	7	2.1 ± 0.0	NB
P	<i>Piptatheropsis pungens</i>	Slender Ricegrass				S2	2 May Be At Risk	12	61.2 ± 0.0	NB
P	<i>Asplenium trichomanes</i>	Maidenhair Spleenwort				S2	3 Sensitive	2	95.1 ± 0.0	NB
P	<i>Anchistea virginica</i>	Virginia chain fern				S2	3 Sensitive	11	50.2 ± 0.0	NB
P	<i>Woodsia alpina</i>	Alpine Cliff Fern				S2	3 Sensitive	1	55.1 ± 0.0	NB
P	<i>Diphasiastrum sitchense</i>	Sitka Ground-cedar				S2	3 Sensitive	2	67.6 ± 0.0	NB
P	<i>Botrychium minganense</i>	Mingan Moonwort				S2	3 Sensitive	1	57.6 ± 0.0	NB
P	<i>Selaginella selaginoides</i>	Low Spikemoss				S2	3 Sensitive	14	91.6 ± 0.0	NB
P	<i>Toxicodendron radicans</i> var. <i>radicans</i>	Eastern Poison Ivy				S2?	3 Sensitive	4	41.2 ± 0.0	NB
P	<i>Symphyotrichum novi-belgii</i> var. <i>crenifolium</i>	New York Aster				S2?	5 Undetermined	1	56.2 ± 0.0	NB
P	<i>Humulus lupulus</i> var. <i>lupuloides</i>	Common Hop				S2?	3 Sensitive	3	17.7 ± 0.0	NB
P	<i>Crataegus macrosperma</i>	Big-Fruit Hawthorn				S2?	5 Undetermined	1	61.5 ± 0.0	NB
P	<i>Galium obtusum</i>	Blunt-leaved Bedstraw				S2?	4 Secure	9	35.2 ± 1.0	NB
P	<i>Salix myricoides</i>	Bayberry Willow				S2?	3 Sensitive	4	34.4 ± 5.0	NB
P	<i>Carex vacillans</i>	Estuarine Sedge				S2?	3 Sensitive	3	4.2 ± 1.0	NB
P	<i>Platanthera huronensis</i>	Fragrant Green Orchid				S2?	5 Undetermined	1	57.4 ± 0.0	NB
P	<i>Callitriche hermaphroditica</i>	Northern Water-starwort				S2S3	4 Secure	4	42.3 ± 0.0	NB
P	<i>Elatine americana</i>	American Waterwort				S2S3	3 Sensitive	19	6.9 ± 1.0	NB
P	<i>Bartonia paniculata</i> ssp. <i>iodandra</i>	Branched Bartonia				S2S3	3 Sensitive	2	51.6 ± 0.0	NB
P	<i>Geranium robertianum</i>	Herb Robert				S2S3	4 Secure	48	96.2 ± 0.0	PE
P	<i>Epilobium coloratum</i>	Purple-veined Willowherb				S2S3	3 Sensitive	3	45.8 ± 10.0	NB
P	<i>Rumex persicarioides</i>	Peach-leaved Dock				S2S3	5 Undetermined	3	39.9 ± 0.0	NB
P	<i>Rumex pallidus</i>	Seabeach Dock				S2S3	3 Sensitive	6	55.3 ± 0.0	NB
P	<i>Rumex occidentalis</i>	Western Dock				S2S3	2 May Be At Risk	3	59.0 ± 0.0	NB
P	<i>Rubus pensilvanicus</i>	Pennsylvania Blackberry				S2S3	4 Secure	3	84.0 ± 100.0	NB
P	<i>Galium labradoricum</i>	Labrador Bedstraw				S2S3	3 Sensitive	15	86.1 ± 0.0	NB
P	<i>Valeriana uliginosa</i>	Swamp Valerian				S2S3	3 Sensitive	8	91.6 ± 0.0	NB
P	<i>Carex adusta</i>	Lesser Brown Sedge				S2S3	4 Secure	9	51.3 ± 0.0	NB
P	<i>Juncus brachycephalus</i>	Small-Head Rush				S2S3	3 Sensitive	2	91.6 ± 0.0	NB
P	<i>Corallorhiza maculata</i> var. <i>occidentalis</i>	Spotted Coralroot				S2S3	3 Sensitive	6	33.6 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>Neottia auriculata</i>	Auricled Twayblade				S2S3	3 Sensitive	17	54.0 ± 0.0	NB
P	<i>Spiranthes cernua</i>	Nodding Ladies'-Tresses				S2S3	3 Sensitive	2	38.8 ± 0.0	NB
P	<i>Stuckenia filiformis</i>	Thread-leaved Pondweed				S2S3	3 Sensitive	1	96.0 ± 1.0	NB
P	<i>Potamogeton praelongus</i>	White-stemmed Pondweed				S2S3	4 Secure	1	88.4 ± 0.0	NB
P	<i>Isoetes acadensis</i>	Acadian Quillwort				S2S3	3 Sensitive	1	53.4 ± 0.0	NB
P	<i>Panax trifolius</i>	Dwarf Ginseng				S3	3 Sensitive	19	7.8 ± 1.0	NB
P	<i>Arnica lanceolata</i>	Lance-leaved Arnica				S3	4 Secure	49	23.9 ± 0.0	NB
P	<i>Artemisia campestris ssp. caudata</i>	Tall Wormwood				S3	4 Secure	4	50.1 ± 0.0	NB
P	<i>Bidens hyperborea</i>	Estuary Beggarticks				S3	4 Secure	122	2.2 ± 5.0	NB
P	<i>Erigeron hyssopifolius</i>	Hyssop-leaved Fleabane				S3	4 Secure	59	42.6 ± 0.0	NB
P	<i>Symphotrichum boreale</i>	Boreal Aster				S3	3 Sensitive	5	62.7 ± 5.0	NB
P	<i>Betula pumila</i>	Bog Birch				S3	4 Secure	124	48.5 ± 0.0	NB
P	<i>Turritis glabra</i>	Tower Mustard				S3	5 Undetermined	16	42.8 ± 0.0	NB
P	<i>Arabis pycnocarpa</i>	Cream-flowered Rockcress				S3	4 Secure	3	95.0 ± 0.0	NB
P	<i>Cardamine maxima</i>	Large Toothwort				S3	4 Secure	3	58.5 ± 0.0	NB
P	<i>Subularia aquatica ssp. americana</i>	American Water Awlwort				S3	4 Secure	1	70.1 ± 1.0	NB
P	<i>Stellaria humifusa</i>	Saltmarsh Starwort				S3	4 Secure	8	4.1 ± 0.0	NB
P	<i>Ceratophyllum echinatum</i>	Prickly Hornwort				S3	3 Sensitive	1	7.5 ± 0.0	NB
P	<i>Hudsonia tomentosa</i>	Woolly Beach-heath				S3	4 Secure	194	36.6 ± 5.0	NB
P	<i>Crassula aquatica</i>	Water Pygmyweed				S3	4 Secure	49	2.1 ± 1.0	NB
P	<i>Elatine minima</i>	Small Waterwort				S3	4 Secure	6	6.1 ± 0.0	NB
P	<i>Hedysarum americanum</i>	Alpine Hedysarum				S3	4 Secure	5	53.3 ± 0.0	NB
P	<i>Geranium bicknellii</i>	Bicknell's Crane's-bill				S3	4 Secure	12	23.6 ± 0.0	NB
P	<i>Myriophyllum farwellii</i>	Farwell's Water Milfoil				S3	4 Secure	6	18.8 ± 0.0	NB
P	<i>Myriophyllum verticillatum</i>	Whorled Water Milfoil				S3	4 Secure	5	5.4 ± 1.0	NB
P	<i>Teucrium canadense</i>	Canada Germander				S3	3 Sensitive	61	3.6 ± 5.0	NB
P	<i>Nuphar microphylla</i>	Small Yellow Pond-lily				S3	4 Secure	6	24.8 ± 0.0	NB
P	<i>Epilobium hornemannii</i>	Hornemann's Willowherb				S3	4 Secure	25	21.4 ± 10.0	NB
P	<i>Epilobium strictum</i>	Downy Willowherb				S3	4 Secure	3	69.1 ± 0.0	NB
P	<i>Polygala sanguinea</i>	Blood Milkwort				S3	3 Sensitive	44	31.1 ± 0.0	NB
P	<i>Persicaria arifolia</i>	Halberd-leaved Tearthumb				S3	4 Secure	32	44.1 ± 5.0	NB
P	<i>Persicaria punctata</i>	Dotted Smartweed				S3	4 Secure	39	2.1 ± 1.0	NB
P	<i>Fallopia scandens</i>	Climbing False Buckwheat				S3	4 Secure	50	18.6 ± 0.0	NB
P	<i>Littorella americana</i>	American Shoreweed				S3	4 Secure	2	89.6 ± 1.0	NB
P	<i>Primula mistassinica</i>	Mistassini Primrose				S3	4 Secure	2	84.1 ± 0.0	NB
P	<i>Samolus parviflorus</i>	Seaside Brookweed				S3	4 Secure	195	3.4 ± 0.0	NB
P	<i>Pyrola minor</i>	Lesser Pyrola				S3	4 Secure	15	42.0 ± 0.0	NB
P	<i>Clematis occidentalis</i>	Purple Clematis				S3	4 Secure	3	58.6 ± 1.0	NB
P	<i>Ranunculus gmelinii</i>	Gmelin's Water Buttercup				S3	4 Secure	12	58.1 ± 5.0	NB
P	<i>Thalictrum confine</i>	Northern Meadow-rue				S3	4 Secure	2	41.7 ± 0.0	NB
P	<i>Amelanchier canadensis</i>	Canada Serviceberry				S3	4 Secure	5	56.9 ± 0.0	NB
P	<i>Rosa palustris</i>	Swamp Rose				S3	4 Secure	7	0.4 ± 1.0	NB
P	<i>Sanguisorba canadensis</i>	Canada Burnet				S3	4 Secure	46	73.6 ± 5.0	NB
P	<i>Galium boreale</i>	Northern Bedstraw				S3	4 Secure	2	65.9 ± 1.0	NB
P	<i>Salix pedicellaris</i>	Bog Willow				S3	4 Secure	28	15.9 ± 0.0	NB
P	<i>Salix interior</i>	Sandbar Willow				S3	4 Secure	1	64.5 ± 1.0	NB
P	<i>Comandra umbellata</i>	Bastard's Toadflax				S3	4 Secure	66	36.6 ± 0.0	NB
P	<i>Parnassia glauca</i>	Fen Grass-of-Parnassus				S3	4 Secure	18	18.4 ± 0.0	NB
P	<i>Limosella australis</i>	Southern Mudwort				S3	4 Secure	124	2.1 ± 0.0	NB
P	<i>Boehmeria cylindrica</i>	Small-spike False-nettle				S3	3 Sensitive	7	15.4 ± 0.0	NB
P	<i>Pilea pumila</i>	Dwarf Clearweed				S3	4 Secure	9	7.6 ± 0.0	NB
P	<i>Viola adunca</i>	Hooked Violet				S3	4 Secure	11	49.8 ± 0.0	NB
P	<i>Viola nephrophylla</i>	Northern Bog Violet				S3	4 Secure	8	86.0 ± 1.0	NB
P	<i>Carex arcta</i>	Northern Clustered Sedge				S3	4 Secure	3	54.8 ± 0.0	NB
P	<i>Carex capillaris</i>	Hairlike Sedge				S3	4 Secure	4	49.8 ± 0.0	NB
P	<i>Carex chordorrhiza</i>	Creeping Sedge				S3	4 Secure	1	48.4 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>Carex conoidea</i>	Field Sedge				S3	4 Secure	2	63.3 ± 10.0	NB
P	<i>Carex eburnea</i>	Bristle-leaved Sedge				S3	4 Secure	12	75.4 ± 3.0	NB
P	<i>Carex garberi</i>	Garber's Sedge				S3	3 Sensitive	24	19.9 ± 0.0	NB
P	<i>Carex haydenii</i>	Hayden's Sedge				S3	4 Secure	6	53.8 ± 0.0	NB
P	<i>Carex lupulina</i>	Hop Sedge				S3	4 Secure	2	67.8 ± 1.0	NB
P	<i>Carex michauxiana</i>	Michaux's Sedge				S3	4 Secure	10	27.5 ± 0.0	NB
P	<i>Carex ormostachya</i>	Necklace Spike Sedge				S3	4 Secure	8	8.2 ± 1.0	NB
P	<i>Carex tenera</i>	Tender Sedge				S3	4 Secure	4	19.4 ± 1.0	NB
P	<i>Carex tuckermanii</i>	Tuckerman's Sedge				S3	4 Secure	18	17.2 ± 0.0	NB
P	<i>Carex vaginata</i>	Sheathed Sedge				S3	3 Sensitive	6	91.6 ± 0.0	NB
P	<i>Carex wiegandii</i>	Wiegand's Sedge				S3	4 Secure	57	32.1 ± 1.0	NB
P	<i>Carex recta</i>	Estuary Sedge				S3	4 Secure	16	36.4 ± 0.0	NB
P	<i>Carex atratifomis</i>	Scabrous Black Sedge				S3	4 Secure	8	43.7 ± 0.0	NB
P	<i>Cyperus dentatus</i>	Toothed Flatsedge				S3	4 Secure	2	33.5 ± 10.0	NB
P	<i>Cyperus esculentus var. leptostachyus</i>	Perennial Yellow Nutsedge				S3	4 Secure	3	20.7 ± 0.0	NB
P	<i>Eleocharis intermedia</i>	Matted Spikerush				S3	4 Secure	2	53.2 ± 0.0	NB
P	<i>Rhynchospora capitellata</i>	Small-headed Beakrush				S3	4 Secure	85	19.4 ± 0.0	NB
P	<i>Rhynchospora fusca</i>	Brown Beakrush				S3	4 Secure	7	39.1 ± 0.0	NB
P	<i>Trichophorum clintonii</i>	Clinton's Clubrush				S3	4 Secure	101	36.5 ± 0.0	NB
P	<i>Schoenoplectus torreyi</i>	Torrey's Bulrush				S3	4 Secure	9	15.6 ± 0.0	NB
P	<i>Lemna trisulca</i>	Star Duckweed				S3	4 Secure	1	93.6 ± 2.0	NB
P	<i>Triantha glutinosa</i>	Sticky False-Asphodel				S3	4 Secure	47	23.2 ± 0.0	NB
P	<i>Cypripedium reginae</i>	Showy Lady's-Slipper				S3	3 Sensitive	15	8.2 ± 1.0	NB
P	<i>Liparis loeselii</i>	Loesel's Twayblade				S3	4 Secure	3	51.5 ± 0.0	NB
P	<i>Platanthera blephariglottis</i>	White Fringed Orchid				S3	4 Secure	150	14.5 ± 0.0	NB
P	<i>Platanthera grandiflora</i>	Large Purple Fringed Orchid				S3	3 Sensitive	17	27.6 ± 100.0	NB
P	<i>Bromus latiglumis</i>	Broad-Glumed Brome				S3	3 Sensitive	6	41.6 ± 0.0	NB
P	<i>Calamagrostis pickeringii</i>	Pickering's Reed Grass				S3	4 Secure	6	60.6 ± 0.0	NB
P	<i>Dichanthelium depauperatum</i>	Starved Panic Grass				S3	4 Secure	29	18.7 ± 0.0	NB
P	<i>Potamogeton obtusifolius</i>	Blunt-leaved Pondweed				S3	4 Secure	11	41.9 ± 1.0	NB
P	<i>Potamogeton richardsonii</i>	Richardson's Pondweed				S3	3 Sensitive	5	44.6 ± 0.0	NB
P	<i>Xyris montana</i>	Northern Yellow-Eyed-Grass				S3	4 Secure	89	11.6 ± 5.0	NB
P	<i>Zannichellia palustris</i>	Horned Pondweed				S3	4 Secure	84	3.0 ± 0.0	NB
P	<i>Adiantum pedatum</i>	Northern Maidenhair Fern				S3	4 Secure	2	33.2 ± 0.0	NB
P	<i>Cryptogramma stelleri</i>	Steller's Rockbrake				S3	4 Secure	9	56.1 ± 0.0	NB
P	<i>Asplenium viride</i>	Green Spleenwort				S3	4 Secure	23	56.0 ± 0.0	NB
P	<i>Dryopteris fragrans</i>	Fragrant Wood Fern				S3	4 Secure	48	32.4 ± 0.0	NB
P	<i>Dryopteris goldiana</i>	Goldie's Woodfern				S3	3 Sensitive	4	85.2 ± 0.0	NB
P	<i>Woodsia glabella</i>	Smooth Cliff Fern				S3	4 Secure	6	95.7 ± 0.0	NB
P	<i>Isoetes tuckermanii</i>	Tuckerman's Quillwort				S3	4 Secure	5	6.2 ± 0.0	NB
P	<i>Diphasiastrum x sabinifolium</i>	Savin-leaved Ground-cedar				S3	4 Secure	14	48.7 ± 1.0	NB
P	<i>Huperzia appressa</i>	Mountain Firmoss				S3	3 Sensitive	15	8.2 ± 1.0	NB
P	<i>Botrychium lanceolatum</i>	Triangle Moonwort				S3	3 Sensitive	1	72.8 ± 0.0	NB
P	<i>Botrychium lanceolatum ssp. angustisegmentum</i>	Narrow Triangle Moonwort				S3	3 Sensitive	3	40.1 ± 0.0	NB
P	<i>Botrychium simplex</i>	Least Moonwort				S3	4 Secure	8	50.4 ± 0.0	NB
P	<i>Polypodium appalachianum</i>	Appalachian Polypody				S3	4 Secure	1	85.4 ± 0.0	NB
P	<i>Crataegus submollis</i>	Quebec Hawthorn				S3?	3 Sensitive	1	65.1 ± 1.0	NB
P	<i>Mertensia maritima</i>	Sea Lungwort				S3S4	4 Secure	1	64.3 ± 0.0	NB
P	<i>Lobelia kalmii</i>	Brook Lobelia				S3S4	4 Secure	11	23.2 ± 0.0	NB
P	<i>Suaeda calceoliformis</i>	Horned Sea-blite				S3S4	4 Secure	32	41.0 ± 1.0	NB
P	<i>Myriophyllum sibiricum</i>	Siberian Water Milfoil				S3S4	4 Secure	8	53.8 ± 0.0	NB
P	<i>Stachys pilosa</i>	Hairy Hedge-Nettle				S3S4	5 Undetermined	3	41.8 ± 0.0	NB
P	<i>Stachys pilosa var. arenicola</i>	Hairy Hedge-nettle				S3S4		1	82.3 ± 0.0	NB
P	<i>Utricularia gibba</i>	Humped Bladderwort				S3S4	4 Secure	1	52.0 ± 1.0	NB
P	<i>Rumex fueginus</i>	Tierra del Fuego Dock				S3S4	4 Secure	54	48.2 ± 0.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>Drymocalis arguta</i>	Tall Wood Beauty				S3S4	4 Secure	6	34.0 ± 50.0	NB
P	<i>Rubus chamaemorus</i>	Cloudberry				S3S4	4 Secure	147	40.3 ± 0.0	NB
P	<i>Geocaulon lividum</i>	Northern Comandra				S3S4	4 Secure	76	11.6 ± 10.0	NB
P	<i>Juniperus horizontalis</i>	Creeping Juniper				S3S4	4 Secure	2	71.5 ± 1.0	NB
P	<i>Cladium mariscoides</i>	Smooth Twigrush				S3S4	4 Secure	7	52.6 ± 0.0	NB
P	<i>Eriophorum russeolum</i>	Russet Cottongrass				S3S4	4 Secure	76	1.2 ± 1.0	NB
P	<i>Triglochin gaspensis</i>	Gasp Arrowgrass				S3S4	4 Secure	91	19.6 ± 0.0	NB
P	<i>Corallorhiza maculata</i>	Spotted Coralroot				S3S4	3 Sensitive	12	41.8 ± 0.0	NB
P	<i>Calamagrostis stricta</i>	Slim-stemmed Reed Grass				S3S4	4 Secure	18	36.3 ± 0.0	NB
P	<i>Calamagrostis stricta ssp. stricta</i>	Slim-stemmed Reed Grass				S3S4	4 Secure	5	71.9 ± 0.0	NB
P	<i>Distichlis spicata</i>	Salt Grass				S3S4	4 Secure	77	7.7 ± 0.0	NB
P	<i>Potamogeton oakesianus</i>	Oakes' Pondweed				S3S4	4 Secure	1	75.0 ± 10.0	NB
P	<i>Polygonum oxyspermum ssp. raii</i>	Ray's Knotweed				SH	0.1 Extirpated	3	74.0 ± 1.0	NB
P	<i>Montia fontana</i>	Water Blinks				SH	2 May Be At Risk	1	20.7 ± 1.0	NB
P	<i>Agalinis maritima</i>	Saltmarsh Agalinis				SX	0.1 Extirpated	2	59.5 ± 50.0	NB

### 5.1 SOURCE BIBLIOGRAPHY (100 km)

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
4808	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs.
3515	Morrison, Guy. 2011. Maritime Shorebird Survey (MSS) database. Canadian Wildlife Service, Ottawa, 15939 surveys. 86171 recs.
2697	eBird. 2014. eBird Basic Dataset. Version: EBD_relNov-2014. Ithaca, New York. Nov 2014. Cornell Lab of Ornithology, 25036 recs.
2507	Cowie, F. 2007. Electrofishing Population Estimates 1979-98. Canadian Rivers Institute, 2698 recs.
2238	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
1067	Pardieck, K.L. & Ziolkowski Jr., D.J.; Hudson, M.-A.R. 2014. North American Breeding Bird Survey Dataset 1966 - 2013, version 2013.0. U.S. Geological Survey, Patuxent Wildlife Research Center <www.pwrc.usgs.gov/BBS/RawData/>.
949	Paquet, Julie. 2018. Atlantic Canada Shorebird Survey (ACSS) database 2012-2018. Environment Canada, Canadian Wildlife Service.
740	Blaney, C.S.; Mazerolle, D.M. 2012. Fieldwork 2012. Atlantic Canada Conservation Data Centre, 13,278 recs.
685	Blaney, C.S.; Mazerolle, D.M.; Belliveau, A.B. 2015. Atlantic Canada Conservation Data Centre Fieldwork 2015. Atlantic Canada Conservation Data Centre, # recs.
656	Kouwenberg, Amy-Lee. 2019. Mountain Birdwatch database 2012-2018. Bird Studies Canada, Sackville, NB, 6484 recs.
503	Amirault, D.L. & Stewart, J. 2007. Piping Plover Database 1894-2006. Canadian Wildlife Service, Sackville, 3344 recs, 1228 new.
449	Gravel, Mireille. 2010. Coordonnées GPS et suivi des tortues marquées, 2005-07. Kouchibouguac National Park, 480 recs.
435	Beaudet, A. 2007. Piping Plover Records in Kouchibouguac NP, 1982-2005. Kouchibouguac National Park, 435 recs.
394	MacDonald, E.C. 2018. Piping Plover nest records from 2010-2017. Canadian Wildlife Service.
393	Blaney, C.S.; Spicer, C.D.; Mazerolle, D.M. 2005. Fieldwork 2005. Atlantic Canada Conservation Data Centre. Sackville NB, 2333 recs.
391	Blaney, C.S.; Mazerolle, D.M. 2010. Fieldwork 2010. Atlantic Canada Conservation Data Centre. Sackville NB, 15508 recs.
383	Tims, J. & Craig, N. 1995. Environmentally Significant Areas in New Brunswick (NBESA). NB Dept of Environment & Nature Trust of New Brunswick Inc, 6042 recs.
314	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2003.
299	Blaney, C.S.; Mazerolle, D.M.; Belliveau, A.B. 2013. Atlantic Canada Conservation Data Centre Fieldwork 2013. Atlantic Canada Conservation Data Centre, 9000+ recs.
274	Stantec. 2014. Energy East Pipeline Corridor Species Occurrence Data. Stantec Inc., 4934 records.
255	iNaturalist. 2018. iNaturalist Data Export 2018. iNaturalist.org and iNaturalist.ca, Web site: 11706 recs.
237	Amirault, D.L. & McKnight, J. 2003. Piping Plover Database 1991-2003. Canadian Wildlife Service, Sackville, unpublished data. 7 recs.
232	Campbell, G. 2017. Maritimes Bicknell's Thrush database 2002-2015. Bird Studies Canada, Sackville NB, 609 recs.
201	Berrigan, L. 2019. Maritimes Marsh Monitoring Project 2013, 2014, 2016, 2017, and 2018 data. Bird Studies Canada, Sackville, NB.
177	Blaney, C.S.; Mazerolle, D.M. 2009. Fieldwork 2009. Atlantic Canada Conservation Data Centre. Sackville NB, 13395 recs.
176	Blaney, C.S.; Mazerolle, D.M.; Oberndorfer, E. 2007. Fieldwork 2007. Atlantic Canada Conservation Data Centre. Sackville NB, 13770 recs.
175	e-Butterfly. 2016. Export of Maritimes records and photos. Maxim Larrivee, Sambo Zhang (ed.) e-butterfly.org.
173	Wilhelm, S.I. et al. 2011. Colonial Waterbird Database. Canadian Wildlife Service, Sackville, 2698 sites, 9718 recs (8192 obs).
163	Mazerolle, D.M. 2017. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre.
157	Askanas, H. 2016. New Brunswick Wood Turtle Database. New Brunswick Department of Energy and Resource Development.
155	Benedict, B. Connell Herbarium Specimens (Data) . University New Brunswick, Fredericton. 2003.

# recs	CITATION
146	MacDonald, E.C. 2018. CWS Piping Plover Census, 2010-2017. Canadian Wildlife Service.
139	Klymko, J. 2018. Maritimes Butterfly Atlas database. Atlantic Canada Conservation Data Centre.
125	Blaney, C.S.; Spicer, C.D.; Rothfels, C. 2004. Fieldwork 2004. Atlantic Canada Conservation Data Centre. Sackville NB, 1343 recs.
123	Haughian, S.R. 2018. Description of Fuscopannaria leucosticta field work in 2017. New Brunswick Museum, 314 recs.
120	Belliveau, A.G. 2016. Atlantic Canada Conservation Data Centre Fieldwork 2016. Atlantic Canada Conservation Data Centre, 10695 recs.
119	Hinds, H.R. 1986. Notes on New Brunswick plant collections. Connell Memorial Herbarium, unpubl, 739 recs.
113	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.
111	Blaney, C.S. 2017. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre.
108	Speers, L. 2008. Butterflies of Canada database: New Brunswick 1897-1999. Agriculture & Agri-Food Canada, Biological Resources Program, Ottawa, 2048 recs.
100	Goltz, J.P. 2012. Field Notes, 1989-2005. , 1091 recs.
93	Mazerolle, D.M. 2005. Bouctouche Irving Eco-Centre rare coastal plant fieldwork results 2004-05. Irving Eco-centre, la Dune du Bouctouche, 174 recs.
93	Tremblay, E. 2006. Kouchibouguac National Park Digital Database. Parks Canada, 105 recs.
89	Brunelle, P.-M. (compiler). 2009. ADIP/MDDS Odonata Database: data to 2006 inclusive. Atlantic Dragonfly Inventory Program (ADIP), 24200 recs.
86	Coursol, F. 2005. Dataset from New Brunswick fieldwork for Eriocaulon parkeri COSEWIC report. Coursol, Pers. comm. to C.S. Blaney, Aug 26. 110 recs.
83	Blaney, C.S.; Mazerolle, D.M.; Klymko, J.; Spicer, C.D. 2006. Fieldwork 2006. Atlantic Canada Conservation Data Centre. Sackville NB, 8399 recs.
77	Klymko, J.J.D. 2016. 2015 field data. Atlantic Canada Conservation Data Centre.
76	Hicks, Andrew. 2009. Coastal Waterfowl Surveys Database, 2000-08. Canadian Wildlife Service, Sackville, 46488 recs (11149 non-zero).
74	Belliveau, A.G. 2018. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre.
69	Thomas, A.W. 1996. A preliminary atlas of the butterflies of New Brunswick. New Brunswick Museum.
64	Mazerolle, D.M. 2016. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre.
63	Canadian Wildlife Service, Dartmouth. 2010. Piping Plover censuses 2007-09, 304 recs.
56	Belland, R.J. Maritimes moss records from various herbarium databases. 2014.
56	Blaney, C.S.; Mazerolle, D.M. 2011. Fieldwork 2011. Atlantic Canada Conservation Data Centre. Sackville NB.
53	Sollows, M.C., 2008. NBM Science Collections databases: mammals. New Brunswick Museum, Saint John NB, download Jan. 2008, 4983 recs.
49	Benedict, B. Connell Herbarium Specimen Database Download 2004. Connell Memorial Herbarium, University of New Brunswick. 2004.
49	Honeyman, K. 2019. Unique Areas Database, 2018. J.D. Irving Ltd.
46	Blaney, C.S.; Spicer, C.D.; Popma, T.M.; Hanel, C. 2002. Fieldwork 2002. Atlantic Canada Conservation Data Centre. Sackville NB, 2252 recs.
45	Anon. 2017. Export of Maritimes Butterfly records. Global Biodiversity Information Facility (GBIF).
45	Tranquilla, L. 2015. Maritimes Marsh Monitoring Project 2015 data. Bird Studies Canada, Sackville NB, 5062 recs.
43	Churchill, J.L.; Walker, J. 2017. Species at Risk Surveys at Correctional Services Canada Properties in Nova Scotia and New Brunswick. Atlantic Canada Conservation Data Centre.
42	Busby, D.G. 1999. 1997-1999 Bicknell's Thrush data, unpublished files. Canadian Wildlife Service, Sackville, 17 recs.
40	Scott, Fred W. 1998. Updated Status Report on the Cougar (Puma Concolor cougar) [ Eastern population]. Committee on the Status of Endangered Wildlife in Canada, 298 recs.
38	Blaney, C.S. 2016. Atlantic Canada Conservation Data Centre Fieldwork 2016. Atlantic Canada Conservation Data Centre, 6719 recs.
37	Allen, K. 2012. Rare plant spatial data from Pleasant Ridge cranberry farm. NB Department of Environment, Environmental Assessment Section, 39 recs.
37	Blaney, C.S. 2000. Fieldwork 2000. Atlantic Canada Conservation Data Centre. Sackville NB, 1265 recs.
37	Robinson, S.L. 2010. Fieldwork 2009 (dune ecology). Atlantic Canada Conservation Data Centre. Sackville NB, 408 recs.
36	Robinson, S.L. 2015. 2014 field data.
35	Amirault, D.L. 2000. Piping Plover Surveys, 1983-2000. Canadian Wildlife Service, Sackville, unpublished data. 70 recs.
35	Miramichi River Environmental Assessment Committee. 2017. Wood Turtle (Glyptemys insculpta) Miramichi & Richibucto Watersheds Inventory 2016. Vladimir King Trajkovic (ed.) Miramichi River Environmental Assessment Committee.
34	Bateman, M.C. 2001. Coastal Waterfowl Surveys Database, 1965-2001. Canadian Wildlife Service, Sackville, 667 recs.
34	Blaney, C.S.; Mazerolle, D.M. 2008. Fieldwork 2008. Atlantic Canada Conservation Data Centre. Sackville NB, 13343 recs.
30	Campbell, G., Villamil, L. 2012. Heath Steele Mine Bird Surveys 2012.
29	Wood Turtle (Glyptemys insculpta) Miramichi Watershed Synopsis 2013
29	Compiled by: Vladimir King Trajkovic, EPt Miramichi River Environmental Assessment Committee
26	Manthorne, A. 2014. MaritimesSwiftwatch Project database 2013-2014. Bird Studies Canada, Sackville NB, 326 recs.
25	Hilaire Chiasson Rare vascular plant specimens in the Hilaire Chiasson Herbarium. 2015.
25	Klymko, J.J.D. 2016. 2014 field data. Atlantic Canada Conservation Data Centre.
24	Donell, R. 2008. Rare plant records from rare coastal plant project. Bouctouche Dune Irving Eco-centre. Pers. comm. to D.M. Mazerolle, 50 recs.
24	Doucet, D.A. & Edsall, J.; Brunelle, P.-M. 2007. Miramichi Watershed Rare Odonata Survey. New Brunswick ETF & WTF Report, 1211 recs.
24	Klymko, J.J.D. 2018. 2017 field data. Atlantic Canada Conservation Data Centre.
24	Neily, T.H. 2017. Maritimes Lichen and Bryophyte records. Atlantic Canada Conservation Data Centre, 1015 recs.
24	Spicer, C.D. 2002. Fieldwork 2002. Atlantic Canada Conservation Data Centre. Sackville NB, 211 recs.
23	Keppie, D.M. 2005. Rare Small Mammal Records in NB, PE. Pers. comm. to K. Bredin; PE 1 rec., NB 24 recs, 23 recs.
23	McAlpine, D.F. 1998. NBM Science Collections: Wood Turtle records. New Brunswick Museum, Saint John NB, 329 recs.
22	Erskine, A.J. 1999. Maritime Nest Records Scheme (MNRS) 1937-1999. Canadian Wildlife Service, Sackville, 313 recs.
22	Nussey, Pat & NCC staff. 2019. AEI tracked species records, 2016-2019. Chapman, C.J. (ed.) Atlantic Canada Conservation Data Centre, 333.
22	Trajkovic, V.K. 2017. Wood turtles inventory miramichi watershed 2017. Miramichi River Environmental Action Committee, 22 records.

# recs	CITATION
21	Bagnell, B.A. 2001. New Brunswick Bryophyte Occurrences. B&B Botanical, Sussex, 478 recs.
21	Doucet, D.A. & Edsall, J. 2007. Ophiogomphus howei records. Atlantic Canada Conservation Data Centre, Sackville NB, 21 recs.
21	Doucet, D.A. 2007. Lepidopteran Records, 1988-2006. Doucet, 700 recs.
21	Mazerolle, M.J., Drolet, B., & Desrochers, A. 2001. Small Mammal Responses to Peat Mining of Southeastern Canadian Bogs. Can. J. Zool., 79:296-302. 21 recs.
20	Clayden, S.R. 2007. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, download Mar. 2007, 6914 recs.
20	Hinds, H.R. 1999. Connell Herbarium Database. University New Brunswick, Fredericton, 131 recs.
20	Kouchibouguac National Park, Natural Resource Conservation Sec. 1988. The Resources of Kouchibouguac National Park. Beach, H. (ed.) , 90 recs.
19	Tingley, S. (compiler). 2001. Butterflies of New Brunswick. , Web site: www.geocities.com/Yosemite/8425/buttrfly. 142 recs.
18	Plissner, J.H. & Haig, S.M. 1997. 1996 International piping plover census. US Geological Survey, Corvallis OR, 231 pp.
16	Arsenault, M. 2019. Cormorant colony nest counts. PE Department of Communities, Land, and Environment.
16	Cowie, Faye. 2007. Surveyed Lakes in New Brunswick. Canadian Rivers Institute, 781 recs.
16	Mazerolle, D. 2003. Assessment of Seaside Pinweed ( <i>Lechea maritima</i> var. <i>subcylindrica</i> ) in Southeastern New Brunswick. Irving Eco-centre, la Dune du Bouctouche, 18 recs.
16	NatureServe Canada. 2018. iNaturalist Butterfly Data Export . iNaturalist.org and iNaturalist.ca.
15	Belland, R.J. 1992. The Bryophytes of Kouchibouguac National Park. Parks Canada, Kouchibouguac NP, 101 pp. + map.
14	Edsall, J. 2001. Lepidopteran records in New Brunswick, 1997-99. , Pers. comm. to K.A. Bredin. 91 recs.
14	Morton, L.D. & Savoie, M. 1983. The Mammals of Kouchibouguac National Park. Parks Canada Report prep. by Canadian Wildlife Service, Sackville, NB, Vols 1-4. 14 recs.
13	Patrick, A.; Horne, D.; Noseworthy, J. et. al. 2017. Field data for Nova Scotia and New Brunswick, 2015 and 2017. Nature Conservancy of Canada.
13	Sollows, M.C. 2008. NBM Science Collections databases: herpetiles. New Brunswick Museum, Saint John NB, download Jan. 2008, 8636 recs.
13	Toner, M. 2005. Lynx Records 1996-2005. NB Dept of Natural Resources, 48 recs.
13	Vladimir King Trajkovic. 2018. Brook Floater ( <i>Alasmidonta varicosa</i> ) records from MREAC surveys 2010-2017. Miramichi River Environmental Assessment Committee.
12	Webster, R.P. & Edsall, J. 2007. 2005 New Brunswick Rare Butterfly Survey. Environmental Trust Fund, unpublished report, 232 recs.
12	Doucet, D.A. 2008. Fieldwork 2008: Odonata. ACCDC Staff, 625 recs.
12	Klymko, J. Henry Hensel's Butterfly Collection Database. Atlantic Canada Conservation Data Centre. 2016.
12	Majka, C. 2009. Université de Moncton Insect Collection: Carabidae, Cerambycidae, Coccinellidae. Université de Moncton, 540 recs.
11	Canadian Wildlife Service, Atlantic Region. 2010. Piping Plover censuses 2006-09. , 35 recs.
11	Chiasson, R. & Dietz, S. 1998. Piper Project Report of Common Tern Observations. Corvus Consulting, Tabusintac NB, 20 recs.
11	David, M. 2000. CNPA website. Club de naturalistes de la Péninsule acadienne (CNPA), www.francophone.net/cnpra/rare. 16 recs.
11	Dept of Fisheries & Oceans. 1999. Status of Wild Striped Bass, & Interaction between Wild & Cultured Striped Bass in the Maritime Provinces. , Science Stock Status Report D3-22. 13 recs.
11	Klymko, J.J.D.; Robinson, S.L. 2014. 2013 field data. Atlantic Canada Conservation Data Centre.
11	Sollows, M.C., 2009. NBM Science Collections databases: molluscs. New Brunswick Museum, Saint John NB, download Jan. 2009, 6951 recs (2957 in Atlantic Canada).
11	Webster, R.P. Database of R.P. Webster butterfly collection. 2017.
10	Klymko, J.J.D.; Robinson, S.L. 2012. 2012 field data. Atlantic Canada Conservation Data Centre, 447 recs.
10	Mazerolle, D.M. 2018. Atlantic Canada Conservation Data Centre botanical fieldwork 2018. Atlantic Canada Conservation Data Centre, 13515 recs.
10	Tremblay, E. 2001. Kouchibouguac River Freshwater Mussel Data. Parks Canada, Kouchibouguac NP, 45 recs.
9	Churchill, J.L. 2018. Atlantic Canada Conservation Data Centre Fieldwork 2017. Atlantic Canada Conservation Data Centre, 2318 recs.
9	Mawhinney, K. & Seutin, G. 2001. Lepidoptera Survey of the Salt Marshes of of Kouchibouguac National Park. Parks Canada Unpublished Report, 5p. 9 recs.
9	Webster, R.P. 2001. R.P. Webster Collection. R. P. Webster, 39 recs.
8	Bateman, M.C. 2000. Waterfowl Brood Surveys Database, 1990-2000 . Canadian Wildlife Service, Sackville, unpublished data. 149 recs.
8	Edsall, J. 2007. Personal Butterfly Collection: specimens collected in the Canadian Maritimes, 1961-2007. J. Edsall, unpubl. report, 137 recs.
8	Klymko, J. Dataset of butterfly records at the New Brunswick Museum not yet accessioned by the museum. Atlantic Canada Conservation Data Centre. 2016.
8	Pike, E., Tingley, S. & Christie, D.S. 2000. Nature NB Listserve. University of New Brunswick, listserv.unb.ca/archives/naturenb. 68 recs.
8	Sollows, M.C. Export of New Brunswick Museum butterfly records for the Maritimes provinces. New Brunswick Museum. 2016.
8	Wilhelm, S.I. et al. 2019. Colonial Waterbird Database. Canadian Wildlife Service.
7	Boyne, A.W. 2000. Tern Surveys. Canadian Wildlife Service, Sackville, unpublished data. 168 recs.
7	Chaput, G. 2002. Atlantic Salmon: Maritime Provinces Overview for 2001. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-14. 39 recs.
7	Doucet, D.A. 2008. Wood Turtle Records 2002-07. Pers. comm. to S. Gerriets, 7 recs, 7 recs.
7	Holder, M.L.; Kingsley, A.L. 2000. Kingsley and Holder observations from 2000 field work.
7	Neily, T. H. 2018. Lichen and Bryophyte records, AEI 2017-2018. Tom Neily; Atlantic Canada Conservation Data Centre.
7	Toner, M. 2005. NB DNR fieldwork on Parker's Pipewort. NB Dept of Natural Resources. Pers. comm to C.S. Blaney, Dec 12, 8 recs.
6	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2000.
6	Chaput, G. 1999. Atlantic Salmon: Miramichi & SFA 16 Rivers. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-05. 6 recs.
6	Cronin, P. & Ayer, C.; Dubee, B.; Hooper, W.C.; LeBlanc, E.; Madden, A.; Pettigrew, T.; Seymour, P. 1998. Fish Species Management Plans (draft). NB DNRE Internal Report. Fredericton, 164pp.
6	Elward, D. 2017. 2015-2016 Freshwater Mussel Inventories in the Bouctouche Watershed. Southeastern Anglers Association, 6 recs.
6	Gowan, S. 1980. The Lichens of Kouchibouguac National Park, Parts I (Macrolichens) & II (Microlichens). National Museum of Natural Sciences. Ottawa, ON, 7 recs.
6	McLeod, D. & Merrithew, C. 2005. The Inventory of the Flora and Fauna of the French Fort Cove Nature Park. French Fort Cove Development Commission, 7 recs.
6	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2013.
6	Newell, R.E. 2008. Vascular Plants of Muzroll Lake. Pers. comm. to C.S. Blaney, 1 pg. 43 recs.
5	Bastien, D. 2017. Rare Peatland plant observations. Pers. comm. to H. Askanas, New Brunswick Department of Energy and Resource Development.



# recs	CITATION
5	Blaney, C.S. 1999. Fieldwork 1999. Atlantic Canada Conservation Data Centre. Sackville NB, 292 recs.
5	Chiasson, R. 2018. Breeding bird observations from NBWTF project. pers. comm. to S. Blaney.
5	Holder, M. & Kingsley, A.L. 2000. Peatland Insects in NB & NS: Results of surveys in 10 bogs during summer 2000. Atlantic Canada Conservation Data Centre, Sackville, 118 recs.
5	Ogden, K. Nova Scotia Museum butterfly specimen database. Nova Scotia Museum. 2017.
4	Blaney, C.S.; Mazerolle, D.M.; Belliveau, A.B. 2014. Atlantic Canada Conservation Data Centre Fieldwork 2014. Atlantic Canada Conservation Data Centre, # recs.
4	Dalton, M. & Saba, B.A. 1980. A preliminary report on the natural history of the Gaspé shrew. The Atlantic Center for the Environment, Ipswich, MA, 29 pp.
4	Gautreau-Daigle, H. 2007. Rare plant records from peatland surveys. Coastal Zones Research Institute, Shippagan NB. Pers. comm. to D.M. Mazerolle, 39 recs.
4	Godbout, V. 2000. Recherche de l'Aster du St-Laurent ( <i>Aster laurentianus</i> ) et du Satyre des Maritimes ( <i>Coenonympha nepisiquit</i> ) au Parc national Kouchibouguac et a Dune du Bouctouche, N-B. Irving Eco-centre, 23 pp.
4	Gravel, Mireille. 2010. Coordonnées des tortues des bois Salmon River Road, 2005. Kouchibouguac National Park, 4 recs.
4	Hinds, H.R. 1997. Vascular Plants of Cocagne Island. , 14 recs.
4	Hoyt, J.S. 2001. Assessment and update status report on the Bathurst Aster ( <i>Symphotrichum subulatum</i> ) in Canada. Committee on the Status of Endangered Wildlife in Canada, 4 recs.
4	McLeod, D. & Saunders, J. 2004. <i>Cypripedium reginae</i> . Pers. comm. to C.S. Blaney. 4 recs, 4 recs.
4	Parks Canada. 2010. Specimens in or near National Parks in Atlantic Canada. Canadian National Museum, 3925 recs.
4	Spicer, C.D., Popma, T.M. 2003. UPM Kymmene site survey 2003
4	Webster, R.P. 1997. Status Report on Maritime Ringlet ( <i>Coenonympha nipisiquit</i> ) in Canada. Committee on the Status of Endangered Wildlife in Canada, 4 recs.
3	Amirault, D.L. 1997-2000. Unpublished files. Canadian Wildlife Service, Sackville, 470 recs.
3	Bredin, K.A. 2001. WTF Project: Freshwater Mussel Fieldwork in Freshwater Species data. Atlantic Canada Conservation Data Center, 101 recs.
3	Gagnon, E. Herbarium from 2017 Plant Systematics class. Université de Moncton. 2017.
3	Gautreau, R. 2005. <i>Betula michauxii</i> occurrence on Bog 324, near Baie-Ste-Anne, NB. Pers. comm. to C.S. Blaney, 3 recs.
3	Gauvin, J.M. 1979. Etude de la vegetation des marais sales du parc national Kouchibouguac, N-B. M.Sc. Thesis, Université de Moncton, 248 pp.
3	Godbout, Valérie. 2010. Étude de l'Aster du Saint-Laurent ( <i>Symphotrichum laurentianum</i> ) dans le parc national Kouchibouguac, 2000-04. Parks Canada, 3 recs.
3	Grondin, P. & Blouin, J.-L., Bouchard, D.; et al. 1981. Description et cartographie de la vegetation du cordon littoral. Parc National de Kouchibouguac. Le Groupe Dryade, 57 pp.
3	Klymko, J.J.D. 2012. Insect fieldwork & submissions, 2003-11. Atlantic Canada Conservation Data Centre. Sackville NB, 1337 recs.
3	Mazerolle, D. 2003. Assessment and Rehabilitation of the Gulf of St Lawrence Aster ( <i>Symphotrichum laurentianum</i> ) in Southeastern New Brunswick. Irving Eco-centre, la Dune du Bouctouche, 13 recs.
3	McAlpine, D.F. 1998. NBM Science Collections databases to 1998. New Brunswick Museum, Saint John NB, 241 recs.
3	Nelson Poirier. 2009. Rare plant finds in the Exmoor & Lyttleton areas. Pers. comm. to S. Blaney. 4 recs, 4 recs.
3	Sollows, M.C., 2009. NBM Science Collections databases: Coccinellid & Cerambycid Beetles. New Brunswick Museum, Saint John NB, download Feb. 2009, 569 recs.
3	Speers, L. 2001. Butterflies of Canada database. Agriculture & Agri-Food Canada, Biological Resources Program, Ottawa, 190 recs.
3	Spicer, C.D. 2004. Specimens from CWS Herbarium, Mount Allison Herbarium Database. Mount Allison University, 5939 recs.
3	Toner, M. 2001. Lynx Records 1973-2000. NB Dept of Natural Resources, 29 recs.
2	Anon. Dataset of butterfly records for the Maritime provinces. Museum of Comparative Zoology, Harvard University. 2017.
2	Basquill, S.P. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre, Sackville NB, 69 recs.
2	Benedict, B. Connell Herbarium Specimens, Digital photos. University New Brunswick, Fredericton. 2005.
2	Blaney, C.S. Miscellaneous specimens received by ACCDC (botany). Various persons. 2001-08.
2	Bouchard, A. Herbar Marie-Victorin. Université de Montreal, Montreal QC. 1999.
2	Catling, P.M., Erskine, D.S. & MacLaren, R.B. 1985. The Plants of Prince Edward Island with new records, nomenclatural changes & corrections & deletions, 1st Ed. Research Branch, Agriculture Canada, Ottawa, Publication 1798. 22pp.
2	Chapman, C.J. 2018. Atlantic Canada Conservation Data Centre botanical fieldwork 2018. Atlantic Canada Conservation Data Centre, 11171 recs.
2	Chiasson, H. 2007. Les Papillons diurnes. NB Naturalist, 34(1): 4-7.
2	Donelle, R. 2007. Bouctouche Dune Rare Coastal Plant Data. Irving Eco-centre, la Dune du Bouctouche, 2 recs.
2	Downes, C. 1998-2000. Breeding Bird Survey Data. Canadian Wildlife Service, Ottawa, 111 recs.
2	Godbout, V. 2001. Recherche de l'Aster du St-Laurent ( <i>Symphotrichum laurentianum</i> ) dans les marais sales du sud-est du Nouveau-Brunswick. Irving Eco-centre, la Dune du Bouctouche, 23 pp.
2	Goltz, J.P. 2002. Botany Ramblings: 1 July to 30 September, 2002. N.B. Naturalist, 29 (3):84-92. 7 recs.
2	Madden, A. 1998. Wood Turtle records in northern NB. New Brunswick Dept of Natural Resources & Energy, Campbellton, Pers. comm. to S.H. Gerriets. 16 recs.
2	NatureServe Canada. 2017. iNaturalist Butterfly Data Export . iNaturalist.org and iNaturalist.ca.
2	NatureServe Canada. 2018. iNaturalist Maritimes Butterfly Records. iNaturalist.org and iNaturalist.ca.
2	Newell, R.E. 2000. E.C. Smith Herbarium Database. Acadia University, Wolfville NS, 7139 recs.
1	Belliveau, A.G. E.C. Smith Herbarium Specimen Database 2019. E.C. Smith Herbarium, Acadia University. 2019.
1	Blaney, C.S. 2018. Atlantic Canada Conservation Data Centre Fieldwork 2018. Atlantic Canada Conservation Data Centre.
1	Blaney, C.S. 2019. Atlantic Canada Conservation Data Centre Fieldwork 2019. Atlantic Canada Conservation Data Centre.
1	Boyne, A.W. 2001. Portage Island National Wildlife Area inspection visit. Canadian Wildlife Service, Sackville, 1 rec.
1	Bredin, K.A. 2001. NB Freshwater Mussel Fieldwork. Atlantic Canada Conservation Data Center, 16 recs.
1	Bredin, K.A. 2002. NB Freshwater Mussel Fieldwork. Atlantic Canada Conservation Data Center, 30 recs.
1	Brunelle, P.-M. 2005. Wood Turtle observations. Pers. comm. to S.H. Gerriets, 21 Sep. 3 recs, 3 recs.
1	Collins, H. 2014. Email to John Klymko regarding CHELserp record from Miramichi watershed. Miramichi River Environmental Assessment Committee, 1 record.
1	Cormier, R. 2019. Wood Turtle observation. pers. comm. to J.L. Churchill.
1	Curley, F.R. 2005. PEF&W Collection 2003-04. PEI Fish & Wildlife Div., 716 recs.
1	DeMerchant, A. 2019. Bank Swallow colony observation. NB Department of Energy and Resource Development, Pers. comm. to J.L. Churchill.

# recs	CITATION
1	Desilets-Starrak, J. 2015. Wood Turtle record. Pers. comm. to E. Tremblay, Parks Canada.
1	Dibblee, R.L. 1999. PEI Cormorant Survey. Prince Edward Island Fisheries, Aquaculture & Environment, 1p. 21 recs.
1	Doucet, D.A. 2007. Fieldwork 2007: Insects (minus Odonata). ACCDC Staff, 1 rec.
1	Douglas, S.G. & G.C. Chaput & R. Bradford. 2001. Status of Striped Bass ( <i>Morone saxatilis</i> ) in the southern Gulf of St. Lawrence in 1999 & 2000. DFO Canadian Science Advisory Secretariat Res. Doc. 2001/058, 2001/058. 1 rec.
1	Edsall, J. 1993. Summer 1993 Report. New Brunswick Bird Info Line, 2 recs.
1	Elderkin, M. 2001. Bog Lemming record for Popple Depot NB. , Pers. comm. to K.A. Bredin. 1 rec.
1	Erskine, D. 1960. The plants of Prince Edward Island, 1st Ed. Research Branch, Agriculture Canada, Ottawa., Publication 1088. 1238 recs.
1	Glen, W. 1991. 1991 Prince Edward Island Forest Biomass Inventory Data. PEI Dept of Energy and Forestry, 10059 recs.
1	Goltz, J.P. & Bishop, G. 2005. Confidential supplement to Status Report on Prototype Quillwort ( <i>Isoetes prototypus</i> ). Committee on the Status of Endangered Wildlife in Canada, 111 recs.
1	Goltz, J.P. 2007. Field Notes: <i>Listera australis</i> at Kouchibouguac National Park. , 7 recs.
1	Klymko, J. 2019. Atlantic Canada Conservation Data Centre zoological fieldwork 2018. Atlantic Canada Conservation Data Centre.
1	Klymko, J. Univeriste de Moncton insect collection butterfly record dataset. Atlantic Canada Conservation Data Centre. 2017.
1	Klymko, J.J.D. 2011. Insect fieldwork & submissions, 2010. Atlantic Canada Conservation Data Centre. Sackville NB, 742 recs.
1	Klymko, J.J.D. 2012. Insect field work & submissions. Atlantic Canada Conservation Data Centre, 852 recs.
1	Klymko, J.J.D. 2012. Insect fieldwork & submissions, 2011. Atlantic Canada Conservation Data Centre. Sackville NB, 760 recs.
1	Mazerolle, D.M. Small-flowered <i>Agalinis</i> collection from Quarryville. AC CDC. 2018.
1	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014.
1	New York Botanical Garden. 2006. Virtual Plant Herbarium - Vascular Plant Types Catalog. Sylva, S.; Kallunki, J. (ed.) International Plant Science Centre, Web site: <a href="http://sciweb.nybg.org/science2/vii2.asp">http://sciweb.nybg.org/science2/vii2.asp</a> . 4 recs.
1	Nye, T. 2002. Wood Turtle observations in Westmorland, Queens Cos. , Pers. com. to S.H. Gerriets, Dec. 3. 3 recs.
1	Richardson, D., Anderson, F., Cameron, R, Pepper, C., Clayden, S. 2015. Field Work Report on the Wrinkled Shingle lichen ( <i>Pannaria lurida</i> ). COSEWIC.
1	Sabine, D.L. 2005. 2001 Freshwater Mussel Surveys. New Brunswick Dept of Natural Resources & Energy, 590 recs.
1	Sabine, D.L. 2013. Dwaine Sabine butterfly records, 2009 and earlier.
1	Saunders, J. 2009. White-Fringe Orchis photo and coordinates. Pers. comm. to S. Blaney, July 17. 1 rec, 1 rec.
1	Toner, M. 2009. Wood Turtle Sightings. NB Dept of Natural Resources. Pers. comm. to S. Gerriets, Jul 13 & Sep 2, 2 recs.
1	Tremblay, E., Craik, S.R., Titman, R.D., Rousseau, A. & Richardson, M.J. 2006. First Report of Black Terns Breeding on a Coastal Barrier Island. <i>Wilson Journal of Ornithology</i> , 118(1):104-106. 1 rec.
1	Young, A.D., Titman, R.D. 1986. Costs and benefits to Red-breasted Mergansers nesting in tern and gull colonies. <i>Can. J. Zool.</i> , 64: 2339-2343.