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CONSULTING

**McCAIN FOODS CANADA, A DIVISION OF MCCAIN FOODS  
LIMITED**

# **Environmental Impact Assessment Registration**

**Grand Falls Complex Processing Line Expansion Project  
Grand Falls, New Brunswick**



February 2020 – 20-2077



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## 1.0 Introduction

This Environmental Impact Assessment (EIA) Registration document has been developed to initiate the EIA regulatory review and approval process for the Grand Falls Complex Processing Line Expansion Project (referred to herein as “the Project”) of the McCain Foods (Canada) (“McCain”) food processing facility located at in Grand Falls, New Brunswick. The Project involves the addition of a new Formed Potato Specialty processing line that will require the use of additional water as well as upgrades to the existing wastewater treatment system.

The Project is an “undertaking” under items (m) and (s) of Schedule “A” of the New Brunswick *Environmental Impact Assessment Regulation – Clean Environment Act* (EIA Regulation) [“(m) all waste disposal facilities or systems” and “(s) all waterworks with a capacity greater than 50 cubic metres of water daily”]. As such, the Project must be registered under Section 5(1) of the EIA Regulation.

This EIA Registration document is submitted to the New Brunswick Department of Environment and Local Government (NBDELG) under Section 5(2) of the New Brunswick *Environmental Impact Assessment Regulation 87-83 of the Clean Environment Act*. It has been prepared by Dillon Consulting Limited (Dillon) on behalf of McCain.

### 1.1 The Undertaking

The Undertaking may be referred to as the “Grand Falls Complex Processing Line Expansion Project” (or simply “the Project” within this EIA Registration).

### 1.2 The Proponent

#### 1.2.1 Name of Proponent

McCain Foods Canada, a Division of McCain Foods Limited.

#### 1.2.2 Address of Proponent

McCain Foods Canada a Division of McCain Foods Limited  
 Grand Falls Frozen Food Production Facility  
 795 Route 108  
 Grand Falls, NB  
 E3Z 4A5

### 1.2.3 Principal Proponent Contact

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The Proponent's project manager and principal proponent contact for the Project is:

**Peter Cormier, P.Eng.**

Manager of Environmental Engineering

McCain Foods Limited

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Grand Falls, NB

E3Z 4A5

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Phone: 920-997-7277

### 1.2.4 Principal Contact Person for the EIA Registration

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The principal contact for the purposes of the EIA Registration is:

**Kristin Banks, P.Eng**

Project Manager

Dillon Consulting Limited

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## 2.0 Project Description

A description of the Project as currently conceived is provided in this section.

### 2.1 Project Overview (Nature of the Undertaking)

The purpose of the Project is to expand the existing McCain Grand Falls food processing facility to increase the amount of finished product by adding a new Formed Potato Specialty production line that will produce an additional five metric tonnes per hour of finished product in order to meet the growing demand for specialty potato products in North America. This expansion will establish approximately 80 new full-time jobs in the local region.

The Project involves the expansion of the existing Grand Falls frozen food production complex which involves the addition of a new processing line, an associated increase in water usage and corresponding upgrades to the existing wastewater treatment system. The Project components required to complete this expansion will include the following:

- The addition of a new Formed Potato Specialty processing line within the existing on-site production building;
- An associated increase in groundwater use compared to the existing operation, which will be fulfilled by pumping approximately 2,200 litres per minute (L/min) of groundwater from the existing on-site wells compared to currently;
- Corresponding upgrades to the existing wastewater treatment system onsite, consisting of the addition of an anaerobic digester tank, a break-tank, and a pumping station to the existing wastewater treatment system, and associated technology upgrades to the existing system, in order to treat the increased volume of wastewater produced by the new processing line. The new infrastructure will be installed adjacent to the existing system in an area currently used as a parking lot;
- An increase in the volume of treated water being discharged that will remain below the current allowable discharge volume limits and effluent quality criteria in the facility's current approval to operate; and
- A new potato storage building will be built. All new facilities to be built to accommodate the Project will be developed within existing disturbed areas of the existing McCain Grand Falls complex.

### 2.2 Project Location and Ownership

The McCain Grand Falls frozen food production complex is located in northwestern New Brunswick, on McCain Road in the rural community of Saint-André, near Grand Falls, Victoria County, New Brunswick,

on the east side of the Saint John River (**Figure 1**). The surrounding area includes residential, commercial, and agricultural properties.

The complex was first developed in the 1970s and spans parcel identifier (PID) numbers 35355452, 35355445, 35355452, 35346568, 35355460, 35106764, 35108034 and 35357011, as referenced by Service New Brunswick.

The new processing line will be located within the existing production building on PID No. 35355445 and will connect to the existing water supply wells and wastewater treatment system via existing piping. A small building, approximately 450 m<sup>2</sup> in size, will be constructed adjacent to the production building in an area that has been previously developed in order to facilitate the receiving of potatoes (**Figure 2**).

The new anaerobic digester tank, break-tank, and pumping station will be located adjacent to the existing wastewater treatment system on PID No. 35106764 in an area currently used as a parking lot (**Figure 2**).

Additionally, a new potato storage building will be constructed in an existing disturbed area of PID No. 35355455 in an area currently used for potato receiving.

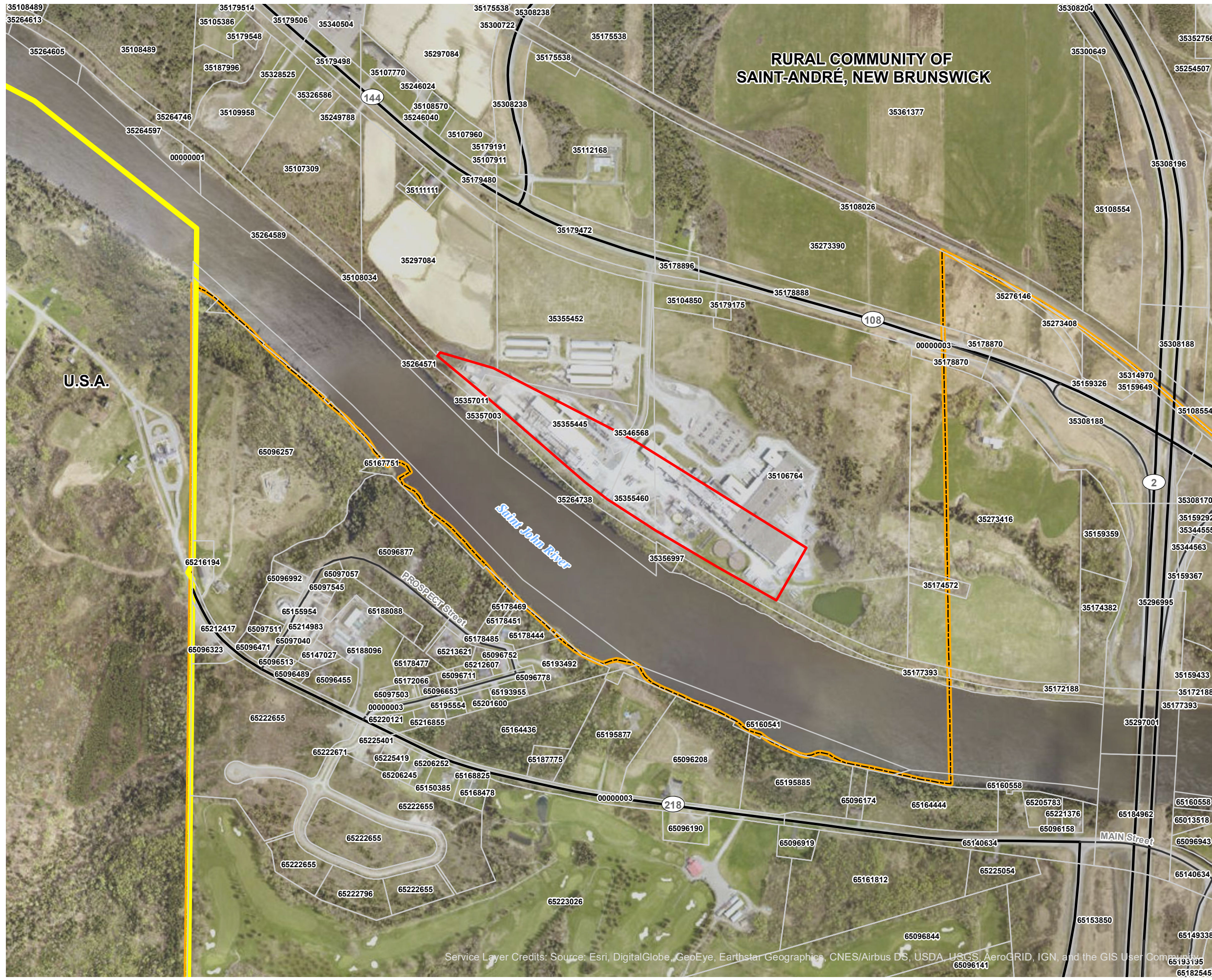
No physical modifications are required to the existing groundwater production wells located on-site in order to accommodate the Project, provided the water withdrawal rate does not exceed the sustainable yield of the wells (to be confirmed via a pumping test in accordance with the NBDELG's Water Supply Source Assessment [WSSA] process, discussed later in this EIA Registration).

The Project will be confined to the existing Grand Falls Complex, specifically PID Nos. 35355452, 35355445, 35355460, and 35106764; however, the footprint of the area that will be disturbed to install the digester tank, break-tank and pumping station is limited to approximately 1,500 m<sup>2</sup> on PID No. 35106764, as defined by the coordinates on **Figure 2**.

### 2.3 Purpose, Rationale, and Need for the Project

The purpose of the Project is to expand the existing McCain Grand Falls food processing facility to increase the amount of finished product by adding a new Formed Potato Specialty production line that will produce an additional five metric tonnes per hour of finished. This expansion, at a cost of \$80 million (CAD), will establish approximately 80 new full-time jobs in the local region.

Over the past few years there has been a notable increase in the worldwide demand for Formed Potato Specialty products. This Project will enable McCain to meet the growing demand and strengthen the company's presence in Canada. Additionally, the new equipment will feature advanced technology that includes state-of-the-art food safety, processing and packing equipment to meet the improving quality standards worldwide.



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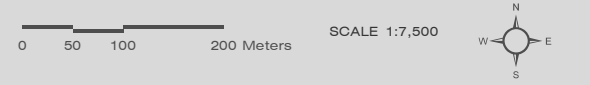
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NORTH AMERICA**

GRAND FALLS COMPLEX  
PROCESSING LINE EXPANSION

**PROJECT LOCATION**

FIGURE 1

- Project Area
- Local Roads
- Highway
- Property Boundary
- Canada-U.S.A Border
- Town Limit of Grand Falls, N.B.



MAP DRAWING INFORMATION:  
DATA PROVIDED BY GEONB  
  
MAP CREATED BY: KE  
MAP CHECKED BY: JH, JAB  
MAP PROJECTION: NAD 1983 CSRS NEW BRUNSWICK STEREOGRAPHIC



PROJECT: 20-2077  
STATUS: FINAL  
DATE: 2020-01-31

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community








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GRAND FALLS COMPLEX  
PROCESSING LINE EXPANSION

## EXISTING AND PROPOSED INFRASTRUCTURE

FIGURE 2

-  Project Area
-  Connections
-  Proposed Infrastructure
-  Existing Infrastructure
-  Area of Disturbance



*Saint John River*



MAP DRAWING INFORMATION:  
DATA PROVIDED BY GEONB

MAP CREATED BY: KE  
MAP CHECKED BY: JH,JAB  
MAP PROJECTION: NAD 1983 CSRS NEW BRUNSWICK STEREOGRAPHIC



PROJECT: 20-2077  
STATUS: FINAL  
DATE: 2020-02-05

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## 2.4

## Siting Considerations

The Project will occur within existing disturbed areas of the existing McCain Grand Falls Complex and will not increase the developed footprint of the complex. The anaerobic digester tank, break-tank, and pumping station will be installed in an area that is currently used as a parking lot and has been previously excavated and graded to facilitate the development of the site. As well, the new potato storage building will also be developed in existing disturbed areas of the site in an area that is used as a tractor-trailer parking area. Collectively, these areas are referred to in this EIA Registration as “the Project Area”. These areas were selected in consideration of:

- Minimizing the disturbance of natural habitat by locating the new infrastructure in areas that had previously been disturbed;
- Maintaining buffers of water features, given that the area to be disturbed is located more than 50 m from the Saint John River and over 200 m from the nearest wetland; and
- The effects of climate change by ensuring the new infrastructure would be located outside of floodplains.

The remaining expansion infrastructure will be located within existing buildings at the Grand Falls complex to minimize effects to the natural environment or potential heritage resources.

## 2.5

## Construction Details

The construction of the Project will be completed in three distinct components referred to as: installation of the new production line; construction of the expanded wastewater treatment system; increasing the volume of water produced by the water supply wells; and construction of the potato receiving building.

### Installation of the New Production Line

The new production line will be installed within the existing production building in spring 2020. All connections to the new supporting systems (i.e., electrical, water supply) will occur within the building. The construction activities are anticipated to occur within typical hours of operation for the complex.

The new production line will include an exhaust capture system that will direct vegetable oil mist from the frying operations into a Rotoclone. The Rotoclone uses a centrifugal exhauster and dynamic wet scrubber to separate the oil from the air prior to exhausting the air to the environment. The remaining oil and water will be discharged to the wastewater treatment system.

External work will be limited to concrete infrastructure and an engineered steel building construction for potato receiving. This work is to occur on the south side of property, utilizing approximately 450 m<sup>2</sup>. The existing area was previously cleared and utilized for parking and facility access, therefore, vegetation clearing is not anticipated.

### Construction of the Expanded Wastewater Treatment System

Construction of the expanded wastewater treatment system will begin in spring 2020 with the preparation of the area for the new tanks. The area of disturbance has been previously cleared and utilized for parking; therefore, vegetation clearing or other biophysical disturbance is not anticipated. The crushed rock currently in place at the location of the expanded wastewater treatment system will be excavated to allow for the placement of compacted aggregate and a concrete base for the proposed tanks. Shallow trenches will then be dug to connect the prepared areas to the existing system.

The infrastructure to be installed will be commissioned from suppliers and delivered to site for placement via McCain Road. Once in place, the tanks will be connected to the existing system and backfilling or regrading will occur.

Construction is anticipated to occur during daylight hours and take approximately 20 weeks to complete. Although access to the construction area will be controlled during these activities it is not anticipated to impede traffic flow in the complex or on McCain Road.

### Increased Water Withdrawal from the Existing Water Supply Well

Once the new tanks for the wastewater treatment system have been connected, the pumping rates for the water supply wells will be increased. The increase will be controlled by technical systems already in place and will not involve any ground disturbance or new infrastructure.

### Construction of the Potato Receiving Building

Construction of the proposed potato receiving building will begin in spring 2020 in an area that is currently used for offloading potatoes and measures approximately 450 m<sup>2</sup>. Because the area is already developed, no vegetation clearing is required. The crushed rock currently in place will be excavated to allow for the placement of compacted aggregate and a concrete base to serve as the building foundation. The steel frame will be constructed in-place and finished using materials similar to the production line building.

Construction is anticipated to occur during daylight hours and take approximately 16 weeks to complete. Although access to the construction area will be controlled during these activities, alternate arrangements will be made for receiving potatoes during construction and it is not anticipated to impede traffic flow in the complex or on McCain Road.

## 2.6 Operation and Maintenance Details

Once the proposed expansion of the facility is complete, production will be increased by approximately one third, or an additional five metric tonnes of finished product per hour. Aligned with the increase in production rate, there will be a corresponding increase of approximately 2,200 L/min in the volume of water consumed. A Water Source Supply Assessment has been completed for the Project and is presented in **Appendix A**.

The wastewater produced will continue to be treated and discharged into the Saint John River, and will remain below the current allowable discharge volume limits and effluent quality criteria in the current approval to operate.

The estimated lifespan of the new process line and wastewater treatment infrastructure is 50 years, with only regular routine maintenance being required.

## 2.7 Future Modifications, Extensions, or Abandonment

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The proposed expansion is being designed to meet the foreseeable needs of McCain and its customers. Decommissioning of the Project is not anticipated in the foreseeable future. Repair and maintenance is intended to support the operation of the facility indefinitely. Incremental replacement or upgrades of the infrastructure may be required in future years for continued effective operation or to conform to current standards and maintain regulatory compliance.

## 2.8 Documents Related to the Undertaking

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The following documents are related to the undertaking:

- The EIA Registration on May 19, 2014 (Project Number 1409);
- Certificate of Determination Issued on April 29, 2016 (File Number 4561-3-1409);
- Water Supply Source Assessment (Dillon 2016); and
- Water Supply Source Assessment (Dillon 2020), appended.

## 3.0 Description of the Existing Environment

### 3.1 Regional Environment

The Project Area is located within the Valley Lowlands ecoregion and, more specifically, within the Blue Bell ecodistrict, which primarily features relief of less than 100 m (Zelazny 2007). This ecoregion is characterized by dramatic influence of major watercourses and large lakes (Zelazny 2007). The interaction of flood events through these major watercourses with the varied topography of the ecoregion creates a wide spectrum of flood and substrate conditions, with a corresponding diversity of wetland types (Zelazny 2007).

Within this ecoregion, tolerant hardwood stands dominated by American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*) and yellow birch (*Betula alleghaniensis*) sit on ridge tops with fertile soils. On less fertile ridges, hardwoods tend to be dominated by American beech, red maple (*Acer rubrum*), and trembling aspen (*Populus tremuloides*). Softwood forests in the area tend to be associated with lower slopes and shallow soils. The softwood forests are dominated by red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), and white spruce (*Picea glauca*), with occasional Eastern hemlock (*Tsuga canadensis*) and white pine (*Pinus strobus*) (Zelazny 2007).

Within this ecodistrict, mixed wood makes up the primary forest cover, and in areas of former agricultural sites, regeneration is primarily made up of trembling aspen (*Populus tremuloides*) and large-tooth aspen (*Populus grandidentata*), and secondarily of white birch (*Betula papyrifera*), white spruce (*Picea glauca*), cedar (*Thuja occidentalis*), and larch (*Larix laricina*). The large spring freshet and ice-scour on the banks of the Saint John River create niche habitats for rare flora species including Furbish's lousewort (*Pedicularis furbishiae*) (Zelazny 2007).

The nearest Environment and Climate Change Canada (ECCC) weather station to the Project Area is located at the St. Leonard Airport (47°09'28.050" N, 67°49'55.014" W), approximately 10 km northwest of the Project Area.

According to this station, the annual daily mean temperature (1981-2010) is 3.5 degrees Celsius (°C), with extremes ranging from -38.8°C to 34.6°C (Government of Canada 2019). On average, the warmest periods annually were between June and August, with July being the warmest month with an average daily temperature of 18.0°C. On average, the coolest periods annually were between December and February, with January being the coldest month with an average daily temperature of -12.6°C.

The historical precipitation data from the St. Leonard Airport station recorded an average of 1,104.1 mm of precipitation per year, with 792.2 mm as rain and 335.0 cm as snowfall (Government of Canada 2019).



## 3.2 Localized Environment

The Project Area is an industrial site and the disturbed area for the proposed facility expansion will be located within the existing facility footprint. Based upon the limited footprint required for this Project, the description of the existing environment has been focused on the terrestrial environment within the area of facility expansion, specifically the vegetated area along the bank of the Saint John River, and the aquatic environment of the Saint John River.

A desktop assessment was completed to identify environmental constraints at a high level. A field visit was conducted by a Dillon biologist on December 23, 2019, prior to significant snowfall, to confirm the findings within the Project. Photographs from the field visit are included in **Appendix B**. A description of the localized existing environment based on the desktop assessment and site visit is provided within the following sections.

## 3.3 Atmospheric Environment

### 3.3.1 Ambient Air Quality

Existing ambient air quality was evaluated through the closest NBDELG ambient air monitoring stations to the Project Area that are located in Fredericton, New Brunswick, approximately 200 km south of the Project. The Fredericton monitoring station reports on fine particulate matter (PM<sub>2.5</sub>), relative humidity, barometric pressure, wind speed and wind direction, ambient temperature, carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), total reduced sulfur (TRS) and ground level ozone (O<sub>3</sub>) (NBDELG 2019). Based on the data, in general, air quality in Fredericton (i.e., an urban area) can be characterized as good to very good with occasional periods of lower air quality. By extension, ambient air quality in the Project area (rural area) can be inferred to be equivalent to, or better than, that in Fredericton.

Ambient air quality is not anticipated to be adversely affected by the Project as the site will continue to operate in the same manner as currently occurs. Additionally, the Project is not anticipated to release vapors or fumes to the environment beyond existing operations at the complex.

### 3.3.2 Ambient Sound Quality

Existing sound quality conditions in the vicinity of the Project Area were not measured for this assessment. Given the setting of this Project and the current operation of the site as a production facility, existing sound pressure levels in the vicinity of the Project are expected to be typical of an industrial processing complex located near a rural residential area. Given the large area of the McCain complex site, the relative distance to the nearest residential receptor (approximately 500 m away), and favourable topography whereby the complex is located lower than surrounding residences (thereby providing a shielding effect, ambient sound quality at residential receptors is not anticipated to be adversely affected by the current, or planned future, operations at the complex.

### 3.4 Geology, Hydrogeology, and Hydrology

Based upon the New Brunswick Department of Energy and Mines Granular Aggregate Resources of Saint-André (21/O4 and 21 N/I) and site specific well log data, the surficial geology in this area consists mainly of glacial fluvial sand and gravel outwash overlain by an agglomeration of boulders, pebbles, sand, silt, and clay as a moderately compacted ablation till.

Based upon the New Brunswick Department of Energy and Mines Geology of Northern New Brunswick map (NTS 21 O, Parts of 21 P, 22 B), the bedrock underlying the Project Area consists of fine-grained, calcareous turbidites and deep-marine carbonate rocks of the Whitehead Formation of the Matapedia Group.

The Project Area is located on an inside meander of the Saint John River. Surficial geology presented in historical well driller logs and the material logged from recent test and back-up well drilling suggest a locally confined/regionally unconfined highly transmissive hydrostratigraphic unit of sand and gravel is sourcing the existing McCain production wells.

There are no watercourses within the Project site; however, the Saint John River runs parallel to the western boundary of the Project Area. The top of a steep bank extends to the river and is located approximately 50 m from the area of disturbance and consists primarily of immature hardwood, shrubs and grass. The portion of the river adjacent the Project Area is part of the headwaters of the Grand Falls Hydroelectric Generating Station located approximately 4 km downstream of the Project Area. Therefore, properties located adjacent to the river within the headwaters may be subject to the effects of water elevation changes which are regulated by the New Brunswick Power Corporation.

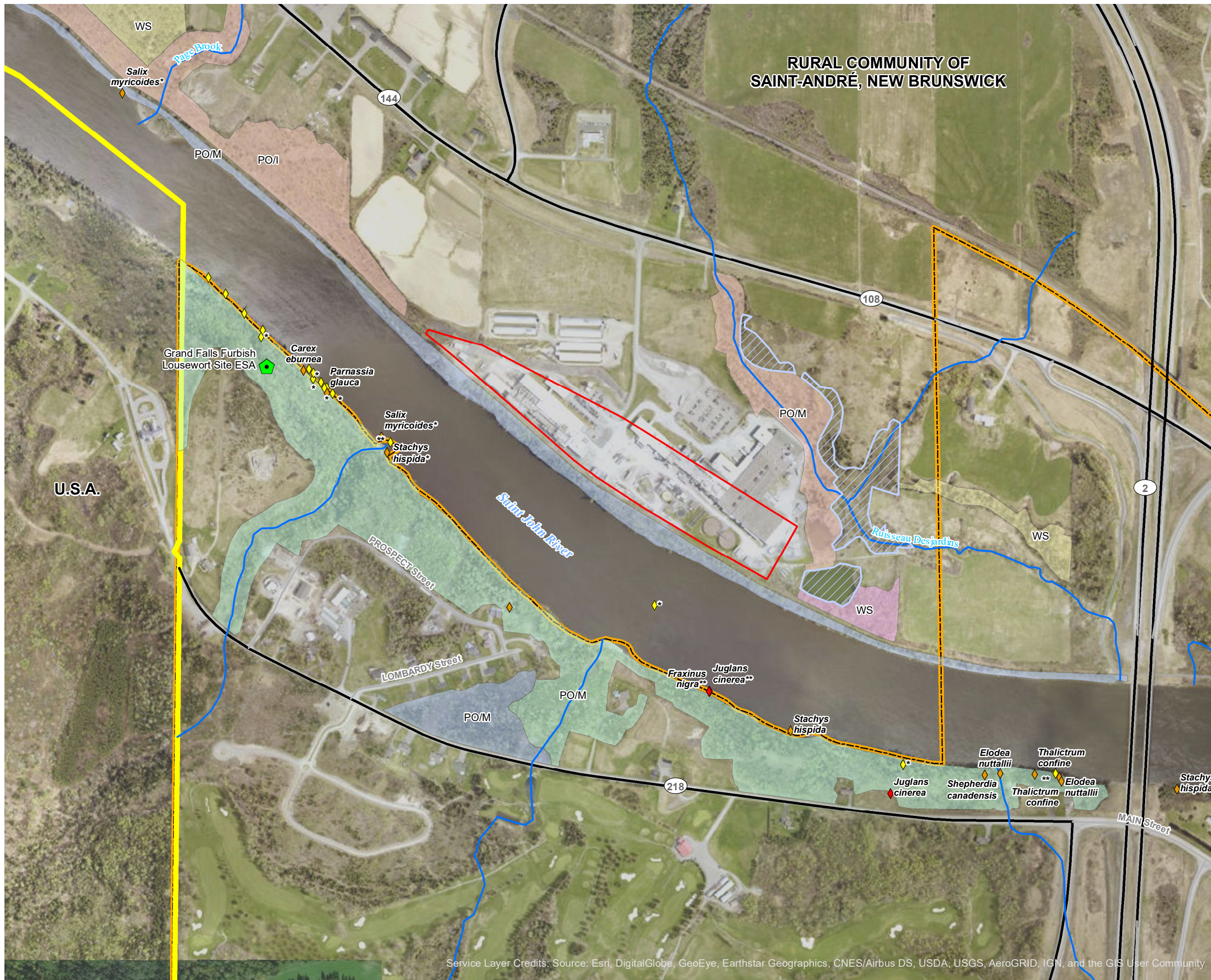
The Project Area is not located in a wellfield protection area under the New Brunswick Wellfield Protection Program or a designated watershed under the New Brunswick Watershed Protection Program.

### 3.5 Terrestrial Environment

#### 3.5.1 Vegetation

Within the complex, specifically the area of disturbance, the site is fully developed with little to no natural vegetation. Although vegetation communities are not found within the facility expansion area, the vegetation communities which exist along the banks of the Saint John River and adjacent to the Project Area consists of Poplar Dominant Hard Wood Stand. This community is composed of immature hardwood species dominated by trembling aspen (*Populus tremuloides*), white birch (*Betula papyrifera*), and white spruce (*Picea glauca*) (Figure 3).

The Grand Falls Furbish's Lousewort Ecologically Significant Area (ESA) is located across the Saint John River from the Project Area (Figure 3). This ESA and some areas of the Upper Saint John River Valley in general contains one of the only two populations of Furbish's lousewort (*Pedicularis furbishiae*) in the world; the other population is found in Maine (Zelazny 2007). Furbish's lousewort is a species at risk



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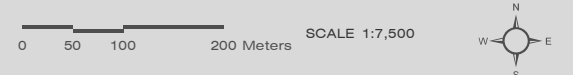
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**VEGETATION AND WETLANDS**

FIGURE 3

- Project Area
  - Grand Falls Furbish Lousewort Site ESA
  - ◆ Species At Risk, Vascular Plant
  - ◆ Species Of Conservation Concern, Vascular Plant
  - ◆ Species At Risk, Pedicularis Furbishiae (Furbish Lousewort)
  - Wetland (NBDELG 2019)
  - Intolerant Mixed Wood Stand
  - Poplar Dominant Hard Wood Stand
  - Poplar Dominant Mixed Wood Stand
  - Spruce/Fir Dominant Soft Wood Stand
  - White Spruce Dominant Soft Wood Stand
  - Watercourse
  - Local Roads
  - Highway
  - Town Limit Grand Falls, N.B.
  - Canada-U.S.A Border
- PO: Poplar (Populus spp.)-trembling aspen, large tooth aspen and/or balsam poplar  
 WS: White spruce (Picea glauca)  
 I: Immature  
 M: Mature  
 DNR Forestry data current to 2006
- \* Location of record within 50 to 100m  
 \*\* Location of record within 100m to 1 km  
 Locations of species rounded more than 1 km are not mapped



MAP DRAWING INFORMATION:  
 DATA PROVIDED BY GEONB

MAP CREATED BY: KE  
 MAP CHECKED BY: JH, JAB  
 MAP PROJECTION: NAD 1983 CSRS NEW BRUNSWICK STEREOGRAPHIC



PROJECT: 20-2077  
 STATUS: FINAL  
 DATE: 2020-01-31

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(SAR) that is listed as “Endangered” under the federal *Species at Risk Act* (SARA) and as “Endangered” under the New Brunswick *Species at Risk Act* (NB SARA).

A review of the Atlantic Canada Conservation Data Centre (AC CDC) database (AC CDC 2020) (**Appendix C**) indicated that flora species at risk and species of conservation concern have been historically observed within 5 km of the Project Area. These flora species have been listed in **Table 1** with a description of their habitats and an assessment of their potential to occur within the Project Area based on the habitats present. The locations of the historical records within 1 km of the Project Area are shown on **Figure 3**. No historical records of flora species at risk or species of conservation concern were observed within the Project Area. In addition, no rare flora species were observed during the field visit conducted on December 23, 2019 by a Dillon biologist; however, this was conducted during the winter season with some snow cover.

**Table 1: Vascular Plant Species at Risk or Species of Conservation Concern within 5 km of the Project Area**

Species	Provincial S-Rank	Provincial/ Federal Status	Habitat	Potential to Occur within Project Area
<i>Anemone multifida</i> (Cut-leaved Anemone)	S2	-	Gravel strands and ledge crevices near shore (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Arabis pycnocarpa</i> (Cream-flowered Rockcross)	S3	-	Ledges, rock outcrops, rocky woodlands, in regions of high-pH bedrock (Haines 2011).	This habitat does not occur in the Project Area.
<i>Artemisia campestris</i> (Field Wormwood)	S3	-	Sandy or gravelly shores, ledges and dry slopes (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Astragalus alpinus</i> <i>var. brunetianus</i> (Alpine Milk-Vetch)	S3	-	Gravel strands, calcareous shores and ledges (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Boechera stricta</i> (Drummond's Rockcross)	S2	-	Listed in Hinds (2000) as <i>Arabis drummondii</i> : Ledges, gravelly shores and rocky thickets (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Carex capillaris</i> (Hairlike Sedge)	S3	-	Rocky shores, moist ground of wood edges, roads and in clearings and similar calcareous areas (Hinds 2000).	This habitat may occur along the river banks or within the forest stand, outside of the Project Area.

Species	Provincial S-Rank	Provincial/ Federal Status	Habitat	Potential to Occur within Project Area
<i>Carex eburnea</i> (Bristle-leaved Sedge)	S3	-	Moist calcareous ledges (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Clematis occidentalis</i> (Purple Clematis)	S3	-	Calcareous ledges, rocky slopes in open woods (Hinds 2000).	This habitat may occur along the river banks or within the forest stand, outside of the Project Area.
<i>Cryptogramma stelleri</i> (Steller's Rockbrake)	S3	-	Moist, shaded, limestone rock crevices and calcareous ledges (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Diphasiastrum x sabinifolium</i> (Savin-leaved Ground- cedar)	S3	-	Open dry woods and pastures (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Elodea nuttallii</i> (Nuttall's Waterweed)	S2	-	Shallow quiet water (Hinds 2000).	This habitat may occur within the Saint John River, outside of the Project Area.
<i>Equisetum palustre</i> (Marsh Horsetail)	S3	-	Marshes and seepy gravels, not usually in standing water (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Erigeron hyssopifolius</i> (Hyssop-leaved Fleabane)	S3	-	Calcareous ledges and shores (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Fraxinus nigra</i> (Black Ash)	S4S5	COSEWIC: Threatened	Swamps and river bottomlands (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Hedysarum americanum</i> (Alpine Hedysarum)	S3	-	Listed as <i>Hedysarum alpinum</i> in Hinds (2000): Calcareous ledges and rocky shores (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Hieracium robinsonii</i> (Robinson's Hawkweed)	S1	-	Ledge crevices and along rocky shored streams (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.

Species	Provincial S-Rank	Provincial/ Federal Status	Habitat	Potential to Occur within Project Area
<i>Juglans cinerea</i> (Butternut)	S1	COSEWIC: Endangered SARA: Endangered NB SARA: Endangered	Rich deciduous woods (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Parnassia glauca</i> (Fen Grass-of-Parnassus)	S3	-	Calcareous marshy shores and marshy bogs (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Pedicularis furbishiae</i> (Furbish's Lousewort)	S1	COSEWIC: Endangered SARA: Endangered NB SARA: Endangered	Along river and railway banks. Outside of New Brunswick and Northern Maine, unknown elsewhere in the world (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area. This species has known historical records of occurrence on the opposite side of the river, across from the Project Area ( <b>Figure 3</b> ).
<i>Primula mistassinica</i> (Mistassini Primrose)	S3	-	Wet, calcareous ledges, shores and slopes (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Salix interior</i> (Sandbar Willow)	S3	-	Listed in Hinds (2000) as <i>Salix exigua</i> : Along sandbars, beaches and alluvial shores (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Salix myricoides</i> (Bayberry Willow)	S2?	-	Sandy or gravelly shores and adjacent thickets (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Shepherdia canadensis</i> (Soapberry)	S2	-	Calcareous ledges, slopes and in open woods (Hinds 2000).	This habitat may occur along the river banks or within the forest stand, outside of the Project Area.
<i>Stachys hispida</i> (Smooth Hedge-Nettle)	S3	-	Alluvial meadows, thickets and along shores (Hinds 2000).	This habitat does not occur in the Project Area.

Species	Provincial S-Rank	Provincial/ Federal Status	Habitat	Potential to Occur within Project Area
<i>Tanacetum bipinnatum ssp. huronense</i> (Lake Huron Tansy)	S3	-	Gravelly river strands or rocky banks (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Thalictrum confine</i> (Northern Meadow-rue)	S3	-	Calcareous shores and in alluvial meadows (Hinds 2000).	This habitat does not occur in the Project Area.
<i>Triantha glutinosa</i> (Sticky False-Asphodel)	S3	-	Listed in Hinds (2000) as <i>Tofieldia glutinosa</i> : Calcareous ledges and shores (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Trichophorum clintonii</i> (Clinton's Clubrush)	S3	-	Calcareous ledges and shores (Hinds 2000).	This habitat may occur along the river banks, outside of the Project Area.
<i>Viola nephrophylla</i> (Northern Bog Violet)	S3	-	Scattered on gravelly shores and wet fens (Hinds 2000).	This habitat does not occur in the Project Area.

Provincial S-Rank: S1: extremely rare in province; S2: rare in province; S3: uncommon in province; S4: widespread, common and apparently secure in province; S5: widespread, abundant and demonstrably secure in province S#S# = a numeric range rank used to indicate any range of uncertainty about the status of the species or community. B= Breeding, N = Nonbreeding, M = Migrant, U = Unrankable (AC CDC 2020).

### 3.5.2 Wetlands

It is recognized that any Project proposed within 30 m of a wetland must apply for a permit under the *Wetland and Watercourse Alteration Regulation (WAWA)* under the *Clean Water Act*. The Project Area is located approximately 60 m from the nearest wetland, with the area of disturbance located approximately 240 m from the nearest wetland (**Figure 3**).

### 3.6 Wildlife and Wildlife Habitat

Due to the absence of available habitats within the complex boundaries, the presence of wildlife on-site is very limited. In particular, it is unlikely that any species at risk may exist in the area.

A review of the AC CDC database (AC CDC 2020; **Appendix C**) indicated that fauna species at risk and species of conservation concern have been historically observed within 5 km of the Project Area. These fauna species have been listed in **Table 2** with a description of their habitats and an assessment of their potential to occur within the Project Area based on the habitats present. The locations of the historical records within 1 km of the Project Area are shown on **Figure 4**. No species at risk or species of conservation concern have been historically observed within the Project Area or area of disturbance. In



addition, no rare fauna species were observed within the Project Area during the field visit conducted on December 23, 2019 by a Dillon biologist; however, this was conducted during the winter season with some snow cover.

**Table 2: Wildlife Species at Risk or Species of Conservation Concern within 5 km of the Project Area**

Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
Bank Swallow ( <i>Riparia riparia</i> )	S2S3B,S2S3M	COSEWIC: Threatened SARA: Threatened	Typically nest in steep embankments along eroding river/ocean shore and forage in open areas (COSEWIC 2013).	This species may nest along the river banks, outside of the Project Area.
Barn Swallow ( <i>Hirundo rustica</i> )	S2B,S2M	COSEWIC: Threatened SARA: Threatened NB SARA: Threatened	Typically nest on human-made structures such as abandoned buildings or barns and forages in open areas (COSEWIC 2011).	This species may nest on the buildings in the Project Area. However, there is low potential for them to nest on the buildings in the Project Area due to the ongoing facility activities.
Bobolink ( <i>Dolichonyx oryzivorus</i> )	S3B,S3M	COSEWIC: Threatened SARA: Threatened NB SARA: Threatened	Typically nest in lush meadows, open grasslands, and hayfields (COSEWIC 2010).	This habitat does not occur in the Project Area.
Canada Warbler ( <i>Cardellina canadensis</i> )	S3B,S3M	COSEWIC: Threatened SARA: Threatened NB SARA: Threatened	Typically breeds throughout Maritimes and southeastern Canada. Typical habitat includes a variety of forest types (COSEWIC 2008). They prefer wet mixed forest with well-developed shrub layer as well as regenerating areas.	This species may nest along the forested river banks, outside of the Project Area.
Wood Thrush ( <i>Hylocichla mustelina</i> )	S1S2B,S1S2M	COSEWIC: Threatened SARA: Threatened NB SARA: Threatened	Wood Thrush nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Large forest mosaics are preferred, but they may also	This species may nest along the forested river banks, outside of the Project Area.

Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
Common Nighthawk ( <i>Chordeiles minor</i> )	S3B,S4M	COSEWIC: Special Concern SARA: Threatened NB SARA: Threatened	nest in small forest fragments (COSEWIC 2012a).  Common nighthawk typically breeds throughout the Maritimes and nests on the ground in open vegetation free habitats (COSEWIC 2007).	This species may nest in open vegetation free areas within the Project Area. However, no known occurrence for this species was within the Project Area.
Eastern Wood-Pewee ( <i>Contopus virens</i> )	S4B,S4M	COSEWIC: Special Concern SARA: Special Concern NB SARA: Special Concern	The Eastern Wood-pewee is often 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 and early successional clearings (COSEWIC 2012b).	This species may nest along the forested river banks, outside of the Project Area.
Evening Grosbeak ( <i>Coccothraustes vespertinus</i> )	S3B,S3S4N,SUM	COSEWIC: Special Concern	Evening grosbeaks tend to breed in mature and second-growth coniferous forests, but will occasionally nest in orchards, parks and deciduous woodlands (Cornell 2019).	This species may nest along the forested river banks, outside of the Project Area.
Rusty Blackbird ( <i>Euphagus carolinus</i> )	S3B,S3M	COSEWIC: Special Concern SARA: Special Concern NB SARA: Special Concern	Typically breeds in coniferous-dominated forests adjacent to wetlands, such as slow-moving streams, peat bogs, sedge meadows, marshes, swamps and beaver ponds (COSEWIC 2017).	This habitat does not occur in the Project Area.

Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
Transverse Lady Beetle ( <i>Coccinella transversoguttata richardsoni</i> )	SH	-	This insect species is considered a habitat generalists occurring across a wide range of habitats including agricultural areas, suburban gardens, parks, coniferous forests, deciduous forests, prairie grasslands, meadows, riparian areas and other natural areas (COSEWIC 2016).	This species may occur in the forested river banks, outside of the Project Area.
Cooper's Hawk ( <i>Accipiter cooperii</i> )	S1S2B,S1S2M	-	Cooper's hawks inhabit a wide variety of forested habitats and typically nest 7-15 m high in a tree in dense woodland. They will nest in many tree species including oaks, pines, firs, beeches, spruces and others, but rarely select trees on hillside, preferring trees on flat ground (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This species may nest along the forested river banks, outside of the Project Area. However, no raptor nests for this species were observed or are known in proximity to the Project Area.
Red-shouldered Hawk ( <i>Buteo lineatus</i> )	S2B,S2M	SARA: Special Concern	Red-shouldered hawks typically will re-use nests from past years and often inhabit deciduous lowlands, swamps and mixedwood forests (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This species may nest along the forested river banks, outside of the Project Area. However, no raptor nests for this species were observed or are known in proximity to the Project Area, the closest known nest is approximately 700 m from the Project Area.
Snowy Owl ( <i>Bubo scandiacus</i> )	S1N,S2S3M	-	Snowy owl's breed in the arctic tundra and only occasionally will occur in New Brunswick during the	This habitat does not occur in the Project Area.

Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
			winter months. On their wintering grounds, snowy owls prefer treeless, wide open places with undulating terrain such as agricultural fields, golf courses, open parkland and airports (Erskine 1992; Stewart et al. 2015; Sibley 2003).	
Baltimore Oriole ( <i>Icterus galbula</i> )	S3B,S3M	-	Baltimore orioles tend to nest high in leafy deciduous trees and prefer open woodland habitats such as forest edge, river banks, and small groves of trees. They have adapted well to humans settlement and can often be found nesting in parkland, orchards and even residential landscaping (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This species may occur in the forested river banks, outside of the Project Area.
Brown Thrasher ( <i>Toxostoma rufum</i> )	S2B,S2M	-	The brown thrasher is a reclusive species is typically found along dense forest edges, in thickets or swales and in overgrown clearings. They will usually nest low in a thorny shrub, but will sometimes nest directly on the ground (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This habitat does not occur in the Project Area.
Brown-headed Cowbird ( <i>Molothrus ater</i> )	S3B,S3M	-	This species is associated with grazing livestock and is often found in residential areas, agricultural fields and pastures. They generally avoid forested habitats and prefer open areas like grasslands, woodland edges,	This habitat does not occur in the Project Area.

Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
			thickets and fields. The brown-headed cowbird is a parasitic nester and can utilize a variety of nest types, but they are known to routinely lay in American goldfinch nests (Erskine 1992; Stewart et al. 2015; Sibley 2003).	
Cliff Swallow ( <i>Petrochelidon pyrrhonota</i> )	S2S3B,S2S3M	-	Cliff swallows are colonial nesters that use available mud, vegetation and their specialized saliva built hollow, gourd-like nest structures. Their colonies were once restricted to natural cliff faces and overhangs, however, they now often nest on buildings and other human-made structures (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This species may nest on the buildings in the Project Area.
Great Crested Flycatcher ( <i>Myiarchus crinitus</i> )	S2S3B,S2S3M	-	Great crested flycatchers tend to select breeding territories in open deciduous forests or at forest edges rather than in densely, undergrown habitats. This species shows an association with dead snags and dying trees as they often provide cavities they need for nesting (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This species may occur in the forested river banks, outside of the Project Area.
Horned Lark ( <i>Eremophila alpestris</i> )	S1B,S4N,S5M	-	Horned larks only began breeding in New Brunswick in the early 1900s when forests were cleared for farm and pastureland. They	This habitat does not occur in the Project Area.

Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
Killdeer ( <i>Charadrius vociferus</i> )	S3B,S3M	-	<p>show a strong preference for dry, sparsely vegetated, open habitats such as coastal barrens, dunes, agricultural fields and airports (Erskine 1992; Stewart et al. 2015; Sibley 2003).</p> <p>This species of shorebird is somewhat peculiar in that it inhabits primarily dry habitats. Killdeer breed across New Brunswick showing a preference for dry, barren type habitats such as sandbars, mudflats, grazed fields, athletic fields, graveled areas, parking lots and golf courses. They build their nest directly on the ground and rely on cryptic camouflage patterns to evade detection and predation (Erskine 1992; Stewart et al. 2015; Sibley 2003).</p>	This habitat does not occur in the Project Area.
Lesser Scaup ( <i>Aythya affinis</i> )	S1B,S4M	-	<p>Lesser scaup are primarily a fall migrant in New Brunswick, mostly breeding further north in boreal and taiga regions of western North America. However, some do nest in New Brunswick mostly associated with coastal islands and rich wetlands, including wastewater settling ponds (Erskine 1992; Stewart et al. 2015; Sibley 2003).</p>	This habitat does not occur in the Project Area.
Long-eared Owl ( <i>Asio otus</i> )	S2S3	-	<p>Long-eared owls are completely nocturnal and</p>	This species may nest along the forested

Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
			generally will roost in dense woodland, often near open areas or forest edges. They will usually make use of the abandoned stick nests of crows or hawks (Erskine 1992; Stewart et al. 2015; Sibley 2003).	river banks, outside of the Project Area. However, no nests for this species were observed or are known in proximity to the Project Area.
Northern Mockingbird ( <i>Mimus polyglottos</i> )	S2B,S2M	-	The northern mockingbird is generally inhabits areas with open ground and shrubby vegetation, often including urban and suburban areas. They breed in open, shrubby habitats and often near human development and landscaping (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This habitat does not occur in the Project Area.
Pine Siskin ( <i>Spinus pinus</i> )	S3	-	Pine siskins nest in open coniferous or mixed forests, as well as suburban areas such as woodlands, cemeteries and parks (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This habitat does not occur in the Project Area.
Red-breasted Merganser ( <i>Mergus serrator</i> )	S3B,S5M,S4S5N	-	This species is found primarily along beaches and coastal wetlands, where they frequently breed in association with tern or gull colonies. Red-breasted mergansers tend to winter in protected bays around rocky coastlines all across New Brunswick and are considered a resident species in the province (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This habitat does not occur in the Project Area.

Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
Triangle Floater ( <i>Alasmidonta undulata</i> )	S3	-	The triangle floater is a freshwater mussel most commonly associated with low-gradient rivers with low to moderate flow velocities and sandy or gravelled substrates. This species can use a range of host fish including the common shiner ( <i>Luxilus cornutus</i> ), white sucker ( <i>Catostomus commersonii</i> ), and large-mouth bass ( <i>Micropterus salmoides</i> ), and thus will occur in habitats where these fish are commonly found (Cordeiro 2011).	This species may occur in the Saint John River and has a known occurrence across the river, but outside of the Project Area.
Turkey Vulture ( <i>Cathartes aura</i> )	S3B,S3M	-	Turkey vultures are most commonly observed soaring over open habitats such as agricultural lands, open forests and uncultivated grasslands. They generally nest in rock crevices and ledges on steep cliff faces, but will also use mammal burrows, fallen trees and even abandoned hawk or heron nests if available. Turkey vultures prefer to nest far away from civilization and often return to the same site for years in a row (Erskine 1992; Stewart et al. 2015; Sibley 2003).	This habitat does not occur in the Project Area.
Warbling Vireo ( <i>Vireo gilvus</i> )	S3B,S3M	-	This species prefers mature deciduous forests, especially near wetlands and waterbodies, but they will also nest in young	This species may occur in the forested river banks, outside of the Project Area.



Species	Provincial S-Rank	Provincial/Federal Status	Habitat	Potential to Occur within Project Area
			deciduous stands should be more preferred habitat not available. They usually place their nest in the outer portions of a large deciduous tree, often quite high off the ground (Erskine 1992; Stewart et al. 2015; Sibley 2003).	

Provincial S-Rank: S1: extremely rare in province; S2: rare in province; S3: uncommon in province; S4: widespread, common and apparently secure in province; S5: widespread, abundant and demonstrably secure in province S#S# = a numeric range rank used to indicate any range of uncertainty about the status of the species or community. B= Breeding, N = Nonbreeding, M = Migrant, U = Unrankable (AC CDC 2020).

**3.6.1 Migratory Birds**

The Project Area is not within an Important Bird Area (IBA) and there are no IBAs located within 10 km of the Project Area.

Migratory bird species such as waterfowl and passerines protected under the *Migratory Birds Convention Act*, 1994 including species at risk or species of conservation concern may occur within the Project Area for foraging purposes or in some cases nesting on human-made structures; however, there is no critical or well-suited habitat identified within the Project Area. According to AC CDC records, migratory species that have occurred within 1 km of the Project Area include (but are not limited to): bobolink (*Dolichonyx oryzivorus*), common nighthawk (*Chordeiles minor*), red-shouldered hawk (*Buteo lineatus*), eastern wood-pewee (*Contopus virens*), rusty blackbird (*Euphagus carolinus*), snowy owl (*Bubo scandiacus*), and barn swallow (*Hirundo rustica*) (Figure 4).

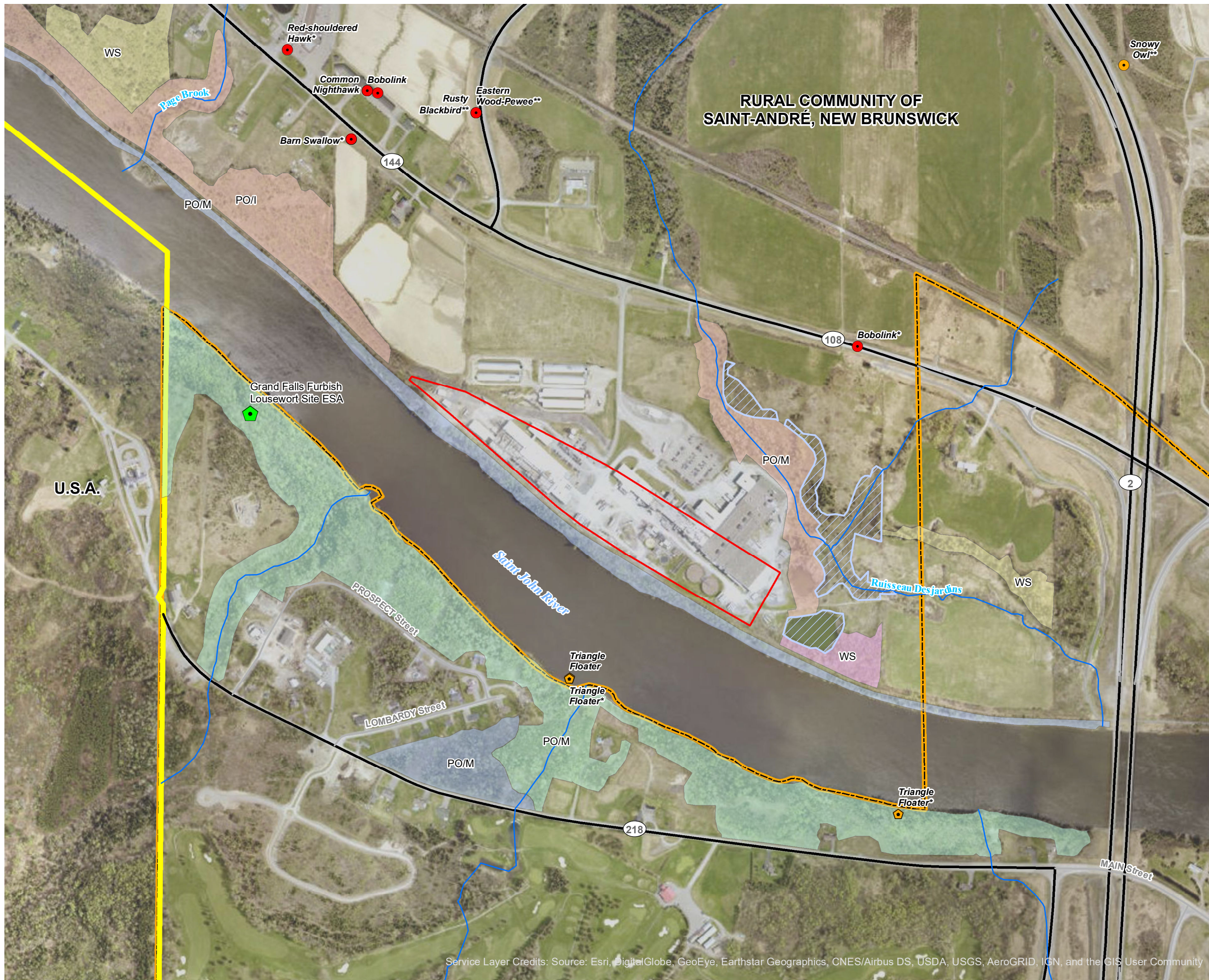
Based on visual observations within the Project Area during the field visit on December 23, 2019, and the limited available habitat within the facility expansion area, it is unlikely that nesting bird species would occur in this area. No bird nests or signs of bird nesting activity were observed within the Project Area, specifically within the facility expansion area, during the field visit. However, there is potential for bird nesting in subsequent breeding seasons and/or foraging within the Project Area.

Based on ECCC’s calendar for specific “nesting zones” across Canada, the Project Area is located within “Nesting Zone C4” which identifies the April 15 to August 31 period as a sensitive nesting period for the area.

**3.7 Aquatic Environment**

The Project Area is situated within the Saint John River basin. It is recognized that any Project proposed within 30 m of a watercourse or wetland must apply for a permit under the *Watercourse and Wetland Alteration Regulation (WAWA)* under the *Clean Water Act*. There are no watercourses within the Project





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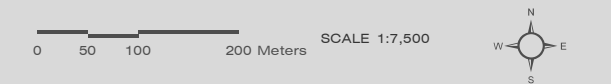
GRAND FALLS COMPLEX  
PROCESSING LINE EXPANSION

**WILDLIFE AND WILDLIFE HABITATS**

FIGURE 4

- Project Area
- Grand Falls Furbish Lousewort Site ESA
- Species At Risk, Bird
- Species Of Conservation Concern, Bird
- Species Of Conservation Concern, Invertebrate
- Wetlands (NBDELG 2019)
- Intolerant Mixed Wood Stand
- Poplar Dominant Hard Wood Stand
- Poplar Dominant Mixed Wood Stand
- Spruce/Fir Dominant Soft Wood Stand
- White Spruce Dominant Soft Wood Stand
- Watercourse
- Local Roads
- Highway
- Town Limit of Grand Falls, N.B.
- Canada-U.S.A Border

PO: Poplar (Populus spp.)-trembling aspen, large tooth aspen and/or balsam poplar  
 WS: White spruce (Picea glauca)  
 I: Immature  
 M: Mature  
 DNR Forestry data is current to 2006  
 \* Location of record within 50 to 100m  
 \*\* Location of record within 100m to 1 km  
 Locations of species rounded more than 1 km are not mapped



MAP DRAWING INFORMATION:  
DATA PROVIDED BY GEONB

MAP CREATED BY: KE  
 MAP CHECKED BY: JH,JAB  
 MAP PROJECTION: NAD 1983 CSRS NEW BRUNSWICK STEREOGRAPHIC



PROJECT: 20-2077  
 STATUS: FINAL  
 DATE: 2020-01-31

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Area. However, the Saint John River runs parallel to the western boundary of the Project Area and is located approximately 50 m from the area of disturbance.

The portion of the river adjacent the Project Area is regulated by New Brunswick Power Corporation; the Grand Falls hydroelectric dam is located approximately 4 km downstream of the Project Area.

Based on the GeoNB Map layer (NBDELG 2019), there are no known wetlands located within the Project Area (**Figure 3**).

### 3.7.1 Fish Species

There are 53 fish species identified within the Saint John River basin, the greatest natural diversity of freshwater fish in Maine and Atlantic Canada (CRI 2011). The Canadian Rivers Institute (CRI 2011) indicates that many stable and healthy populations and communities exist throughout the river; however, some populations demonstrate signs of stress. Key stressors to the fish populations within the Saint John River include poor management of wastewater, river flow, and fish passage.

The AC CDC database did not report any fish species at risk or species of conservation concern within 5 km of the Project Area.

The facility expansion will be installed approximately 50 m from the river with treated wastewater discharging into the river along with treated wastewater from the remainder of the complex and using existing discharge infrastructure, and as such the Project is not expected to physically interact with the river, fish, or fish habitat. The discharged wastewater will not exceed the volume/quality limits currently in place under the approval to operate for the complex and as such, and thus interactions between treated wastewater and the river, fish, or fish habitat will remain largely as currently.

## 3.8 Heritage and Cultural Features

### 3.8.1 Archaeological and Cultural Resources

Based on the proximity to the Saint John River, there is potential for Indigenous cultural heritage resources (both pre-contact and historic) or Euro-Canadian resources to exist within the Project Area. Areas with high potential for archaeological and cultural resources are typically found along the shoreline of waterbodies, and the Saint John River has a particularly rich cultural history for both Indigenous and Euro-Canadian settlement.

However, it is noted that the Project area, including the area of disturbance, has been previously excavated and graded to facilitate development on the subject site. Due to this work, it is anticipated that any archaeological or cultural resources that may have existed in the Project area would have already been destroyed.

### 3.8.2 Aboriginal Communities

The Project, being located in the Saint John River watershed, is within the traditional territory of the Wolastoqey (Maliseet) Nation. The Wolastoqey Nation is comprised of six communities: Oromocto, St.

Mary's, Kingsclear, Woodstock, Tobique, and Madawaska. The nearest First Nation community to the Project Area is the Tobique First Nation which is located approximately 40 km to the south, followed by the Madawaska Maliseet First Nation located approximately 50 km to the northwest.

The Indigenous people historically used waterways as transportation routes and sources of food through hunting, fishing and gathering. It is recognized that the banks of the Saint John River would have been utilized for these purposes and as such there is a potential for archaeological sites along the Saint John River.

However, it is noted that the Project area, including the area of disturbance, has been previously excavated and graded to facilitate development on the subject site. Due to this work it is anticipated that evidence of Indigenous use that may have existed in the Project area would have already been destroyed.

### 3.8.3 Existing and Historic Land Uses

There are no known cultural heritage or archaeological resources located within the Project Area. Additionally, the complex was first constructed in 1970s and the facility has been excavated, graded and built up repeatedly over the years to facility development. As a result, it is not anticipated that any cultural heritage or archaeological resources would be present within the area of disturbance in the Project Area.

## 3.9 Socio-Economic Environment

### 3.9.1 Population and Local Economy

Based on the 2016 Census, the population of the Grand Falls area was 4,221, which was relatively constant with the population during the 2011 census (Statistics Canada 2016). Almost 30% of the population is over 65 years in age, and as with many rural areas in New Brunswick many young adults are moving to larger municipalities for employment opportunities. This Project will result in an additional 80 full-time jobs during the operation phase, either directly at the production plant or in the farms that supply the potatoes.

The Project area is located in a residential and agricultural area outside of Grand Falls, New Brunswick. A few commercial properties are located to the north and northwest. The area surrounding the Project is serviced by private wells and septic systems.

The Trans-Canada Highway is located approximately 500 m to the east of the Project area and provides direct access to the Grand Falls complex.

The Saint John River is located approximately 50 m south of the Project area and is frequently used for recreational purposes. Particularly during the ice-free season, the river is used for recreational fishing, sailing, swimming, and other water-based transportation and recreational activities.

## 4.0 Identification of Potential Environmental Effects

There is potential for the local environment within the vicinity of the Project Area to be affected by the Project. An assessment of potential effects during each phase of the Project, as well as potential accidental events/malfunctions, has been undertaken below.

Environmental features deemed to have specific value to the ecosystem, heritage and/or culture, or are afforded protection by legislation, are identified as Valued Components (VC). The following environmental features have been identified as VCs in relation to the proposed facility expansion Project activities:

- Atmospheric Environment;
- Geology, Hydrogeology and Hydrology;
- Terrestrial Environment;
- Wildlife and Wildlife Habitat;
- Aquatic Environment;
- Heritage and Cultural Features; and
- Socio-Economic Environment.

The effects assessment involves identifying the potential for the Project to interact with the VCs.

Because each phase of the Project involves different activities, and potentially different interactions with the VCs, the effects assessment was completed in consideration of each of the Project phases (Construction, and Operation and Maintenance) as well as for Accidents, Malfunctions, and Unplanned Events. The potential interactions between the Project and the VCs are presented in **Table 3**.

**Table 3: Potential Project Interactions with Valued Components**

Valued Components		Project Phases		
		Construction	Operation and Maintenance	Accidents, Malfunctions, and Unplanned Events
Atmospheric Environment	<i>Ambient Air Quality</i>	✓		✓
	<i>Ambient Sound Quality</i>	✓		✓
Geology/ Hydrogeology/ Hydrology	<i>Geology</i>			
	<i>Hydrogeology/ Hydrology</i>		✓	
Terrestrial Environment	<i>Vegetation (Including Flora Species at Risk/Species of Conservation Concern)</i>			✓
	<i>Wetlands*</i>			
Wildlife and Wildlife Habitat	<i>Species at Risk and Species of Conservation Concern</i>	✓		✓
	<i>Migratory Birds</i>	✓		✓
Aquatic Environment	<i>Watercourses</i>	✓		✓
	<i>Fish</i>			✓
Heritage and Cultural Features	<i>Archaeological/ Cultural Resources</i>			✓
	<i>Aboriginal Communities Existing and Historical Land Uses</i>			✓
Socioeconomic Environment	<i>Land Use, Employment and Local Economy</i>	✓	✓	

\*Based upon NBDELG draft Beta Wetland Mapping (non-regulated wetlands).



## Environmental Effects Assessment and Mitigation

Mitigation is identified for each interaction and/or effect in an attempt to prevent the interaction from occurring if possible, or to reduce the severity, magnitude or duration of the interaction. Best management practices (based on industry guidelines and regulatory guidance documents) have been identified as appropriate mitigative measures. In addition, several Acts, codes, regulations and guidelines may require appropriate actions be conducted as mitigative measures prior to or during the interaction. A variety of provincial and federal Acts, codes, regulations and guidelines have been consulted in the development of the mitigative measures.

The federal and provincial legislation and codes that apply to the Project include (but may not be limited to):

- *Canadian Environmental Protection Act, 1999 (CEPA) and Regulations;*
- *Fisheries Act, 2019;*
- *Migratory Birds Convention Act, 1994;*
- *The federal Species at Risk Act, 2002;*
- *The Federal Policy on Wetland Conservation, 1991;*
- *New Brunswick Clean Environment Act, 1973 and Regulations;*
- *New Brunswick Clean Water Act, 1989 and Regulations;*
- *New Brunswick Clean Air Act, 1996 and Regulations;*
- *New Brunswick Occupational Health and Safety Act, 1988 and Regulations; and*
- *New Brunswick Species at Risk Act, 2013 and Regulations.*

### Standard Mitigation of Potential Environmental Effects

The following mitigation measures have been identified to reduce the likelihood of occurrence, or minimize the potential extent of effects of the Project on the VCs identified during the identification of potential environmental effects in **Section 4.0**. A list of key standard mitigation measures applicable to more than one VC is provided below:

- The contractor will ensure that there is basic fire-fighting equipment available on-site and all personnel will be familiar with the equipment and equipment location the event of a spill or accidental fire;
- The contractor will be required to provide spill response training to construction personnel and will ensure that spill response equipment is readily available on-site and each piece of machinery is equipped with a spill response kit;

- Remedial action, or engineered controls, for any spills or leaks that occur will be completed;
- Proper labeling of chemical storage containers will be completed and appropriate material safety data sheets (MSDS) for stored chemicals will be stored on-site to reduce likelihood of accidents or spills and to ensure the safety of workers on-site;
- Proper sediment control measures will be installed and checked regularly during the construction phase and prior to and after storm events to ensure they are continuing to operate properly to minimize potential effects to adjacent habitat;
- A plan for handling fill and construction materials for the site will be communicated to the contractor (i.e., if stockpiling is required, materials will be stored away from any watercourse (Saint John River) or wetland in predefined areas or removed from site to a predetermined location) with an intent to minimize soil stockpiled, and duration soil is stockpiled, at the site;
- Exposed soils will be stabilized as soon as practical to minimize emissions of fine particulate matter; and
- The contractor will be required to follow McCain’s security check in procedures and health and safety policies.

Potential effects and mitigation measures specific to each VC is discussed within the following sections.

**5.2 Construction Phase**

**5.2.1 Atmospheric Environment**

**5.2.1.1 Potential Effects**

There is potential for elevated noise levels from equipment to occur during the construction phase of the Project. In addition, there is the potential for the minor increase of emissions of NO<sub>x</sub>, CO, VOCs and SO<sub>2</sub> from construction and/or maintenance equipment during the construction phase. Because the Grand Falls Complex will continue to operate in the same manner as it currently operates, and the Rotoclone will capture additional mists and vapors from the new production line, there are not anticipated to be any additional effects to the environment during the operation phase.

**5.2.1.2 Mitigation**

During the construction phase of the Project, the following mitigative measures for the atmospheric environment will be employed:

- Construction/maintenance activities will be completed during daylight hours, when possible, so as to reduce noise disturbance to nearby residences;
- Contractors are to ensure that vehicles, tools, and equipment will be properly maintained according to emission and noise suppression standards;

- All construction/maintenance equipment will be turned off when not in active use to minimize idling;
- Monitoring of weather (wind conditions) and stabilization of soil stockpiles and bare slopes to minimize a potential increase in fine particulate matter;
- Exposed soils will be stabilized as soon as practical; and
- Complaints related to noise from the construction will be addressed by the contractor.

**5.2.1.3 Residual Effects**

Construction activities have the potential to result in changes to the local air quality, primarily due to dust, and sound quality. However, because the site currently operates, and will continue to operate, as an industrial site during the construction phase and the nearest human receptor is approximately 500m away, the residual effects from the Project are anticipated to be minimal. The effects resulting from the operation of the project in addition to the current operations at the complex are anticipated to be limited. With the implementation of the planned mitigation indicated above, interactions between the Project and the atmospheric environment are not anticipated to be substantive and limited to the very local environment.

**5.2.2 Geology, Hydrogeology and Hydrology**

**5.2.2.1 Potential Effects**

There is potential for groundwater use to increase from the existing on-site wells by approximately 2,200 L/min. There is the potential for minor changes to the local aquifer.

**5.2.2.2 Mitigation**

During the construction phase and operation and maintenance phases of the Project, the following mitigative measures for hydrogeology will be employed:

- A Water Supply Source Assessment (WSSA) is currently underway to assess the local hydrogeology with respect to the facility expansion and any assumptions made within the WSSA will be followed;
- Water levels will continue to be monitored and any if unexpected conditions arise, the pumping rate will be scaled back until the conditions are understood;
- Pumping rates will stay within the rates indicated in the approval to operate amended following the WSSA;
- Storage of chemicals and fuels shall be in an area away from the wells; and
- Sampling procedures outlined in the approval to operate will be followed.

5.2.2.3

**Residual Effects**

During the construction phase the pumping rates are being increased via currently in-place technology and there physical modifications being made to the system, therefore there are not anticipated to be effects on the environment.

The existing McCain wells are confined to river valley channel sands and gravel, while other water users (i.e. private wells in the local area) are anticipated to be outside of this deposit based upon their locations and the limited extent of the river channel deposit. This indicates that the McCain wells access a different hydrogeologic unit than the other nearby water users and any effects noticed in the aquifer should not translate to the nearby wells. Additionally, because the Saint John River represents a boundary condition, there is no connection between the hydrogeologic unit servicing the McCain wells on the east side on the Saint John River and the hydrogeologic unit servicing wells on the west side.

Once the production wells increase the pumping rate, the potential for additional impacts to the surrounding aquifer is not considered to be substantial as indicated in the attached WSSA (**Appendix A**).

5.2.3

**Terrestrial Environment**

5.2.3.1

**Potential Effects**

The terrestrial environment (i.e., vegetation and wetlands) is not anticipated to be affected by the Project. No vegetation is proposed to be removed for the Project, as the facility expansion area is located entirely within the existing facility on gravel and/or concrete. The site will continue to operate in the same manner as it currently does, and any additional traffic will be contained to the currently developed roadways; therefore, there are not anticipated to be any significant additional effects to the terrestrial environment during the operational phase.

5.2.3.2

**Mitigation**

General mitigation measures for the terrestrial environment include the following:

- The source of any new fill material will be approved and the material shall be inspected prior to construction;
- Roads, dust and erosion/sedimentation measures will be monitored and mitigated with hay bales as required; and
- Existing roads and trails will be utilized during the construction and operation phases.

5.2.3.3

**Residual Effects**

As there will be no clearing of vegetation and the Project activities during the construction and operational phase will be contained to developed areas the mitigation proposed above will reduce the potential for the Project to effect the environment. With the implementation of the planned mitigation indicated above, the residual effects of the Project on the terrestrial environment are anticipated to be low.

**5.2.4 Wildlife and Wildlife Habitat**

**5.2.4.1 Potential Effects**

The McCain Grand Falls complex currently operates as an industrial facility which, combined with a chain-link fence along the perimeter, deters wildlife from the complex footprint. Therefore, due to the limited presence of wildlife at the site there is low potential for wildlife to be affected by collisions with vehicles or encounters with humans during the construction phase of the Project. However if wildlife are attracted to the site for food collisions could occur. Potential also exists for wildlife in the local area to be disturbed by noise emitted during construction activities. Birds nesting in the areas of disturbance may be affected during the construction phase as well.

**5.2.4.2 Mitigation**

During the Project activities, the following mitigation measures for wildlife and wildlife habitat will be applied:

- To minimize wildlife encounters, the site and working areas shall be kept clean of food scraps and garbage and will be removed from the site daily;
- In the case of wildlife encounters, the following shall be implemented:
  - No attempt will be made by any worker at the Project site to chase, catch, divert, follow or otherwise harass wildlife by vehicle or on foot.
  - Equipment and vehicles will yield the right-of-way to wildlife.
  - If a species at risk is encountered, contact the Species at Risk Biologist at the New Brunswick Department of Natural Resources and Energy Development.
- If possible, construction work will start prior to the commencement of the breeding bird season;
- Any nuisance wildlife as identified under the *Nuisance Wildlife Regulation (97-141)* of the *Fish and Wildlife Act* identified as disrupting Project-related activities may only be removed by a licensed Nuisance Wildlife Control Officer or a licensed trapper;
- To minimize disruptions with wildlife activity at night, the Project construction activities will be limited to daylight hours;
- All workers will adhere to the provincial and federal *Species at Risk Acts*;
- All workers will adhere to the *Migratory Birds Convention Act, 1994* and the *Migratory Birds Regulations*; and
- If a nest is encountered during construction activities, work around the nest shall cease until a biologist assesses the situation and appropriate mitigation measures are applied.

**5.2.4.3 Residual Effects**

The Grand Falls Complex is an active industrial site and because other more suitable habitat is available in the general area, wildlife are not anticipated to be attracted to the Project area without enticement in

the form of available food. With the implementation of the planned mitigation above applied to limit the available food for wildlife, interactions between the Project and wildlife and wildlife habitat are not anticipated to be substantive.

Noise levels during the construction phase may be slightly increased due to the use of additional construction equipment (i.e. excavator, cement truck) however, because the site currently operates, and will continue to operate, as an industrial site during the construction phase and the construction activities will occur at least 200m from the complex perimeter (or nearest terrestrial habitat), the residual effects from the Project are anticipated to be minimal.

Additionally, although some bird species may nest on structures because the Project area currently operates as an industrial site it is anticipated that activities related to construction will not be a deterrent. Additionally, no buildings which would be the preferred nesting location for the species identified in Section 3.6, will be dismantled or disturbed during the construction phase.

**5.2.5 Aquatic Environment**

**5.2.5.1 Potential Effects**

Although ground disturbance activities are not anticipated to occur within 30 m of the Saint John River or other waterbody, there is potential for runoff from the Project Area to reach the Saint John River if appropriate mitigative measures are not in place.

**5.2.5.2 Mitigation**

During the construction phase, the following general mitigation measures for the aquatic environment will be applied:

- No work is to be conducted within 30 m of the Saint John River or other waterbody;
- Soil will not be stockpiled within 30 m of the Saint John River;
- Ground disturbance work will not be completed during significant storm events;
- Erosion and sediment control structures will follow specifications as outlined in the Watercourse and Wetland Alteration technical guidelines, should they be required; and
- Where appropriate, siltation prevention measures (i.e. silt fences) shall be installed. Sediment control structures shall be monitored and maintained on a daily basis.

**5.2.5.3 Residual Effects**

Due to initial siting considerations for the project, the project activities will occur outside of the 30m buffer of the Saint John River. There is a potential for sediment laden runoff from the project site to reach the river, however by limiting the timing of soil disturbance activities to avoid high precipitation events and installing sediment control measures runoff from the project area will be limited and controlled. With the implementation of these mitigation measures, interactions between the Project and the aquatic environment are not anticipated to be substantive.

**5.2.6 Heritage and Cultural Features**

**5.2.6.1 Potential Effects**

It is unlikely that heritage and cultural features will be encountered in the facility expansion area in the Project Area as this is located entirely within the existing facility on previously disturbed land. However, any ground moving activity has the potential to uncover previously undiscovered heritage resources.

**5.2.6.2 Mitigation**

If heritage or cultural features are identified at any point over the course of the Project, the following mitigative measures for archaeological resources will be employed:

- Work in the area must cease immediately and the Heritage and Archaeological Services Branch of the New Brunswick Department of Tourism, Heritage and Culture will be contacted at (506) 453-2738 for further mitigation;
- Until a qualified archaeologist arrives at the scene, no one shall disturb, move or re-bury any uncovered artifact;
- Activities at the site may resume only when authorized by Archaeological Services and once mitigative measures have been completed;
- If bones or human remains are found, work in the area must cease, and the RCMP shall be immediately notified;
- No one shall disturb, move or rebury any uncovered human remains; and
- If the discovered resources are related to Aboriginal culture, the New Brunswick Department of Aboriginal Affairs will be contacted to determine how best to proceed with respect to repatriation of the resources.

**5.2.6.3 Residual Effects**

Given the low archaeological potential of the Project site, the potential to encounter previously undiscovered heritage resource during construction and operation of the Project is believed to be very low. With the implementation of mitigation measures, contingency and emergency response procedures, and best practices, the potential residual environmental effects of a discovery of a heritage resource on heritage resources during the construction phase of the Project anticipated to be substantial.

**5.2.7 Socioeconomic Environment**

The Project has the potential to interact with the socioeconomic environment, which includes land use, and employment and the local economy.

**5.2.7.1 Mitigation**

During the construction and operation phases, the following general mitigation measures for the socioeconomic environment will be applied:

- Truck drivers will adhere to posted speed limits and warning signage and adjust driving to meet weather and road conditions;
- All necessary permits will be obtained and industry best practices will be followed for special moves or traffic interruptions on public roads;
- Where possible the local workforce will be sourced to fill the employment opportunities; and
- Where possible, local resources (i.e. potatoes) will be sourced to supply operations.

#### 5.2.7.2 Residual Effects

The Project will result in a modest increase in traffic volumes on the transportation route during the construction and operation. However, the preferred route will use designated truck routes that are designed to handle the volume of traffic and the have suitable weight bearing capacities for the anticipated traffic related to the Project.

The Project is anticipated to result in a positive interaction with the local workforce and economy as an anticipated 80 full-time jobs will result from this Project.

### 5.3 Unplanned Events, Accidents and Malfunctions

There is a potential for unplanned event, accidents and malfunctions related to any construction project. During the construction and/or operation and maintenance phases of the Project, the following mitigative measures will be followed:

- Storage of chemicals and fuels shall be in an area away from the surrounding terrestrial environment, or direct pathways (i.e. ditches) to the surrounding environment;
- To avoid/minimize potential hazardous materials spills, spill response kits will be available within the proposed Project area during all phases of the Project;
- Any spills or leaks that occur will be reported to the appropriate regulatory authorities, if applicable, as soon as possible;
- Remedial action, or engineered controls, for any spills or leaks that occur will be completed. If contaminated soil is encountered, it will be reported to NBDELG and managed utilizing the Atlantic Risk Based Corrective Action Framework;
- Refueling, oiling, and maintenance of equipment will be completed in specifically designated areas located at least 30 m away from any watercourse, wetland, or well to minimize potential effects that could arise in the event of a spill;
- Servicing of equipment will be completed off-site by a licensed mechanic; however if required to be completed on-site, the work will be completed over an impervious surface or trap;
- Rubbish and waste materials will be kept at minimum quantities and burning of this material will be prohibited;



- If work is required at night, the area will be appropriately lit with shielded lights pointing downwards;
- Oily rags will be stored in approved receptacles and disposed of at approved waste facilities;
- Chemical and petroleum hydrocarbons will be stored in appropriate containers and in specifically designated areas to reduce potential for leaks. Where applicable, secondary containment of chemicals or petroleum hydrocarbons will be employed;
- Work entailing use of toxic or hazardous materials, chemicals, or otherwise creating hazard to life, safety of health, will be conducted in accordance with National Fire Code of Canada to minimize the potential for spills or fires; and
- If fuel storage is required onsite, double walled fuel storage tanks will be required.

With the implementation of the planned mitigation, and with the careful development and implementation of contingency and emergency response plans to be applied in the unlikely occurrence of an accident, malfunction, or unplanned event, interactions between the Project and the environment arising from an accidental event are not anticipated to be substantive.

## 6.0 Public Involvement

In accordance with the EIA Regulation, direct communication with stakeholders (local residents, elected officials, businesses, etc.) is required. The planned approach to public and stakeholder consultation in respect of the EIA of the Project is described in this section. Evidence of notification and a summary report detailing engagement efforts and comments received will be provided to the NBDELG within 60 days of registration of the Project.

### COMMUNICATIONS OBJECTIVES

The following objectives have been established to ensure effective communications with the stakeholders and public:

- Keep the public informed about the proposed project through timely and meaningful information release(s) in both official languages.
- Consult with affected stakeholders in a timely manner in an effort to mitigate impacts.
- Provide the public and interested stakeholder groups with opportunities to be involved and learn more about the proposed Project.

### DIRECT WRITTEN COMMUNICATIONS TO AREA RESIDENTS

Residents will be made aware of the proposed Project, and its location, through direct written communications. An example of the project notification letter is included in **Appendix D**. Each resident will be given the option to review the EIA document at either the NBDELG Grand Falls office located at 65 Broadway Boulevard in Grand Falls, at the McCain Grand Falls Complex located at 795 Route 108 in Grand Falls or via an electronic version of the document, available to download on the NBDELG's website. The residents will be directed to contact Jean Theriault, Grand Falls Plant Manager, should they have any questions about the project.

The residents were provided with a letter on February 3, 2020 detailing the following information:

- Brief description of the proposed Project;
- Description of the Project location;
- Map showing the location of the Project components;
- Status of the Provincial Regulatory Approval process;
- Statement indicating that members of the general public can ask questions and/or raise concerns with the proponent regarding any and all environmental impacts; and
- Date that the public comment period expires.

Feedback received during the 45 day comment period will be documented in a database and responded to in writing or via personal conversation. A summary report documenting the engagement efforts and feedback received during the first 45 days of the comment period following submission of the EIA Registration document will be prepared and submitted to NBDELG for review within 60 days following registration of the Project, so that the information can be considered in the course of decision-making in respect of the Project.

## First Nation Consultation

The entire province of New Brunswick is currently unceded territory and is subject to the Peace and Friendship Treaties signed by the British with the Wolastoqey (Maliseet), Mi'kmaq, and Peskotomuhkati (Passamaquoddy) Nations in 1752 and renewed in specific agreements thereafter. Section 35 of the *Constitution Act, 1982* recognizes and affirms the existing Aboriginal rights and title of the Aboriginal peoples of Canada, and the Supreme Court of Canada has confirmed that Mi'kmaq and Wolastoqey First Nations continue to have treaty rights to carry out traditional activities (including the right to hunt, trap, fish, and gather towards earning a moderate livelihood). The Supreme Court of Canada has also held that the Crown (including the Governments of Canada and New Brunswick) has a duty to consult with First Nations, and accommodate them as necessary, for any power, duty or function they may exercise that may affect Aboriginal or treaty rights. Along with these treaty rights, First Nations maintain that they continue to hold Aboriginal rights and title throughout their traditional territory, including on privately-owned land.

Thus, the Province of New Brunswick has a legal duty to consult, and where appropriate accommodate, with First Nations when it makes a decision that may affect Aboriginal or treaty rights. Several aspects of the duty to consult that can be delegated to the proponent by the Crown include:

- Notification of a project, and information exchange;
- Assessment of the potential adverse effects from the project;
- Responding to concerns raised by First Nation communities; and
- Revisiting project plans to avoid or minimize negative effects posed by the Project.

The planned approach to the delegated aspects of the duty to consult in respect of the EIA of the Project is described in this section.

### APPROACH

The Project Area is located within the traditional territory of the Wolastoqey Nation which is comprised of six communities: Oromocto, St. Mary's, Kingsclear, Woodstock, Tobique and Madawaska. As such, McCain has undertaken consultation with all six member communities of the Wolastoqey Nation.

The Chief of each of the six First Nation communities was initially introduced to the Project in writing on January 30, 2020. The project notification letter included a brief description of the proposed Project, location (with map included), status of the Provincial Regulatory Approval process and a method for accessing the registration document. In accordance with the Consultation Contact Protocol (November 2019), the Wolastoqey Nation in New Brunswick (WNNB) was also copied on the letters. The community was invited to contact McCain to discuss the Project in greater detail in a method suitable to the Chief and their consultation lead.

To openly engage with the Wolastoqey Nation, McCain will also provide each community, and WNNB, with a copy of this EIA Registration document.

Questions, comments and concerns that are raised by the Nation will be documented and included in the Public Consultation Summary Report, unless they are of a confidential nature. The questions, comments or concerns raised will be responded to in a timely manner either in writing or by personal conversation.

## 8.0 Approval of the Project

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The following permits and approvals will be obtained once the Certificate of Determination is received and prior to proceeding with the physical components of the Project:

- Approval to Construct from NBDELG; and
- Amendment to the Approval to Operate.

## Funding

---

The Project is being funded by the proponent, McCain. The contact information for the proponent is as follows:

**Peter Cormier, P.Eng.**

Manager of Environmental Engineering

McCain Foods Limited

795 Route 108

Grand Falls, NB

E3Z 4A5

Email: [peter.cormier@mccain.com](mailto:peter.cormier@mccain.com)

Phone: 920-997-7277

## 10.0 Signature of Proponent

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Peter Cormier, P.Eng.

FEBRUARY 7, 2020

Date of Signature

## Closure

Any effects to the surrounding environment related to this project are anticipated to be minimal due to siting considerations at the onset of project design. Potential impacts to the environment that may arise from this work can be appropriately mitigated as outlined in this report and as a result, minimal impacts are anticipated to the environment from this Project. The Project will also result in 80 jobs being added directly to the local community. With proposed mitigation, the potential interactions of the Project with all affected valued components are not expected to be substantive.

This report was prepared by Dillon on behalf of McCain Foods Canada. Dillon has used the degree of care and skill ordinarily exercised under similar circumstances at the time the work was performed by reputable members of the environmental consulting profession practicing in Canada. Dillon assumes no responsibility for conditions which were beyond its scope of work. There is no warranty expressed or implied by Dillon.

The material in the report reflects Dillon's best judgment in light of the information available to Dillon at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Yours truly,

**DILLON CONSULTING LIMITED**



Kristin Banks, P.Eng.  
EIA Lead for Project, Dillon Consulting Limited



# Appendix A

## *Water Supply Source Assessment*





**DILLON**  
CONSULTING

**MCCAIN FOODS (CANADA)**

# **Water Supply Source Assessment**

McCain Foods (Canada), Grand Falls, New Brunswick



February 2020 – 20-2077





February 7, 2020

New Brunswick Department of Environment and Local Government  
20 McGloin Street  
PO Box 6000  
Fredericton, NB  
E3B 3H1

Attention: Lee Swanson, B.Sc., M.A.  
Project Manager

***Updated Water Supply Source Assessment (Final)  
McCain's Foods (Canada), Grand Falls, New Brunswick***

We are pleased to present a final copy of the updated Water Supply Source Assessment document for the above-noted project. This document is being submitted on behalf of McCain Foods (Canada) to the New Brunswick Department of Environment and Local Government as part of the water supply project under EIA registration 4561-3-1409.

Should you have any questions, please contact the undersigned.

Yours sincerely,

**DILLON CONSULTING LIMITED**

A handwritten signature in black ink, appearing to read "Parrish Arnott".

Parrish Arnott, P. Geo.  
Project Manager

AFG:trw

Our file: 20-2077

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	Figure 4: Relative Water Levels Observation Wells .....	9

## Appendices

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- A McCain RS-View Data
- B Laboratory Analytical Certificates
- C Disclaimer

## References

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## 1.0 Introduction

Dillon Consulting Limited (Dillon) was retained by McCain Foods (Canada), a Division of McCain Foods Limited (McCain), to complete an updated Water Supply Source Assessment (WSSA) as part of an Environmental Impact Assessment (EIA) at the McCain Grand Falls facility located in Saint André, New Brunswick (**Figure 1**). The assessment work was conducted in accordance with the New Brunswick Department of Environment and Local Government (NBDELG), Environmental Impact Assessment, Water Supply Source Assessment Guidelines (WSSA Guideline) issued by the NBDELG in March 2014.

Currently, the McCain Grand Falls facility utilizes an average of approximately 4,600 Liters per minute (L/min) to meet the demands of its operations in the manufacturing of commercial frozen food products. Water supply wells (Well E and Well F) were installed in 2015 and 2016 respectively, capable of meeting the demand volume of 4,600 L/min. The NBDELG requires that waterworks with groundwater extraction rates exceeding 50 m<sup>3</sup>/d be classified as an 'undertaking' on Schedule A of the Environmental Impact Assessment Regulation 87-83 (EIA). Therefore, this project was registered with the NBDELG and an environmental assessment and water supply source assessment were previously completed. McCain is currently expanding its operations to grow manufacturing capacity, which will increase water demand. This WSSA is being completed in conjunction with an update EIA as part of the proposed expansion.

## 2.0 Project Description

### 2.1 Purpose/Rationale

The Grand Falls McCain Foods facility currently has an Approval to Operate that allows for wellfield extraction of 4,600 L/min to meet its operational needs. The plant is currently undergoing an expansion to increase manufacturing capacity. Once the new expansion is completed, the plant will require up to 5,800 L/min to meet the new water demand for facility operations.

The purpose of this work is to assess the aquifer under increased extraction rates and follow the procedures outlined in the WSSA in coordination with NBDELG.

### 2.2 Site Description

The McCain facility is located on McCain Road in Saint-André, New Brunswick on the northeast bank of the Saint John River. The McCain facility water supply wells and associated well house are located on property identification (PID) Nos. 35355452 and 35355445 owned by McCain. The well house property abuts with an easement owned by the New Brunswick Railway Company (PID No. 35108034). An agreement exists between McCain and the identified third parties to allow for the occupation and operation of their water supply infrastructure. See **Figure 1** for site location.

The McCain-owned properties, consisting of either vacant land or components of the manufacturing facility, comprise an approximate extent of 0.5 km<sup>2</sup>. The nearest adjacent property and water user is approximately 400 m northwest from the McCain wellfield.

### 2.3 Current Groundwater Use

The McCain facility uses up to 4,600 L/min from groundwater supplied by two water supply wells (Well E and Well F) in the manufacturing of commercial frozen food products. Both of the wells (Well E and Well F) are located approximately 60 meters (m) from the edge of the Saint John River adjacent a newly constructed well house containing associated distribution system equipment including; pressure tanks, chlorine injection equipment and piping distribution network. A single water supply line exits the well house below grade to connect to the facility's water distribution network. Well E and Well F are also connected to distribution piping which allows for bypass, followed by discharge to a dissipation chamber and rock swale adjacent to the well house. Well E and Well F are currently outside the well house and completed with stick-up casings (pitless adapters) and well caps. The wellfield is protected by a locked fence. See **Figure 1** for well locations.

The currently operational McCain wells (Well E and Well F) are installed into a semi-confined sand and gravel aquifer. See **Table 1** for a summary of construction details for each well based upon historical well logs and video inspections.

**Table 1: Summary of Existing Well Construction**






Well ID	Total Depth (m)	Casing Diameter (m)	Casing Length (m)	Screen Length (m)	Pump Size (HP) / Average Pump Capacity (L/min)
Well E	49.0	0.41	40.0	9	125 / 7500
Well F	49.0	0.41	40.0	9	125 / 7500

The project site is not located in a wellfield protection area under the New Brunswick Wellfield Protection Program or a designated watershed under the New Brunswick Watershed Protection Program. Further, there are no protected natural areas or provincially significant habitats located in the area of the project activities. More details concerning the physical environment have been provided within the registration document titled *Environmental Impact Assessment Registration (Final), McCain Foods (Canada), Grand Falls, NB* (Dillon, 2013).



**McCain Foods Canada**  
 GRAND FALLS, VICTORIA CO., NB  
 UPDATED WATER SUPPLY SOURCE  
 ASSESSMENT

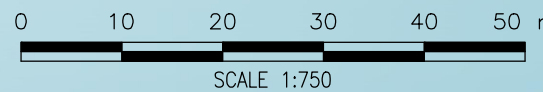
**SITE PLAN**  
 FIGURE 1

-  TREE LINE
-  PROPERTY LINE
-  PRODUCTION WELL LOCATION
-  OBSERVATION WELL
-  OBSOLETE TEST WELL (TO BE DECOMMISSIONED)

File Location:  
 c:\projectwise\working directory\projects  
 2020\50heh\dms03589\202077-05-03-fig.dwg  
 February, 04, 2020 3:34 PM

MAP/DRAWING INFORMATION  
 Property boundaries are based on Service New  
 Brunswick records and may not be exact. This  
 is not a legal survey.  
 Imagery provided by Google Earth Pro.

CREATED BY: IDM  
 UPDATED: HEB  
 CHECKED BY: RCD



INFRASTRUCTURE LOCATIONS ARE  
 APPROXIMATE ONLY AND SHOULD  
 BE FIELD VERIFIED

PROJECT: 20 2077  
 STATUS: FINAL  
 DATE: FEBRUARY 2020



## 2.4 Methodology

In order to assess the aquifer under increased extraction rates, Dillon performed a 72-hour variable rate pumping test, which included monitoring of water elevations in the existing well network. A 72-hour variable rate pumping test was selected based upon the requirements of the WSSA Guideline and in conjunction through discussion with NBDELG.

### 2.4.1 72 Hour Variable Rate Pumping Test

On January 14, 2020, Dillon personnel initiated a 72 hour variable rate pumping test on Wells E and F. Given the peak demands of the McCain facility are planned to be increased to 5,800 L/min from 4,600 the variable rate was conservatively set at 5,800 L/min on average for the duration of the 72 hour pumping test. Based upon the nature of facility operations it was not feasible to undergo a pumping test during a time where water was not being extracted from the wellfield. Therefore, the extraction rate was set to maintain the desired 5,800 L/min flow rate using a combination of Well E and Well F. This allowed for the water needs of the facility to be maintained while the excess water required to maintain the desired pumping rate (5,800 L/min) discharged to the Saint John River. Based upon the distribution system setup and the variability in water demand from the facility the overall flow rate did not remain constant however, an average flow rate of 5,800 L/min was maintained throughout the testing period.

### 2.4.2 Water Elevation Monitoring

During the 72 hour variable rate pumping test, changes in water levels were recorded in each of the production wells (Well E and Well F) as well as two observation wells (TH15-1 and TH15-2). Relative changes in water elevations were measured in the observation wells using Solinst® brand electronic pressure transducers (dataloggers), and measured within the pumping wells by McCain's SCADA system

### 2.4.3 Flow Monitoring

Measurements from the pumping wells were collected using McCain's SCADA system throughout the testing. The SCADA system recorded time, water level, and flow. Flow data from Well F was not recovered due to electrical error, while the data from Well E was retrieved following the completion of the test. Dillon staff was onsite intermittently throughout the pumping test to monitor discharge to the Saint John River and manually record electronic data from the SCADA system output within the well house. Manual readings consisted of flow to the plant, total flow (flow to the plant plus open discharge to the Saint John River), water levels, and time

### 2.4.4 Laboratory Analytical Program

Samples were collected during the pumping test to look for changes in water quality over time. The laboratory analytical program for this assessment was developed through discussion with NBDELG and as a means to assess potential changes in water quality associated with the increased extraction from the aquifer. Water samples were collected, preserved (as directed by the laboratory), and submitted for analysis. Samples were submitted to Research and Productivity Council Inc. (RPC) in Fredericton, NB, for general chemistry and trace metals. RPC is accredited by the Standards Council of Canada (SCC) for each

of the analytical methods utilized and have in-house QA/QC programs to govern sample analysis and analytical data quality assurance. Samples were collected at 48 and 72 hours into the pumping test for general chemistry and metals as per NBDELGs request. The results of the analytical program are discussed in **Section 3.2.1** and laboratory analytical certificates are attached in **Appendix B**.

## 3.0 Water Supply Source Assessment Results

### 3.1 72 Hour Variable Rate Pumping Test

At 1:00 pm on January 14, 2020, Dillon personnel, with support from McCain, initiated the 72 hour variable rate pumping test on Wells E and F to assess the sustainability of the proposed increase in pumping rate on the aquifer. The aquifer/water supply sourced by Well E and F has previously been assessed as part of the WSSA reports submitted in 2015 and 2016 (*Water Supply Source Assessment (2016), McCain Foods (Canada), Grand Falls, NB*). Groundwater elevations were monitored throughout the duration of the test in the pumping wells (Well E and F) and observation wells (TH15-1, TH15-2).

The variable rate pumping test utilized an average flow rate of 5,851 L/min. A total flow of 5,800 L/min between the two wells was set and continuous operation of the facility was sustained, while excess water was discharged to the Saint John River in an attempt to maintain the average pumping rate of 5,851 L/min throughout the test.

### 3.2 Water Elevation Monitoring

McCain's SCADA system recorded water levels prior to and following the completion of the pumping test. Instantaneous recovery was recorded in Well F when the extraction rate was reduced to meet the demands of the plant with no excess discharge. The maximum total observable drawdown was 3.79 m in Well F and 3.61 m in Well E. Static water level was not measured due to the wells being utilized prior to and throughout the duration of the testing period. Upon completion of the variable rate pumping test, it was not possible to monitor well recovery due to the facility maintaining operations throughout and post testing period. However, some instantaneous recovery was observed associated with the immediate change in extraction rate (see **Section 3.2** and **Appendix A** for McCain RSView data). See **Figure 2** for the water level data for Well E, and Well F, and **Figure 4** for relative water levels for observation wells (TH15-1, TH15-2).

### 3.3 Flow Monitoring

Flow readings throughout the testing (including time, water level, and flow), recorded by McCain's SCADA system as well as manually from the SCADA system output within the well house, are presented on **Figure 3**. As discussed above, flow data from Well F was not recovered due to electrical error at the time of testing.

### 3.4 Laboratory Analytical Results

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Laboratory analytical results, from historical and the current assessments, for general chemistry and trace metals are shown in **Table 2**. Laboratory analytical certificates are presented in **Appendix B**.

Water samples were collected from Well E/F at 48 and 72 hours into the pumping test. Concentrations of parameters analyzed in these samples were below the Guidelines for Canadian drinking Water Quality (GCDWQ, 2019). Historical general chemistry and trace metal data from previous testing is also shown in **Table 2**. Based upon a review of geochemistry from the time the wells were installed to the current assessment, the quality of the source water in Wells E and F appear to be consistent with previous results.





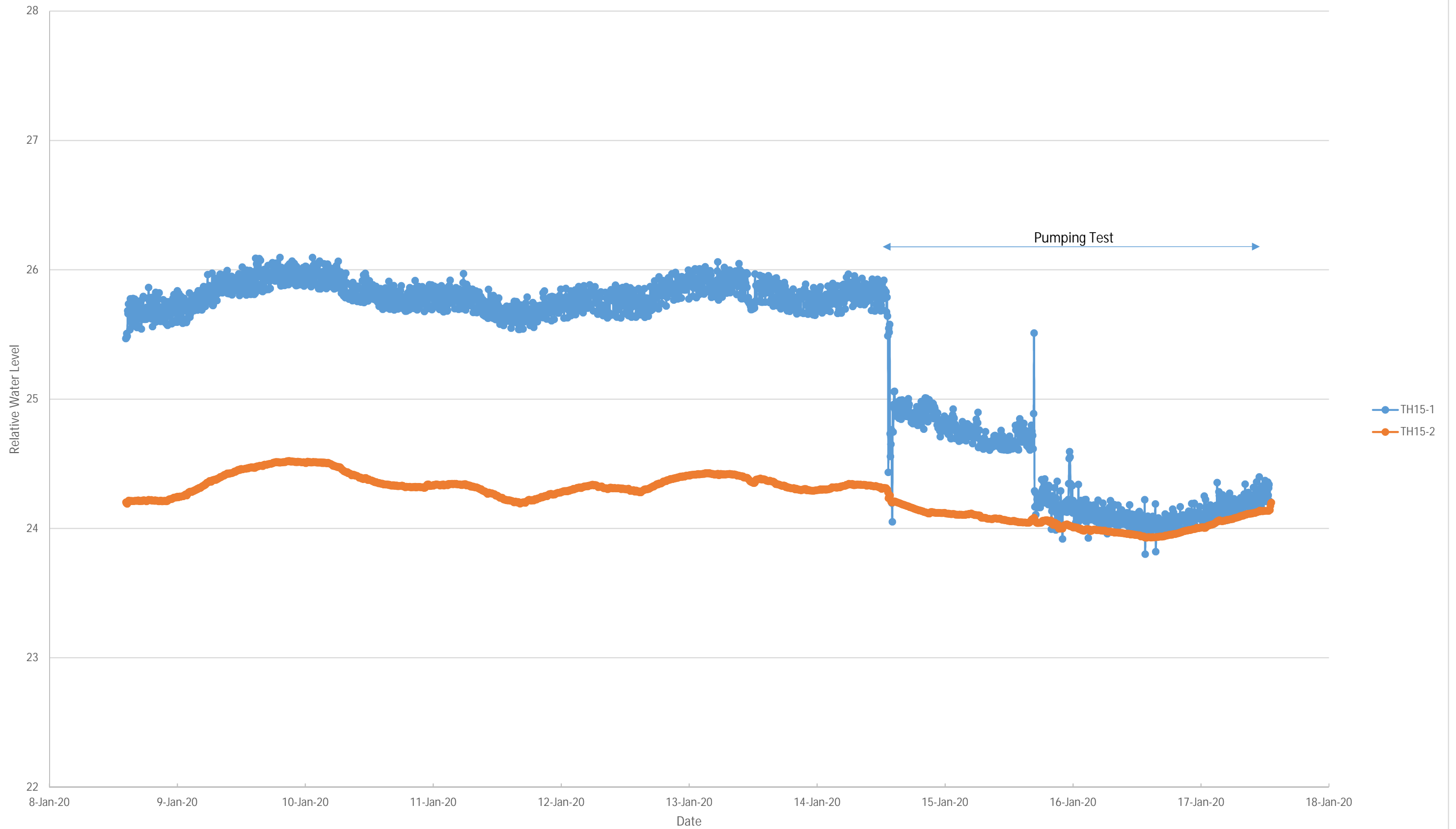
Figure 2: Water Levels in Wells E & F



Figure 3: Pump Flow Rates



Figure 4: Relative Water Levels Observation Wells





**TABLE 2**  
**GENERAL CHEMISTRY AND TRACE METALS IN GROUNDWATER**  
**Well E/F**  
**McCain Foods, Grand Falls, New Brunswick**  
**Project No. 20-2077**

Parameter	Units	*GCDWQ 2019	Well E	Well E	Well E	Well E	Well F	Well F	Well F	Well F	Well E/F	Well E/F
			(Day 1)	(Day 2)	(Day 3)	(Day 4)	(Day 1)	(Day 2)	(Day 3)	(Day 4)	48 Hours	72 Hours
			16-Nov-15	17-Nov-15	18-Nov-15	18-Nov-15	27-Sep-16	28-Sep-16	29-Sep-16	30-Sep-16	16-Jan-20	17-Jan-20
<b>General Chemistry</b>												
Sodium	mg/L	<b>200</b>	---	---	---	---	---	---	---	---	22.4	20.6
Potassium	mg/L	-	---	---	---	---	---	---	---	---	0.68	0.64
Calcium	mg/L	-	---	---	---	---	---	---	---	---	76.5	73.2
Magnesium	mg/L	-	---	---	---	---	---	---	---	---	11.8	11.9
Iron	mg/L	<b>0.3</b>	---	---	---	---	---	---	---	---	< 0.02	< 0.02
Manganese	mg/L	<b>0.02</b>	---	---	---	---	---	---	---	---	< 0.001	< 0.001
Copper	mg/L	<b>1</b>	---	---	---	---	---	---	---	---	< 0.001	< 0.001
Zinc	mg/L	<b>5</b>	---	---	---	---	---	---	---	---	0.003	0.002
Ammonia (as N)	mg/L	-	---	---	---	---	---	---	---	---	< 0.05	< 0.05
pH	units	<b>7-10.5</b>	7.7	7.8	7.9	8.0	7.8	7.8	7.7	7.7	7.7	7.7
Alkalinity (as CaCO3)	mg/L	-	200	200	200	210	200	200	200	200	180	180
Chloride	mg/L	<b>250</b>	77.9	74.0	74.3	73.5	61.3	67.5	66.3	65.8	52.0	51.6
Sulfate	mg/L	<b>500</b>	21	22	23	25	37	32	32	34	28	27
Nitrate + Nitrite (as N)	mg/L	<b>10</b>	2.5	3.0	2.8	3.2	3.2	2.7	3.2	2.9	4.1	4.1
o-Phosphate (as P)	mg/L	-	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	< 0.01	< 0.01
r-Silica (as SiO2)	mg/L	-	6.9	7.1	7.1	7.1	8.9	7.3	7.2	7.1	7.7	7.7
Total Organic Carbon	mg/L	-	0.6	0.7	0.7	0.6	0.7	0.7	0.7	0.7	0.5	0.5
Turbidity	NTU	-	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.1	< 0.1	< 0.1
Conductivity	µS/cm	-	670	676	674	675	640	638	636	629	598	590
<b>Calculated Parameters</b>												
Bicarbonate as CaCO3	mg/L	-	199	199	198	208	199	199	199	199	179	179
Carbonate as CaCO3	mg/L	-	0.938	1.18	1.48	1.96	1.18	1.18	0.938	0.938	0.844	0.844
Hydroxide as CaCO3	mg/L	-	---	---	---	---	---	---	---	---	0.025	0.025
Cation sum	meq/L	-	6.32	6.91	6.85	6.81	6.23	6.43	6.48	6.14	5.78	5.54
Anion sum	meq/L	-	6.81	6.76	6.77	7.02	6.72	6.76	6.76	6.77	5.94	5.91
% difference	%	-	-3.76	1.16	0.56	-1.55	-3.84	-2.52	-2.15	-4.88	-1.37	-3.16
Theoretical Conductivity	µS/cm	-					---	---	---	---	553	542
Hardness (as CaCO3)	mg/L	-	238	262	260	258	254	262	263	251	240	232
Ion Sum (mg/L)	mg/L	-	---	---	---	---	---	---	---	---	327	321
Saturation pH (@ 5C)	-	-	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.5	7.5
Langelier Index (@ 5C)	-	-	0.25	0.39	0.48	0.60	0.36	0.37	0.27	0.26	0.18	0.16
Saturation pH (@ 20C)	-	-	---	---	---	---	---	---	---	---	---	---
Saturation pH (@ 4C)	-	-	---	---	---	---	---	---	---	---	---	---
Saturation pH (5oC)	units	-	---	---	---	---	---	---	---	---	---	---
Langelier Index (5oC)	units	-	---	---	---	---	---	---	---	---	---	---

\*Health Canada Federal-Provincial-Territorial Committee on Canadian Drinking Water (FTP CDW) Guidelines for Canadian Drinking Water Quality (GCDWQ, August 2012)

*Italic - indicates guideline is an aesthetic objective and is not health based*

**75** bold/shaded value denotes concentration exceeds GCDWQ

' - ' denotes no guideline, not analyzed, or not applicable

**TABLE 2**  
**GENERAL CHEMISTRY AND TRACE METALS IN GROUNDWATER**  
**Well E/F**  
**McCain Foods, Grand Falls, New Brunswick**  
**Project No. 20-2077**

Trace Metals												
Aluminum	µg/L	<b>100</b>	1	1	1	< 1	2	1	1	1	1	< 1
Antimony	µg/L	<b>6</b>	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Arsenic	µg/L	<b>10</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Barium	µg/L	<b>1000</b>	35	38	38	38	34	35	35	32	32	31
Beryllium	µg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bismuth	µg/L	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Boron	µg/L	<b>5000</b>	10	10	10	10	7	7	7	6	8	8
Cadmium	µg/L	<b>5</b>	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Calcium	µg/L	-	81500	90300	89500	89000	84400	87200	87600	84100	76500	73200
Chromium	µg/L	<b>50</b>	2	2	3	2	< 1	1	1	< 1	1	1
Cobalt	µg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Copper	µg/L	<b>1000</b>	1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Iron	µg/L	<b>300</b>	< 20	< 20	< 20	< 20	70	< 20	20	30	< 20	< 20
Lead	µg/L	<b>5</b>	0.1	< 0.1	< 0.1	< 0.1	<b>22.1</b>	0.2	0.4	0.2	< 0.1	< 0.1
Lithium	µg/L	-	1.0	1.1	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9
Magnesium	µg/L	-	8480	8930	8830	8810	10600	10700	10800	9960	11800	11900
Manganese	µg/L	<b>20</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Molybdenum	µg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Nickel	µg/L	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Potassium	µg/L	-	1310	1490	1490	1490	880	830	820	760	680	640
Rubidium	µg/L	-	0.5	0.6	0.6	0.6	0.4	0.4	0.4	0.4	0.4	0.4
Selenium	µg/L	<b>5</b>	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Silver	µg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sodium	µg/L	<b>200000</b>	34900	37600	37200	36800	25700	27000	27500	25300	22400	20600
Strontium	µg/L	-	710	781	771	774	795	827	830	748	755	750
Tellurium	µg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Thallium	µg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tin	µg/L	-	< 0.1	< 0.1	< 0.1	< 0.1	6.5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Titanium	µg/L	-	---	---	---	---	---	---	---	---	---	---
Uranium	µg/L	<b>20</b>	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Vanadium	µg/L	-	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Zinc	µg/L	<b>5000</b>	3	2	2	1	7	< 1	< 1	< 1	3	1

\*Health Canada Federal-Provincial-Territorial Committee on Canadian Drinking Water (FTP CDW) Guidelines for Canadian Drinking Water Quality (GCDWQ, June 2019)

*Italic - indicates guideline is an aesthetic objective and is not health based*

**75** bold/shaded value denotes concentration exceeds GCDWQ

' - ' denotes no guideline, not analyzed, or not applicable

### 3.5 Theoretical Assessment

The WSSA Guideline suggests that appropriate analysis (e.g., Cooper-Jacob method, Theis method) be completed on the data collected from a constant rate pumping test. However, based upon the results of previous assessments completed on Well E and Well F and aquifer system, the following provides additional rationalization for the increase in water extraction from the wellfield beyond the observed conditions (water levels) during the most recent pumping test;

- **Well Construction** – Well E and Well F have the same construction and as such are both designed to function efficiently under the proposed operating conditions (5,800 L/min). Design capacity of the well screens are 7,250 L/min per well; therefore, the proposed extraction rate (5,800 L/min) is within the design capacity (80%) of each well.
- **Aquifer Transmissivity** – The near instantaneous drawdown and transition to steady-state observed during the current and previous hydrogeological testing suggests that additional stress could potentially be applied to the aquifer. Therefore, the available yield from the source aquifer has a greater capacity than what is proposed for extraction from water supply wells (Well E and Well F).
- **Boundary Condition** – Well E and Well F are located adjacent the Saint John River, which is considered to represent a constant head boundary. The presence of gravel, available transmissivity, results from current and previous pumping test analysis (2015 and 2016) and knowledge of similar aquifers along the Saint John River suggest hydraulic connection to the source aquifer. This hydraulic connection provides an infinite recharge component to the semi-confined sand and gravel beneath it. Based upon near instantaneous drawdown and recovery response it is suggestive that the source aquifer is able to maintain the hydraulic connection to the constant head boundary (Saint John River).

## 4.0 Conclusions and Recommendations

Based upon the results of the variable rate pumping test, the aquifer is capable of meeting and exceeding the anticipated water demand of 5,800 L/min. Approximate drawdown was observed to be less than 4 m in Well E or Well F during the pumping test, and instantaneous water level recoveries were observed in Well F upon completion of the test. This behaviour is also expected of Well E; however, it remained in use for plant operations upon completion of the test.

The aquifer assessment, including the testing of Well E and Well F, was completed at a total average extraction rate of 5,851 L/min, which is approximately 25% higher than the current approved rate of 4,600 L/min. Based upon the water level response, theoretical assessment, and as a means to maintain a high level of conservatism, Dillon recommends that the maximum allowable extraction rate from the aquifer (Wells E and Well F) be not more than 5,800 L/min.

## 5.0

## Closing Remarks

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This report was prepared by Andrew Gillett, EIT, and reviewed by Parrish Arnott, P.Ge.

Dillon has prepared this report for the exclusive use of McCain Food's (Canada) for specific application to the subject site. The Dillon assessment was conducted in accordance with Dillon's scope of work and accepted environmental practices/regulations. Limitations to this report are included in the disclaimer presented in **Appendix C**. No other warranty, expressed or implied, is made.



Parrish Arnott, P.Ge.

Project Manager



## **Appendix A**

### ***McCain RS-View Data***

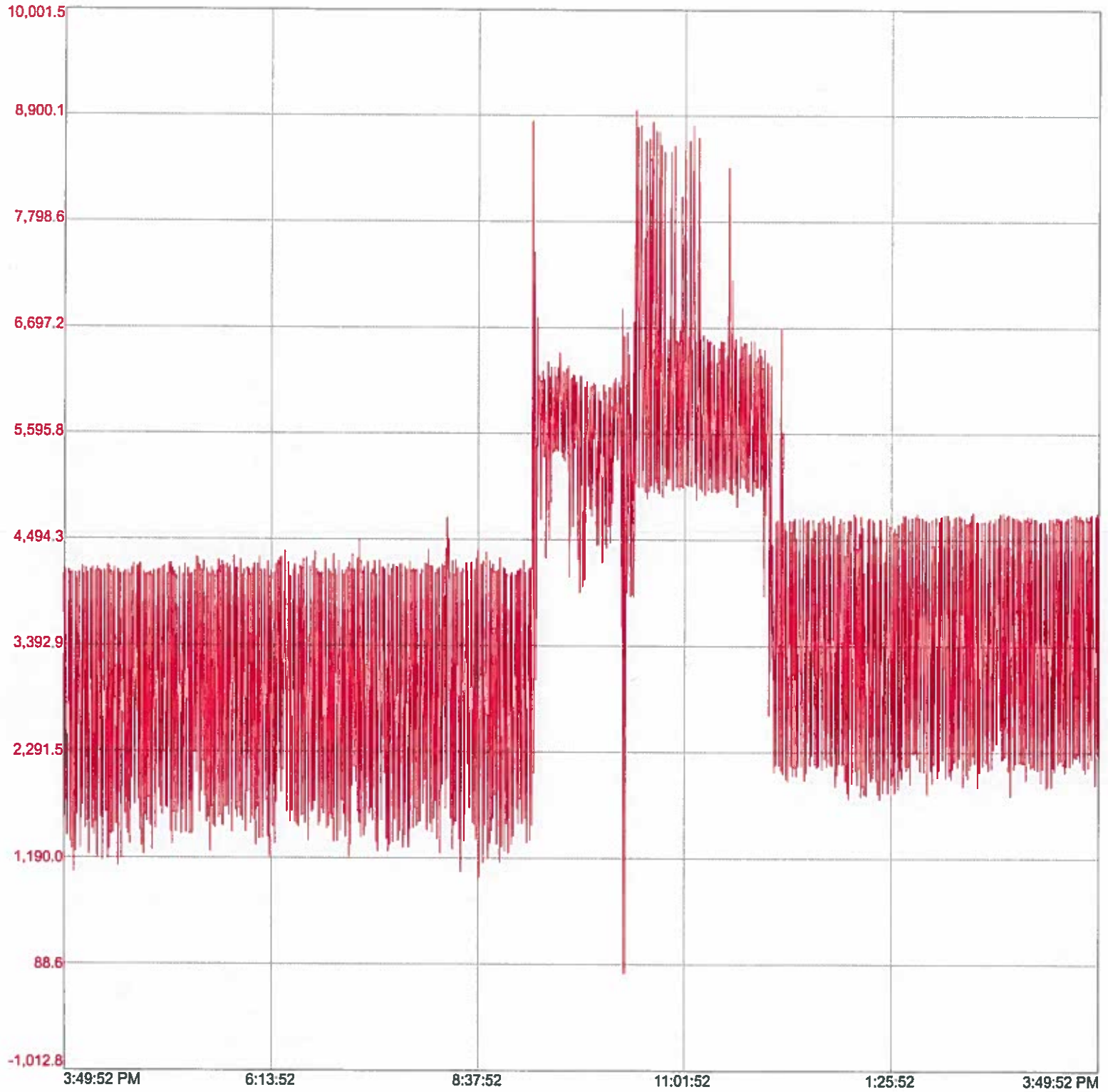


Well Flow (Calculated)  
Lpm

Wednesday, January 08, 2020 - Tuesday, January 21, 2020 - -

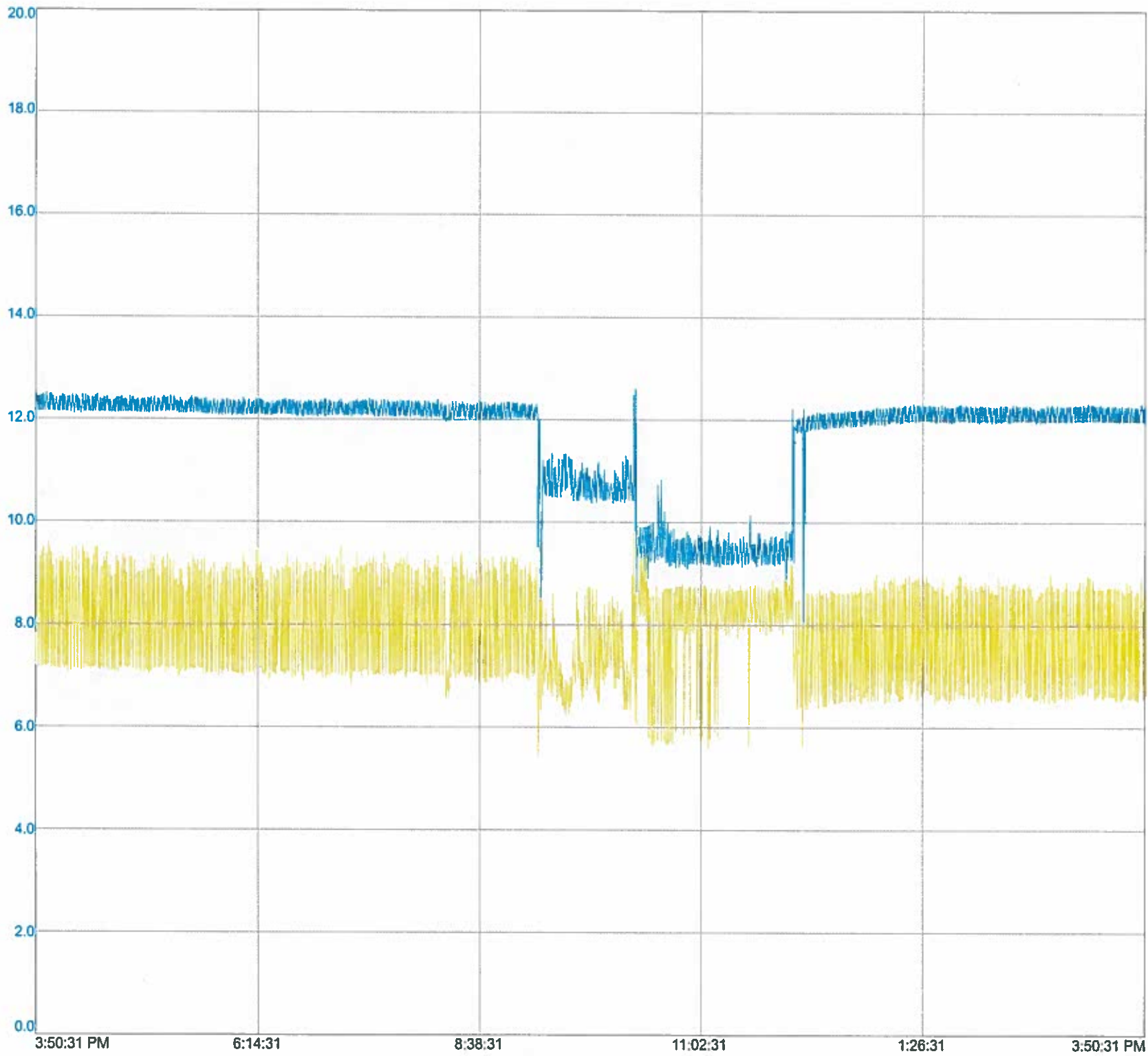
3:49:52 PM

3,985.6



Well E Level
m
Well F Level
m

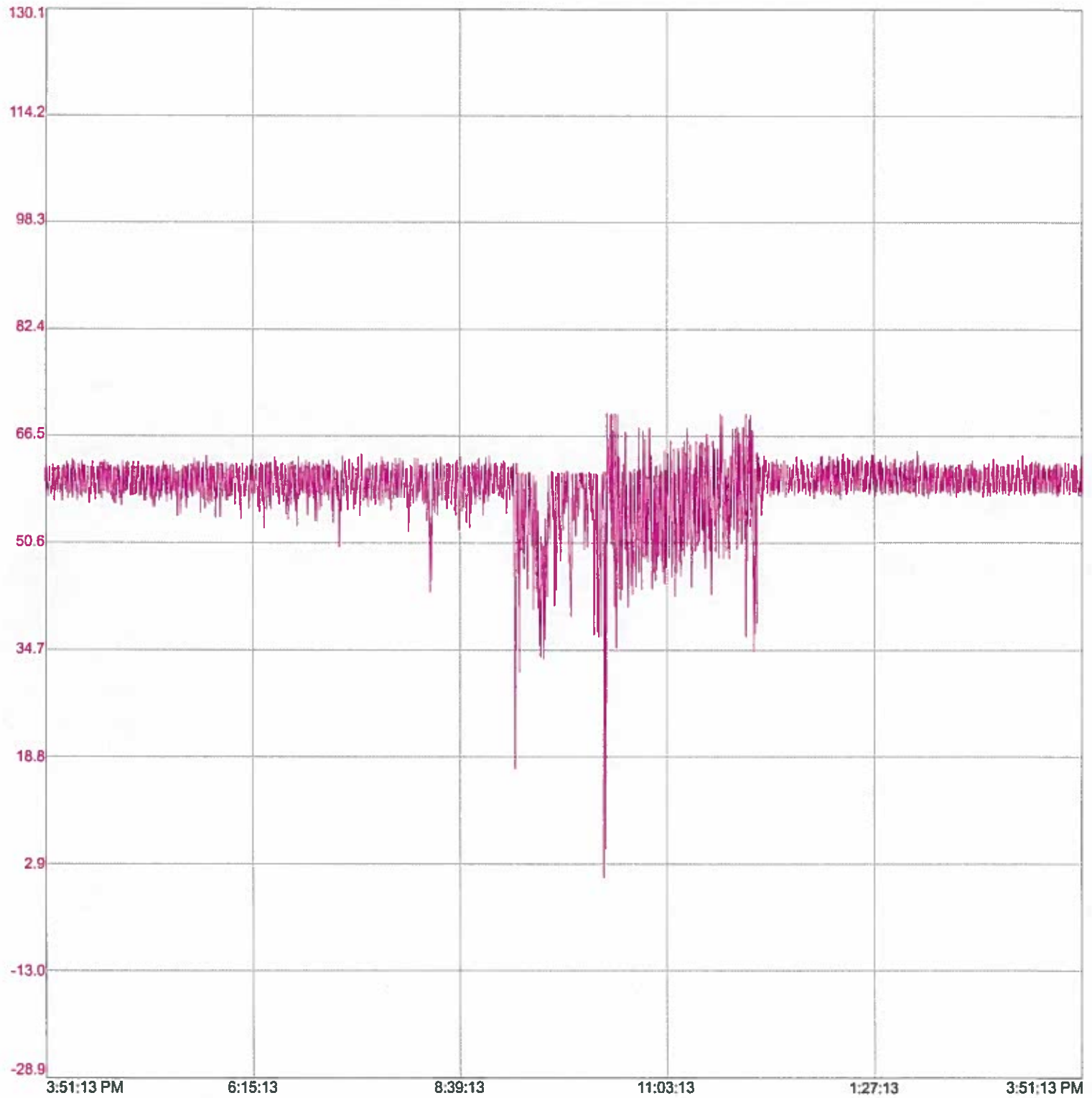
8.1
12.1



main water header pressure  
psi

Wednesday, January 09, 2020 - Tuesday, January 21, 2020 -

3:51:13 PM  
59.7





## Appendix B

### *Laboratory Analytical Certificates*





Report ID: 342614-IAS  
 Report Date: 22-Jan-20  
 Date Received: 17-Jan-20

## CERTIFICATE OF ANALYSIS

for  
 Dillon Consulting Ltd  
 1149 Smythe Street, Suite 200  
 Fredericton, NB E3B 3H4



921 College Hill Rd  
 Fredericton NB  
 Canada E3B 6Z9  
 Tel: 506.452.1212  
 Fax: 506.452.0594  
 www.rpc.ca

Attention: Parrish Arnott

**Project #: 20-2077**

Location: McCain Grand Falls

### Analysis of Water

RPC Sample ID:			342614-1	342614-2
Client Sample ID:			Pump Test-48h	Pump Test-72h
Date Sampled:			16-Jan-20	17-Jan-20
Analytes	Units	RL		
Sodium	mg/L	0.05	22.4	20.6
Potassium	mg/L	0.02	0.68	0.64
Calcium	mg/L	0.05	76.5	73.2
Magnesium	mg/L	0.01	11.8	11.9
Iron	mg/L	0.02	< 0.02	< 0.02
Manganese	mg/L	0.001	< 0.001	< 0.001
Copper	mg/L	0.001	< 0.001	< 0.001
Zinc	mg/L	0.001	0.003	0.002
Ammonia (as N)	mg/L	0.05	< 0.05	< 0.05
pH	units	-	7.7	7.7
Alkalinity (as CaCO <sub>3</sub> )	mg/L	2	180	180
Chloride	mg/L	0.5	52.0	51.6
Sulfate	mg/L	1	28	27
Nitrate + Nitrite (as N)	mg/L	0.05	4.1	4.1
o-Phosphate (as P)	mg/L	0.01	< 0.01	< 0.01
r-Silica (as SiO <sub>2</sub> )	mg/L	0.1	7.7	7.7
Carbon - Total Organic	mg/L	0.5	0.5	0.5
Turbidity	NTU	0.1	< 0.1	< 0.1
Conductivity	µS/cm	0.1	598	590
<b>Calculated Parameters</b>				
Bicarbonate (as CaCO <sub>3</sub> )	mg/L	-	179.	179.
Carbonate (as CaCO <sub>3</sub> )	mg/L	-	0.844	0.844
Hydroxide (as CaCO <sub>3</sub> )	mg/L	-	0.025	0.025
Cation Sum	meq/L	-	5.78	5.54
Anion Sum	meq/L	-	5.94	5.91
Percent Difference	%	-	-1.37	-3.16
Theoretical Conductivity	µS/cm	-	553	542
Hardness (as CaCO <sub>3</sub> )	mg/L	0.2	240	232
Ion Sum	mg/L	-	327	321
Saturation pH (5°C)	units	-	7.5	7.5
Langelier Index (5°C)	-	-	0.18	0.16

This report relates only to the sample(s) and information provided to the laboratory.

RL = Reporting Limit; Organic Carbon and ion chemistries for turbid samples are determined on filtered aliquots.

*Ross Kean*

*Brannen Burhoe*

Ross Kean  
 Department Head  
 Inorganic Analytical Chemistry

**WATER CHEMISTRY**  
 Page 1 of 3

Brannen Burhoe  
 Chemical Technician  
 Inorganic Analytical Services

Report ID: 342614-IAS  
 Report Date: 22-Jan-20  
 Date Received: 17-Jan-20

## CERTIFICATE OF ANALYSIS

for  
 Dillon Consulting Ltd  
 1149 Smythe Street, Suite 200  
 Fredericton, NB E3B 3H4



921 College Hill Rd  
 Fredericton NB  
 Canada E3B 6Z9  
 Tel: 506.452.1212  
 Fax: 506.452.0594  
 www.rpc.ca

Attention: Parrish Arnott

**Project #: 20-2077**

Location: McCain Grand Falls

### Analysis of Metals in Water

RPC Sample ID:		342614-1	342614-2
Client Sample ID:		Pump Test-48h	Pump Test-72h
Date Sampled:		16-Jan-20	17-Jan-20
Analytes	Units	RL	
Aluminum	µg/L	1	< 1
Antimony	µg/L	0.1	< 0.1
Arsenic	µg/L	1	< 1
Barium	µg/L	1	32
Beryllium	µg/L	0.1	< 0.1
Bismuth	µg/L	1	< 1
Boron	µg/L	1	8
Cadmium	µg/L	0.01	< 0.01
Calcium	µg/L	50	76500
Chromium	µg/L	1	1
Cobalt	µg/L	0.1	< 0.1
Copper	µg/L	1	< 1
Iron	µg/L	20	< 20
Lead	µg/L	0.1	< 0.1
Lithium	µg/L	0.1	0.9
Magnesium	µg/L	10	11800
Manganese	µg/L	1	< 1
Molybdenum	µg/L	0.1	< 0.1
Nickel	µg/L	1	< 1
Potassium	µg/L	20	680
Rubidium	µg/L	0.1	0.4
Selenium	µg/L	1	< 1
Silver	µg/L	0.1	< 0.1
Sodium	µg/L	50	22400
Strontium	µg/L	1	755
Tellurium	µg/L	0.1	< 0.1
Thallium	µg/L	0.1	< 0.1
Tin	µg/L	0.1	< 0.1
Uranium	µg/L	0.1	0.3
Vanadium	µg/L	1	< 1
Zinc	µg/L	1	3

Report ID: 342614-IAS  
Report Date: 22-Jan-20  
Date Received: 17-Jan-20

## CERTIFICATE OF ANALYSIS

for  
Dillon Consulting Ltd  
1149 Smythe Street, Suite 200  
Fredericton, NB E3B 3H4



921 College Hill Rd  
Fredericton NB  
Canada E3B 6Z9  
Tel: 506.452.1212  
Fax: 506.452.0594  
www.rpc.ca

### Methods

<u>Analyte</u>	<u>RPC SOP #</u>	<u>Method Reference</u>	<u>Method Principle</u>
Ammonia	4.M47	APHA 4500-NH <sub>3</sub> G	Phenate Colourimetry
pH	4.M03	APHA 4500-H <sup>+</sup> B	pH Electrode - Electrometric
Alkalinity (as CaCO <sub>3</sub> )	4.M43	EPA 310.2	Methyl Orange Colourimetry
Chloride	4.M44	APHA 4500-CL E	Ferricyanide Colourimetry
Sulfate	4.M45	APHA 4500-SO <sub>4</sub> E	Turbidimetry
Nitrate + Nitrite (as N)	4.M48	APHA 4500-NO <sub>3</sub> H	Hydrazine Red., Derivatization, Colourimetry
o-Phosphate (as P)	4.M50	APHA 4500-P F	Molybdate/Ascorbic Acid Colourimetry
r-Silica (as SiO <sub>2</sub> )	4.M46	APHA 4500-SI F	Heteropoly Blue Colourimetry
Carbon - Total Organic	4.M38	APHA 5310 C	UV-Persulfate Digestion, NDIR Detection
Turbidity	4.M06	APHA 2130 B	Nephelometry
Conductivity	4.M04	APHA 2510 B	Conductivity Meter - Electrode
Trace Metals	4.M01/4.M29	EPA 200.8/EPA 200.7	ICP-MS/ICP-ES



## Appendix C

### *Disclaimer*



**DISCLAIMER**

The material in this report reflects Dillon's best judgement in light of the information available to Dillon at the time of preparation. Any use which a third party make of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions or actions based on this report.





## References

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Health Canada (2019). Guidelines for Canadian Drinking Water Quality-Summary Table. Water and Air Quality Bureau, Health Environments and Consumer Safety Branch, Health Canada, Ottawa, Ontario.

New Brunswick Department of Environment and Local Government. 1987. New Brunswick Regulation 87-97 Under the Clean Environment Act. Available: <http://www.gNew Brunswick.ca/0062/pdf-regs/87-97.pdf>

New Brunswick Department of Environment and Local Government, Environmental Impact Assessment, Water Supply Source Assessment Guidelines, April 2017.



## Appendix B

### *Project Site - Photos*





Photo 1 – Frozen Saint John River facing southeast from bank with treated wastewater drainage area.



Photo 2 – Frozen Saint John River facing southwest from bank with mix-wood stand.



Photo 3 – Existing infrastructure and proposed excavation area facing northeast.



Photo 4 – Existing infrastructure and proposed excavation area facing east



Photo 5 – Mixed wood stand adjacent to Project area facing northwest.



Photo 6 – Mixed wood stand adjacent to Project area facing southeast





## Appendix C

### *Atlantic Canada Conservation Data Centre – Site-specific Reports*



# DATA REPORT 6531: Grand Falls, NB

Prepared 3 January 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

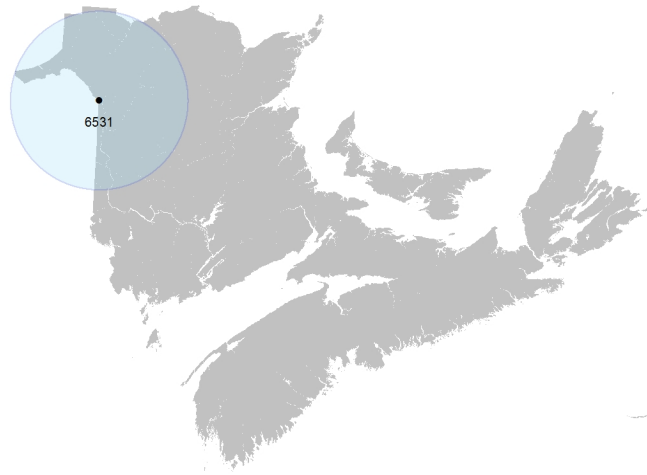
- 3.1 Managed Areas
- 3.2 Significant Areas
- Map 3: Special Areas

### 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:

**Filename**

GrFallsNB\_6531ob.xls  
GrFallsNB\_6531ob100km.xls  
GrFallsNB\_6531sa.xls

**Contents**

Rare and legally protected Flora and Fauna in your study area  
A list of Rare and legally protected Flora and Fauna within 100 km of your study area  
Significant Natural Areas in your study area

## 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:** Duncan Bayne  
(902) 648-3536

[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

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(902) 890-1046

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**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

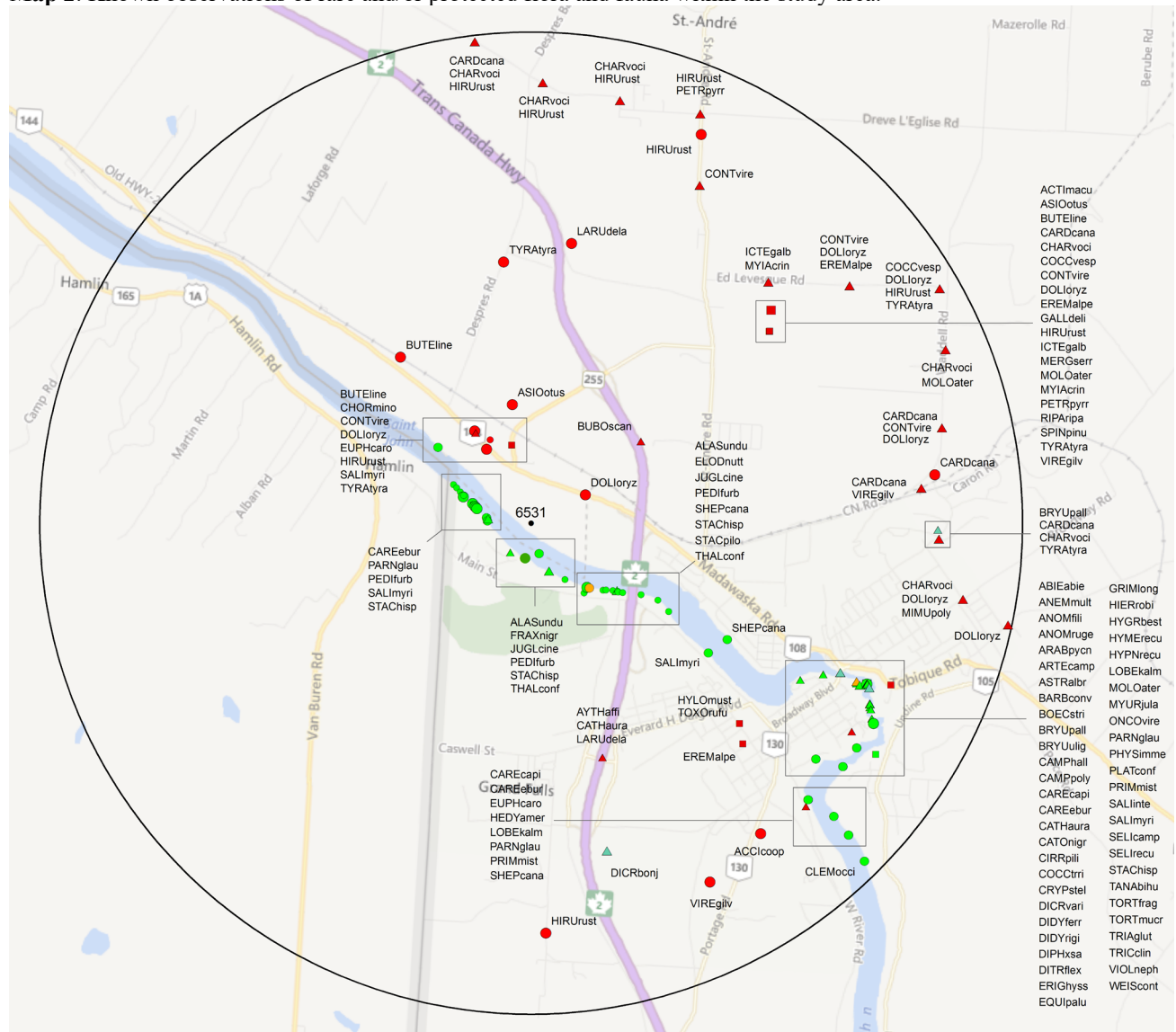
### 2.1 FLORA

The study area contains 131 records of 31 vascular and 62 records of 29 nonvascular flora (Map 2 and attached: \*ob.xls).

### 2.2 FAUNA

The study area contains 124 records of 30 vertebrate and 4 records of 2 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if “location-sensitive” species occur near your study site.

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



#### RESOLUTION

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

#### HIGHER TAXON

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

### 3.0 SPECIAL AREAS

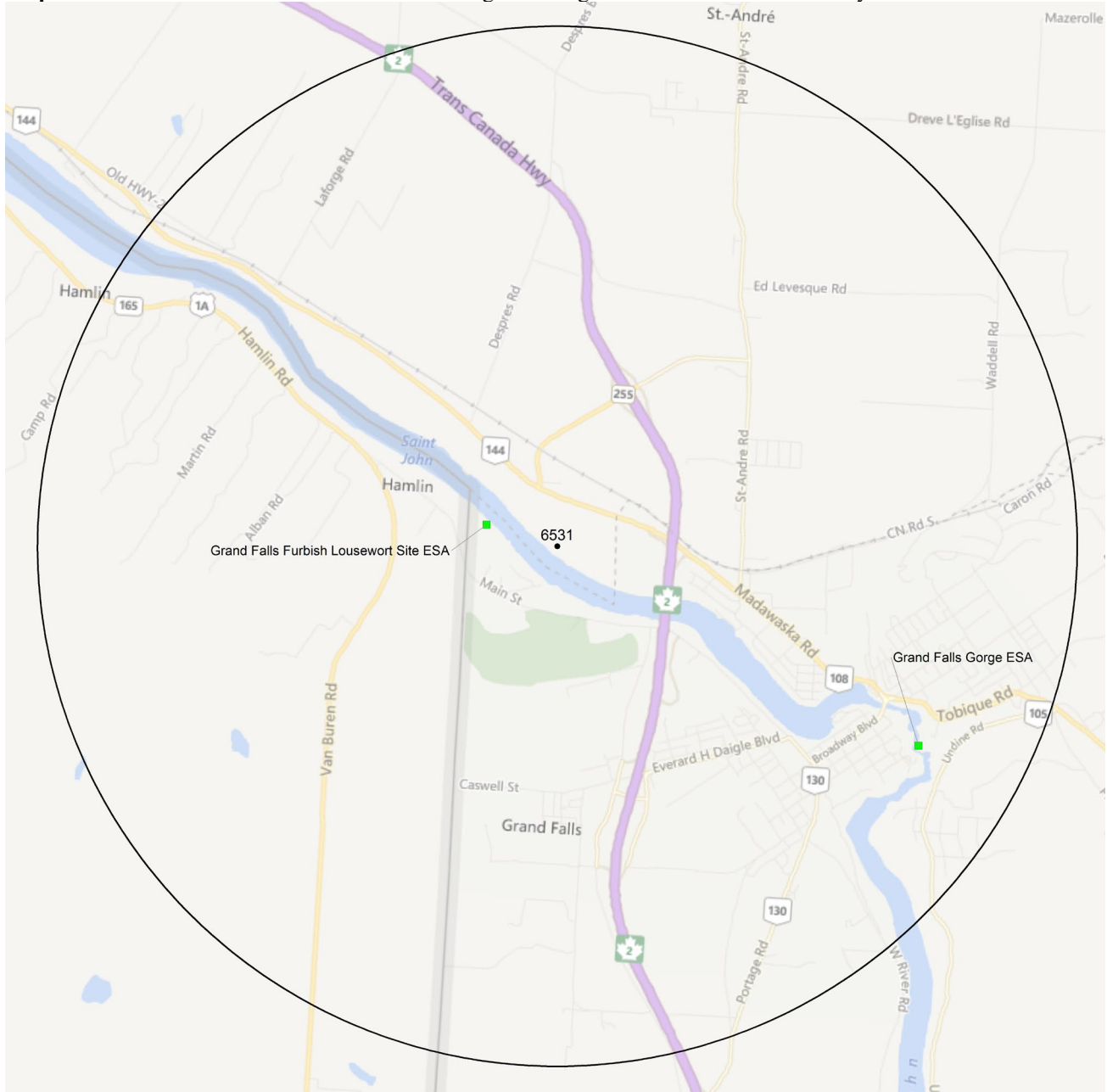
#### 3.1 MANAGED AREAS

The GIS scan identified no managed areas in the vicinity of the study area (Map 3 and attached file: \*ma\*.xls).

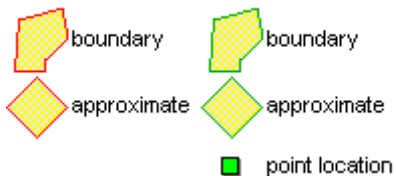
#### 3.2 SIGNIFICANT AREAS

The GIS scan identified 2 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    SIGNIFAIANT AREAS**



## 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)
N	<i>Campyllum halleri</i>	Haller's Fine Wet Moss				S1	2 May Be At Risk	2	3.8 $\pm$ 1.0
N	<i>Hypnum recurvatum</i>	Recurved Plait Moss				S1	2 May Be At Risk	3	3.8 $\pm$ 1.0
N	<i>Bryum pallens</i>	a Moss				S1?	2 May Be At Risk	2	3.8 $\pm$ 1.0
N	<i>Catoscopium nigratum</i>	Black Golf Club Moss				S1?	2 May Be At Risk	3	3.8 $\pm$ 1.0
N	<i>Dicranum bonjeanii</i>	Bonjean's Broom Moss				S1?	2 May Be At Risk	1	3.4 $\pm$ 1.0
N	<i>Seligeria recurvata</i>	a Moss				S1?	2 May Be At Risk	5	3.8 $\pm$ 1.0
N	<i>Grimmia longirostris</i>	a Moss				S1S2	2 May Be At Risk	1	3.8 $\pm$ 1.0
N	<i>Hygrohypnum bestii</i>	Best's Brook Moss				S1S2	3 Sensitive	1	3.8 $\pm$ 10.0
N	<i>Oncophorus virens</i>	Green Spur Moss				S1S2	2 May Be At Risk	2	3.8 $\pm$ 1.0
N	<i>Platydictya confervoides</i>	a Moss				S1S2	3 Sensitive	2	3.8 $\pm$ 1.0
N	<i>Cirriphyllum piliferum</i>	Hair-pointed Moss				S2	3 Sensitive	1	3.8 $\pm$ 1.0
N	<i>Didymodon ferrugineus</i>	a moss				S2	3 Sensitive	1	3.8 $\pm$ 1.0
N	<i>Ditrichum flexicaule</i>	Flexible Cow-hair Moss				S2	3 Sensitive	6	3.5 $\pm$ 1.0
N	<i>Physcomitrium immersum</i>	a Moss				S2	3 Sensitive	1	3.8 $\pm$ 1.0
N	<i>Tortula mucronifolia</i>	Mucronate Screw Moss				S2	3 Sensitive	3	3.8 $\pm$ 1.0
N	<i>Anomobryum filiforme</i>	a moss				S2	5 Undetermined	1	3.8 $\pm$ 1.0
N	<i>Bryum pallescens</i>	Pale Bryum Moss				S2?	5 Undetermined	1	3.8 $\pm$ 1.0
N	<i>Seligeria campylospoda</i>	a Moss				S2?	3 Sensitive	2	3.8 $\pm$ 1.0
N	<i>Bryum uliginosum</i>	a Moss				S2S3	3 Sensitive	2	3.8 $\pm$ 1.0
N	<i>Campyllum polygamum</i>	a Moss				S2S3	3 Sensitive	2	3.5 $\pm$ 1.0
N	<i>Didymodon rigidulus</i>	Rigid Screw Moss				S2S3	3 Sensitive	6	3.5 $\pm$ 1.0
N	<i>Tortella fragilis</i>	Fragile Twisted Moss				S3	3 Sensitive	1	3.8 $\pm$ 1.0
N	<i>Hymenostylium recurvirostre</i>	Hymenostylium Moss				S3	3 Sensitive	1	3.8 $\pm$ 1.0
N	<i>Anomodon rugelii</i>	Rugel's Anomodon Moss				S3S4	3 Sensitive	1	3.5 $\pm$ 1.0
N	<i>Barbula convoluta</i>	Lesser Bird's-claw Beard Moss				S3S4	4 Secure	2	3.5 $\pm$ 1.0
N	<i>Dicranella varia</i>	a Moss				S3S4	4 Secure	4	3.5 $\pm$ 1.0
N	<i>Myurella julacea</i>	Small Mouse-tail Moss				S3S4	4 Secure	1	3.8 $\pm$ 1.0
N	<i>Weissia controversa</i>	Green-Cushioned Weissia				S3S4	4 Secure	1	3.5 $\pm$ 1.0
N	<i>Abietinella abietina</i>	Wiry Fern Moss				S3S4	4 Secure	3	3.5 $\pm$ 1.0
P	<i>Juglans cinerea</i>	Butternut	Endangered	Endangered	Endangered	S1	1 At Risk	2	0.5 $\pm$ 2.0
P	<i>Pedicularis furbishiae</i>	Furbish Lousewort	Endangered	Endangered	Endangered	S1	1 At Risk	21	0.3 $\pm$ 0.0
P	<i>Fraxinus nigra</i>	Black Ash	Threatened			S4S5	4 Secure	1	0.5 $\pm$ 2.0
P	<i>Hieracium robinsonii</i>	Robinson's Hawkweed				S1	3 Sensitive	1	3.8 $\pm$ 1.0
P	<i>Boechera stricta</i>	Drummond's Rockcress				S2	3 Sensitive	1	3.9 $\pm$ 0.0
P	<i>Shepherdia canadensis</i>	Soapberry				S2	3 Sensitive	7	1.0 $\pm$ 0.0
P	<i>Anemone multifida</i>	Cut-leaved Anemone				S2	3 Sensitive	5	3.9 $\pm$ 0.0
P	<i>Elodea nuttallii</i>	Nuttall's Waterweed				S2	3 Sensitive	2	1.0 $\pm$ 0.0
P	<i>Salix myricoides</i>	Bayberry Willow				S2?	3 Sensitive	4	0.5 $\pm$ 0.0
P	<i>Artemisia campestris</i>	Field Wormwood				S3	4 Secure	3	3.3 $\pm$ 0.0
P	<i>Erigeron hyssopifolius</i>	Hyssop-leaved Fleabane				S3	4 Secure	10	3.2 $\pm$ 0.0
P	<i>Tanacetum bipinnatum ssp. huronense</i>	Lake Huron Tansy				S3	4 Secure	1	3.3 $\pm$ 0.0
P	<i>Arabis pycnocarpa</i>	Cream-flowered Rockcress				S3	4 Secure	4	3.8 $\pm$ 0.0
P	<i>Astragalus alpinus var. brunetianus</i>	Alpine Milk-Vetch				S3	4 Secure	6	3.7 $\pm$ 1.0
P	<i>Hedysarum americanum</i>	Alpine Hedysarum				S3	4 Secure	2	4.0 $\pm$ 0.0
P	<i>Stachys hispida</i>	Smooth Hedge-Nettle				S3	3 Sensitive	5	0.4 $\pm$ 0.0

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	<i>Primula mistassinica</i>	Mistassini Primrose				S3	4 Secure	6	3.7 ± 0.0
P	<i>Clematis occidentalis</i>	Purple Clematis				S3	4 Secure	1	4.8 ± 0.0
P	<i>Thalictrum confine</i>	Northern Meadow-rue				S3	4 Secure	3	0.4 ± 0.0
P	<i>Salix interior</i>	Sandbar Willow				S3	4 Secure	1	3.8 ± 0.0
P	<i>Parnassia glauca</i>	Fen Grass-of-Parnassus				S3	4 Secure	8	0.6 ± 0.0
P	<i>Viola nephrophylla</i>	Northern Bog Violet				S3	4 Secure	1	3.8 ± 0.0
P	<i>Carex capillaris</i>	Hairlike Sedge				S3	4 Secure	4	3.7 ± 0.0
P	<i>Carex eburnea</i>	Bristle-leaved Sedge				S3	4 Secure	10	0.6 ± 0.0
P	<i>Trichophorum clintonii</i>	Clinton's Clubrush				S3	4 Secure	1	3.7 ± 0.0
P	<i>Triantha glutinosa</i>	Sticky False-Asphodel				S3	4 Secure	10	3.2 ± 0.0
P	<i>Cryptogramma stelleri</i>	Steller's Rockbrake				S3	4 Secure	2	3.8 ± 0.0
P	<i>Equisetum palustre</i>	Marsh Horsetail				S3	4 Secure	1	3.8 ± 0.0
P	<i>Diphasiastrum x sabinifolium</i>	Savin-leaved Ground-cedar				S3	4 Secure	2	3.8 ± 1.0
P	<i>Lobelia kalmii</i>	Brook Lobelia				S3S4	4 Secure	4	3.3 ± 0.0
P	<i>Stachys pilosa</i>	Hairy Hedge-Nettle				S3S4	5 Undetermined	2	1.2 ± 0.0

#### 4.2 FAUNA

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	<i>Hylocichla mustelina</i>	Wood Thrush	Threatened	Threatened	Threatened	S1S2B,S1S2M	2 May Be At Risk	1	2.9 ± 7.0
A	<i>Hirundo rustica</i>	Barn Swallow	Threatened	Threatened	Threatened	S2B,S2M	3 Sensitive	24	0.9 ± 0.0
A	<i>Riparia riparia</i>	Bank Swallow	Threatened	Threatened		S2S3B,S2S3M	3 Sensitive	1	3.1 ± 7.0
A	<i>Cardellina canadensis</i>	Canada Warbler	Threatened	Threatened	Threatened	S3B,S3M	1 At Risk	7	3.1 ± 7.0
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened	Threatened	Threatened	S3B,S3M	3 Sensitive	18	0.6 ± 0.0
A	<i>Euphagus carolinus</i>	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S3B,S3M	2 May Be At Risk	2	0.8 ± 7.0
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Special Concern			S3B,S3S4N,SUM	3 Sensitive	4	3.1 ± 7.0
A	<i>Chordeiles minor</i>	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	1 At Risk	1	0.9 ± 0.0
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S4B,S4M	4 Secure	7	0.8 ± 7.0
A	<i>Bubo scandiacus</i>	Snowy Owl	Not At Risk			S1N,S2S3M	4 Secure	1	1.4 ± 0.0
A	<i>Accipiter cooperii</i>	Cooper's Hawk	Not At Risk			S1S2B,S1S2M	2 May Be At Risk	1	3.9 ± 0.0
A	<i>Buteo lineatus</i>	Red-shouldered Hawk	Not At Risk	Special Concern		S2B,S2M	2 May Be At Risk	4	1.1 ± 0.0
A	<i>Aythya affinis</i>	Lesser Scaup				S1B,S4M	4 Secure	1	2.5 ± 0.0
A	<i>Eremophila alpestris</i>	Horned Lark				S1B,S4N,S5M	2 May Be At Risk	5	3.1 ± 7.0
A	<i>Mimus polyglottos</i>	Northern Mockingbird				S2B,S2M	3 Sensitive	1	4.5 ± 1.0
A	<i>Toxostoma rufum</i>	Brown Thrasher				S2B,S2M	3 Sensitive	1	2.9 ± 7.0
A	<i>Asio otus</i>	Long-eared Owl				S2S3	5 Undetermined	2	1.2 ± 0.0
A	<i>Myiarchus crinitus</i>	Great Crested Flycatcher				S2S3B,S2S3M	3 Sensitive	2	3.1 ± 7.0
A	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow				S2S3B,S2S3M	3 Sensitive	2	3.1 ± 7.0
A	<i>Spinus pinus</i>	Pine Siskin				S3	4 Secure	1	3.1 ± 7.0
A	<i>Cathartes aura</i>	Turkey Vulture				S3B,S3M	4 Secure	2	2.5 ± 0.0
A	<i>Charadrius vociferus</i>	Killdeer				S3B,S3M	3 Sensitive	12	3.1 ± 7.0
A	<i>Vireo gilvus</i>	Warbling Vireo				S3B,S3M	4 Secure	4	3.1 ± 7.0
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B,S3M	2 May Be At Risk	4	3.1 ± 7.0
A	<i>Icterus galbula</i>	Baltimore Oriole				S3B,S3M	4 Secure	2	3.1 ± 7.0
A	<i>Mergus serrator</i>	Red-breasted Merganser				S3B,S5M,S4S5N	4 Secure	1	3.1 ± 7.0
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B,S3S4M	3 Sensitive	8	1.1 ± 0.0
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B,S5M	4 Secure	2	3.1 ± 7.0
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B,S5M	4 Secure	1	3.1 ± 7.0
A	<i>Larus delawarensis</i>	Ring-billed Gull				S3S4B,S5M	4 Secure	2	2.5 ± 0.0
I	<i>Coccinella transversoguttata richardsoni</i>	Transverse Lady Beetle	Special Concern			SH	2 May Be At Risk	1	3.7 ± 1.0
I	<i>Alasmidonta undulata</i>	Triangle Floater				S3	3 Sensitive	3	0.4 ± 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
<i>Glyptemys insculpta</i>	Wood Turtle	Threatened	Threatened	No
<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
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## 5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 506 records of 50 vertebrate and 21 records of 11 invertebrate fauna; 48 records of 24 vascular, 15 records of 8 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
x	x	x	x	Special Concern	x	x	x	x	x	
A	<i>Myotis lucifugus</i>	Little Brown Myotis	Endangered	Endangered	Endangered	S1	1 At Risk	4	73.2 $\pm$ 1.0	NB
A	<i>Myotis septentrionalis</i>	Northern Long-eared Myotis	Endangered	Endangered	Endangered	S1	1 At Risk	2	44.2 $\pm$ 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	427	76.4 $\pm$ 50.0	NB
A	<i>Rangifer tarandus pop. 2</i>	Woodland Caribou (Atlantic-Gasp /rsie pop.)	Endangered	Endangered	Extirpated	SX	0.1 Extirpated	2	34.2 $\pm$ 1.0	NB
A	<i>Emydoidea blandingii</i>	Blanding's Turtle - Nova Scotia pop.	Endangered	Endangered				1	75.6 $\pm$ 1.0	NB
A	<i>Sturnella magna</i>	Eastern Meadowlark	Threatened	Threatened	Threatened	S1B,S1M	2 May Be At Risk	22	14.4 $\pm$ 7.0	NB
A	<i>Ixobrychus exilis</i>	Least Bittern	Threatened	Threatened	Threatened	S1S2B,S1S2M	1 At Risk	5	28.4 $\pm$ 7.0	NB
A	<i>Hylocichla mustelina</i>	Wood Thrush	Threatened	Threatened	Threatened	S1S2B,S1S2M	2 May Be At Risk	160	2.9 $\pm$ 7.0	NB
A	<i>Antrostomus vociferus</i>	Eastern Whip-Poor-Will	Threatened	Threatened	Threatened	S2B,S2M	1 At Risk	9	45.6 $\pm$ 7.0	NB
A	<i>Hirundo rustica</i>	Barn Swallow	Threatened	Threatened	Threatened	S2B,S2M	3 Sensitive	500	0.9 $\pm$ 0.0	NB
A	<i>Catharus bicknelli</i>	Bicknell's Thrush	Threatened	Special Concern	Threatened	S2B,S2M	1 At Risk	748	52.1 $\pm$ 0.0	NB
A	<i>Glyptemys insculpta</i>	Wood Turtle	Threatened	Threatened	Threatened	S2S3	1 At Risk	55	24.0 $\pm$ 0.0	NB
A	<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	1 At Risk	209	12.6 $\pm$ 0.0	NB
A	<i>Riparia riparia</i>	Bank Swallow	Threatened	Threatened	Threatened	S2S3B,S2S3M	3 Sensitive	184	3.1 $\pm$ 7.0	NB
A	<i>Cardellina canadensis</i>	Canada Warbler	Threatened	Threatened	Threatened	S3B,S3M	1 At Risk	845	3.1 $\pm$ 7.0	NB
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened	Threatened	Threatened	S3B,S3M	3 Sensitive	336	0.6 $\pm$ 0.0	NB
A	<i>Anguilla rostrata</i>	American Eel	Threatened		Threatened	S4	4 Secure	4	50.2 $\pm$ 0.0	NB
A	<i>Asio flammeus</i>	Short-eared Owl	Special Concern	Special Concern	Special Concern	S2B,S2M	3 Sensitive	14	20.5 $\pm$ 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	2	51.5 $\pm$ 5.0	NB
A	<i>Chelydra serpentina</i>	Snapping Turtle	Special Concern	Special Concern	Special Concern	S3	3 Sensitive	2	78.2 $\pm$ 0.0	NB
A	<i>Euphagus carolinus</i>	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S3B,S3M	2 May Be At Risk	249	0.8 $\pm$ 7.0	NB
A	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Special Concern	Threatened	Threatened	S3B,S3M	1 At Risk	787	8.2 $\pm$ 7.0	NB
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Special Concern			S3B,S3S4N,SUM	3 Sensitive	320	3.1 $\pm$ 7.0	NB
A	<i>Chordeiles minor</i>	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	1 At Risk	244	0.9 $\pm$ 0.0	NB
A	<i>Phalaropus lobatus</i>	Red-necked Phalarope	Special Concern			S3M	3 Sensitive	2	15.9 $\pm$ 0.0	NB
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern	Special Concern	Special Concern	S4B,S4M	4 Secure	400	0.8 $\pm$ 7.0	NB
A	<i>Podiceps auritus</i>	Horned Grebe	Special Concern		Special Concern	S4N,S4M	4 Secure	1	66.4 $\pm$ 2.0	NB
A	<i>Bubo scandiacus</i>	Snowy Owl	Not At Risk			S1N,S2S3M	4 Secure	5	1.4 $\pm$ 0.0	NB
A	<i>Accipiter cooperii</i>	Cooper's Hawk	Not At Risk			S1S2B,S1S2M	2 May Be At Risk	13	3.9 $\pm$ 0.0	NB
A	<i>Fulca americana</i>	American Coot	Not At Risk			S1S2B,S1S2M	3 Sensitive	2	68.3 $\pm$ 0.0	NB
A	<i>Aegolius funereus</i>	Boreal Owl	Not At Risk			S1S2B,SUM	2 May Be At Risk	2	88.4 $\pm$ 7.0	NB
A	<i>Sorex dispar</i>	Long-tailed Shrew	Not At Risk	Special Concern		S2	3 Sensitive	25	52.1 $\pm$ 1.0	NB
A	<i>Buteo lineatus</i>	Red-shouldered Hawk	Not At Risk	Special Concern		S2B,S2M	2 May Be At Risk	15	1.1 $\pm$ 0.0	NB
A	<i>Chlidonias niger</i>	Black Tern	Not At Risk			S2B,S2M	3 Sensitive	3	61.7 $\pm$ 0.0	NB
A	<i>Lynx canadensis</i>	Canadian Lynx	Not At Risk		Endangered	S3	1 At Risk	109	18.1 $\pm$ 1.0	NB
A	<i>Sterna hirundo</i>	Common Tern	Not At Risk			S3B,SUM	3 Sensitive	46	45.3 $\pm$ 0.0	NB
A	<i>Podiceps grisegena</i>	Red-necked Grebe	Not At Risk			S3M,S2N	3 Sensitive	1	66.4 $\pm$ 0.0	NB
A	<i>Haliaeetus leucocephalus</i>	Bald Eagle	Not At Risk		Endangered	S4	1 At Risk	192	3.1 $\pm$ 7.0	NB
A	<i>Puma concolor pop. 1</i>	Eastern Cougar	Data Deficient		Endangered	SNA	5 Undetermined	18	37.9 $\pm$ 1.0	NB
A	<i>Synaptomys borealis sphagnicola</i>	Northern Bog Lemming				S1		1	76.7 $\pm$ 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>Tringa melanoleuca</i>	Greater Yellowlegs				S1?B,S5M	4 Secure	24	15.9 ± 0.0	NB
A	<i>Gallinula galeata</i>	Common Gallinule				S1B,S1M	3 Sensitive	1	92.9 ± 0.0	NB
A	<i>Antigone canadensis</i>	Sandhill Crane				S1B,S1M	8 Accidental	2	66.3 ± 7.0	NB
A	<i>Progne subis</i>	Purple Martin				S1B,S1M	2 May Be At Risk	61	28.0 ± 7.0	NB
A	<i>Thryothorus ludovicianus</i>	Carolina Wren				S1B,S1M	8 Accidental	2	49.6 ± 7.0	NB
A	<i>Oxyura jamaicensis</i>	Ruddy Duck				S1B,S2S3M	4 Secure	5	14.4 ± 7.0	NB
A	<i>Aythya affinis</i>	Lesser Scaup				S1B,S4M	4 Secure	1	2.5 ± 0.0	NB
A	<i>Eremophila alpestris</i>	Horned Lark				S1B,S4N,S5M	2 May Be At Risk	48	3.1 ± 7.0	NB
A	<i>Chroicocephalus ridibundus</i>	Black-headed Gull				S1N,S2M	3 Sensitive	1	12.2 ± 0.0	NB
A	<i>Butorides virescens</i>	Green Heron				S1S2B,S1S2M	3 Sensitive	15	28.4 ± 7.0	NB
A	<i>Nycticorax nycticorax</i>	Black-crowned Night-heron				S1S2B,S1S2M	3 Sensitive	17	14.4 ± 7.0	NB
A	<i>Empidonax traillii</i>	Willow Flycatcher				S1S2B,S1S2M	3 Sensitive	15	69.2 ± 2.0	NB
A	<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow				S1S2B,S1S2M	2 May Be At Risk	2	70.2 ± 7.0	NB
A	<i>Troglodytes aedon</i>	House Wren				S1S2B,S1S2M	5 Undetermined	5	14.4 ± 7.0	NB
A	<i>Calidris bairdii</i>	Baird's Sandpiper				S1S2M	3 Sensitive	2	47.7 ± 0.0	NB
A	<i>Microtus chrotorrhinus</i>	Rock Vole				S2?	5 Undetermined	35	36.7 ± 1.0	NB
A	<i>Mimus polyglottos</i>	Northern Mockingbird				S2B,S2M	3 Sensitive	49	4.5 ± 1.0	NB
A	<i>Toxostoma rufum</i>	Brown Thrasher				S2B,S2M	3 Sensitive	76	2.9 ± 7.0	NB
A	<i>Poocetes gramineus</i>	Vesper Sparrow				S2B,S2M	2 May Be At Risk	34	11.5 ± 0.0	NB
A	<i>Pinicola enucleator</i>	Pine Grosbeak				S2B,S4S5N,S4S5M	3 Sensitive	109	28.4 ± 7.0	NB
A	<i>Tringa solitaria</i>	Solitary Sandpiper				S2B,S5M	4 Secure	30	15.9 ± 0.0	NB
A	<i>Anser caerulescens</i>	Snow Goose				S2M	4 Secure	1	89.5 ± 0.0	NB
A	<i>Phalacrocorax carbo</i>	Great Cormorant				S2N,S2M	4 Secure	1	70.6 ± 1.0	NB
A	<i>Asio otus</i>	Long-eared Owl				S2S3	5 Undetermined	15	1.2 ± 0.0	NB
A	<i>Picoides dorsalis</i>	American Three-toed Woodpecker				S2S3	3 Sensitive	47	28.8 ± 0.0	NB
A	<i>Salmo salar</i>	Atlantic Salmon				S2S3	2 May Be At Risk	719	35.6 ± 0.0	NB
A	<i>Spatula clypeata</i>	Northern Shoveler				S2S3B,S2S3M	4 Secure	19	14.4 ± 7.0	NB
A	<i>Myiarchus crinitus</i>	Great Crested Flycatcher				S2S3B,S2S3M	3 Sensitive	57	3.1 ± 7.0	NB
A	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow				S2S3B,S2S3M	3 Sensitive	193	3.1 ± 7.0	NB
A	<i>Pluvialis dominica</i>	American Golden-Plover				S2S3M	3 Sensitive	3	47.7 ± 0.0	NB
A	<i>Calcarius lapponicus</i>	Lapland Longspur				S2S3N,SUM	3 Sensitive	1	90.7 ± 2.0	NB
A	<i>Loxia curvirostra</i>	Red Crossbill				S3	4 Secure	39	27.9 ± 0.0	NB
A	<i>Spinus pinus</i>	Pine Siskin				S3	4 Secure	181	3.1 ± 7.0	NB
A	<i>Prosopium cylindraceum</i>	Round Whitefish				S3	4 Secure	8	28.8 ± 10.0	NB
A	<i>Salvelinus namaycush</i>	Lake Trout				S3	3 Sensitive	10	62.5 ± 0.0	NB
A	<i>Eptesicus fuscus</i>	Big Brown Bat				S3	3 Sensitive	1	20.2 ± 0.0	NB
A	<i>Cathartes aura</i>	Turkey Vulture				S3B,S3M	4 Secure	47	2.5 ± 0.0	NB
A	<i>Rallus limicola</i>	Virginia Rail				S3B,S3M	3 Sensitive	14	9.8 ± 0.0	NB
A	<i>Charadrius vociferus</i>	Killdeer				S3B,S3M	3 Sensitive	349	3.1 ± 7.0	NB
A	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo				S3B,S3M	4 Secure	27	8.0 ± 7.0	NB
A	<i>Vireo gilvus</i>	Warbling Vireo				S3B,S3M	4 Secure	88	3.1 ± 7.0	NB
A	<i>Piranga olivacea</i>	Scarlet Tanager				S3B,S3M	4 Secure	214	11.9 ± 3.0	NB
A	<i>Passerina cyanea</i>	Indigo Bunting				S3B,S3M	4 Secure	28	12.1 ± 7.0	NB
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B,S3M	2 May Be At Risk	104	3.1 ± 7.0	NB
A	<i>Icterus galbula</i>	Baltimore Oriole				S3B,S3M	4 Secure	93	3.1 ± 7.0	NB
A	<i>Somateria mollissima</i>	Common Eider				S3B,S4M,S3N	4 Secure	2	58.0 ± 0.0	NB
A	<i>Setophaga tigrina</i>	Cape May Warbler				S3B,S4S5M	4 Secure	151	8.2 ± 1.0	NB
A	<i>Anas acuta</i>	Northern Pintail				S3B,S5M	3 Sensitive	9	28.4 ± 7.0	NB
A	<i>Mergus serrator</i>	Red-breasted Merganser				S3B,S5M,S4S5N	4 Secure	28	3.1 ± 7.0	NB
A	<i>Arenaria interpres</i>	Ruddy Turnstone				S3M	4 Secure	1	47.7 ± 0.0	NB
A	<i>Bucephala albeola</i>	Bufflehead				S3M,S2N	3 Sensitive	2	55.2 ± 0.0	NB
A	<i>Calidris maritima</i>	Purple Sandpiper				S3M,S3N	4 Secure	1	70.6 ± 1.0	NB
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3S4B,S3S4M	3 Sensitive	294	1.1 ± 0.0	NB
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B,S5M	4 Secure	381	3.1 ± 7.0	NB
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B,S5M	4 Secure	261	3.1 ± 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>Larus delawarensis</i>	Ring-billed Gull				S3S4B,S5M	4 Secure	70	2.5 ± 0.0	NB
A	<i>Setophaga striata</i>	Blackpoll Warbler				S3S4B,S5M	4 Secure	751	17.3 ± 7.0	NB
A	<i>Calidris pusilla</i>	Semipalmated Sandpiper				S3S4M	4 Secure	12	15.9 ± 0.0	NB
A	<i>Calidris melanotos</i>	Pectoral Sandpiper				S3S4M	4 Secure	7	47.7 ± 0.0	NB
A	<i>Calidris alba</i>	Sanderling				S3S4M,S1N	3 Sensitive	3	47.7 ± 0.0	NB
C	<i>Acer saccharum</i> - <i>Fraxinus americana</i> / <i>Gymnocarpium dryopteris</i> - <i>Deparia acrostichoides</i> Forest	Sugar Maple - White Ash / Common Oak Fern - Silvery Glade Fern Forest				S3		2	77.1 ± 0.0	NB
I	<i>Cicindela marginipennis</i>	Cobblestone Tiger Beetle	Endangered	Endangered	Endangered	S1	1 At Risk	8	68.3 ± 0.0	NB
I	<i>Danaus plexippus</i>	Monarch	Endangered	Special Concern	Special Concern	S3B,S3M	3 Sensitive	15	10.7 ± 0.0	NB
I	<i>Ophiogomphus howei</i>	Pygmy Snaketail	Special Concern	Special Concern	Special Concern	S2	2 May Be At Risk	3	60.5 ± 0.0	NB
I	<i>Bombus terricola</i>	Yellow-banded Bumblebee	Special Concern			S3?	3 Sensitive	13	17.1 ± 0.0	NB
I	<i>Coccinella transversoguttata richardsoni</i>	Transverse Lady Beetle	Special Concern			SH	2 May Be At Risk	2	3.7 ± 1.0	NB
I	<i>Lycaena dorcas</i>	Dorcas Copper				S1	2 May Be At Risk	14	77.7 ± 1.0	NB
I	<i>Erora laeta</i>	Early Hairstreak				S1	2 May Be At Risk	10	29.2 ± 0.0	NB
I	<i>Somatochlora septentrionalis</i>	Muskeg Emerald				S1	2 May Be At Risk	3	88.1 ± 0.0	NB
I	<i>Leucorrhinia patricia</i>	Canada Whiteface				S1	2 May Be At Risk	7	77.0 ± 1.0	NB
I	<i>Plebejus saepiolus</i>	Greenish Blue				S1S2	4 Secure	24	11.7 ± 1.0	NB
I	<i>Ophiogomphus colubrinus</i>	Boreal Snaketail				S1S2	2 May Be At Risk	2	72.1 ± 0.0	NB
I	<i>Cicindela ancociscconensis</i>	Appalachian Tiger Beetle				S2	5 Undetermined	2	68.3 ± 0.0	NB
I	<i>Encyclops caerulea</i>	a Longhorned Beetle				S2		2	93.8 ± 0.0	NB
I	<i>Satyrnum calanus</i>	Banded Hairstreak				S2	3 Sensitive	3	93.2 ± 0.0	NB
I	<i>Aeshna juncea</i>	Rush Darner				S2	3 Sensitive	8	74.5 ± 0.0	NB
I	<i>Somatochlora brevicincta</i>	Quebec Emerald				S2	5 Undetermined	7	84.9 ± 0.0	NB
I	<i>Hetaerina americana</i>	American Rubyspot				S2	3 Sensitive	1	94.8 ± 0.0	NB
I	<i>Coenagrion interrogatum</i>	Subarctic Bluet				S2	3 Sensitive	13	43.2 ± 1.0	NB
I	<i>Callophrys henrici</i>	Henry's Elfin				S2S3	4 Secure	3	13.3 ± 2.0	NB
I	<i>Hesperia sassacus</i>	Indian Skipper				S3	4 Secure	2	57.6 ± 7.0	NB
I	<i>Euphyes bimacula</i>	Two-spotted Skipper				S3	4 Secure	1	97.6 ± 7.0	NB
I	<i>Satyrnum acadica</i>	Acadian Hairstreak				S3	4 Secure	7	13.0 ± 0.0	NB
I	<i>Callophrys polios</i>	Hoary Elfin				S3	4 Secure	9	16.1 ± 0.0	NB
I	<i>Callophrys eryphon</i>	Western Pine Elfin				S3	4 Secure	12	92.1 ± 1.0	NB
I	<i>Speyeria aphrodite</i>	Aphrodite Fritillary				S3	4 Secure	13	26.7 ± 0.0	NB
I	<i>Boloria eunomia</i>	Bog Fritillary				S3	5 Undetermined	20	21.1 ± 0.0	NB
I	<i>Boloria bellona</i>	Meadow Fritillary				S3	4 Secure	9	39.9 ± 2.0	NB
I	<i>Boloria chariclea</i>	Arctic Fritillary				S3	4 Secure	14	72.3 ± 0.0	NB
I	<i>Polygonia satyrus</i>	Satyr Comma				S3	4 Secure	24	27.1 ± 0.0	NB
I	<i>Polygonia gracilis</i>	Hoary Comma				S3	4 Secure	33	39.9 ± 2.0	NB
I	<i>Nymphalis l-album</i>	Compton Tortoiseshell				S3	4 Secure	13	15.7 ± 1.0	NB
I	<i>Gomphus vastus</i>	Cobra Clubtail				S3	3 Sensitive	2	23.2 ± 0.0	NB
I	<i>Gomphus abbreviatus</i>	Spine-crowned Clubtail				S3	4 Secure	7	37.3 ± 0.0	NB
I	<i>Somatochlora albicincta</i>	Ringed Emerald				S3	4 Secure	29	63.4 ± 0.0	NB
I	<i>Somatochlora cingulata</i>	Lake Emerald				S3	4 Secure	24	43.9 ± 0.0	NB
I	<i>Somatochlora forcipata</i>	Forcinate Emerald				S3	4 Secure	9	63.1 ± 1.0	NB
I	<i>Williamsonia fletcheri</i>	Ebony Boghaunter				S3	4 Secure	2	79.5 ± 0.0	NB
I	<i>Lestes eurinus</i>	Amber-Winged Spreadwing				S3	4 Secure	6	72.9 ± 0.0	NB
I	<i>Enallagma geminatum</i>	Skimming Bluet				S3	5 Undetermined	4	78.3 ± 0.0	NB
I	<i>Enallagma signatum</i>	Orange Bluet				S3	4 Secure	3	81.2 ± 0.0	NB
I	<i>Stylurus scudderi</i>	Zebra Clubtail				S3	4 Secure	5	54.8 ± 0.0	NB
I	<i>Alasmidonta undulata</i>	Triangle Floater				S3	3 Sensitive	4	0.4 ± 0.0	NB
I	<i>Pantala hymenaea</i>	Spot-Winged Glider				S3B,S3M	4 Secure	2	72.1 ± 1.0	NB
I	<i>Satyrnum liparops</i>	Striped Hairstreak				S3S4	4 Secure	13	9.3 ± 0.0	NB
I	<i>Cupido comyntas</i>	Eastern Tailed Blue				S3S4	4 Secure	2	53.4 ± 2.0	NB
N	<i>Fuscopannaria leucosticta</i>	Rimmed Shingles Lichen	Threatened			S2	2 May Be At Risk	2	75.7 ± 0.0	NB
N	<i>Aphanorhagma serratum</i>	a Moss				S1	5 Undetermined	2	34.2 ± 0.0	NB
N	<i>Arctoa fulvella</i>	a Moss				S1	2 May Be At Risk	2	76.7 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
N	<i>Campyllum halleri</i>	Haller's Fine Wet Moss				S1	2 May Be At Risk	2	3.8 ± 1.0	NB
N	<i>Drepanocladus capillifolius</i>	Hair Hook Moss				S1	5 Undetermined	1	22.6 ± 1.0	NB
N	<i>Grimmia donniana</i>	Donn's Grimmia Moss				S1	2 May Be At Risk	4	76.7 ± 1.0	NB
N	<i>Grimmia incurva</i>	Black Grimmia				S1	2 May Be At Risk	4	76.7 ± 1.0	NB
N	<i>Grimmia unicolor</i>	a Moss				S1	2 May Be At Risk	1	27.5 ± 1.0	NB
N	<i>Hypnum recurvatum</i>	Recurved Plait Moss				S1	2 May Be At Risk	3	3.8 ± 1.0	NB
N	<i>Kiaeria starkei</i>	Starke's Fork Moss				S1	2 May Be At Risk	1	76.7 ± 1.0	NB
N	<i>Placynthium asperellum</i>	Lilliput Ink Lichen				S1		1	47.7 ± 0.0	NB
N	<i>Collema tenax</i>	Soil Tarpaper Lichen				S1		5	34.0 ± 0.0	NB
N	<i>Cetraria ericetorum ssp. ericetorum</i>	a Lichen				S1		2	78.7 ± 20.0	NB
N	<i>Bryum pallens</i>	a Moss				S1?	2 May Be At Risk	3	3.8 ± 1.0	NB
N	<i>Catoscopium nigratum</i>	Black Golf Club Moss				S1?	2 May Be At Risk	4	3.8 ± 1.0	NB
N	<i>Cinclidium stygium</i>	Sooty Cupola Moss				S1?	2 May Be At Risk	2	39.2 ± 0.0	NB
N	<i>Dicranum bonjeanii</i>	Bonjean's Broom Moss				S1?	2 May Be At Risk	2	3.4 ± 1.0	NB
N	<i>Entodon brevisetus</i>	a Moss				S1?	2 May Be At Risk	1	56.6 ± 1.0	NB
N	<i>Eurhynchium hians</i>	Light Beaked Moss				S1?	2 May Be At Risk	1	79.1 ± 0.0	NB
N	<i>Paludella squarrosa</i>	Tufted Fen Moss				S1?	2 May Be At Risk	1	39.2 ± 0.0	NB
N	<i>Seligeria recurvata</i>	a Moss				S1?	2 May Be At Risk	5	3.8 ± 1.0	NB
N	<i>Splachnum sphaericum</i>	Round-fruited Dung Moss				S1?	3 Sensitive	1	64.0 ± 1.0	NB
N	<i>Timmia megapolitana</i>	Metropolitan Timmia Moss				S1?	2 May Be At Risk	3	13.7 ± 1.0	NB
N	<i>Rhizomnium pseudopunctatum</i>	Felted Leafy Moss				S1?	2 May Be At Risk	1	76.2 ± 1.0	NB
N	<i>Euopsis granatina</i>	Lesser Rockbud Lichen				S1?		1	86.9 ± 0.0	NB
N	<i>Spilonema revertens</i>	Rock Hairball Lichen				S1?		1	86.9 ± 0.0	NB
N	<i>Peltigera venosa</i>	Fan Pelt Lichen				S1?	5 Undetermined	4	89.5 ± 0.0	NB
N	<i>Lophozia heterocolpos</i>	Whip Notchwort				S1S2	6 Not Assessed	1	94.1 ± 0.0	NB
N	<i>Metacalypogeia schusterana</i>	Schuster's Pouchwort				S1S2	6 Not Assessed	2	80.9 ± 1.0	NB
N	<i>Calliergon richardsonii</i>	Richardson's Spear Moss				S1S2	2 May Be At Risk	4	39.3 ± 0.0	NB
N	<i>Campyllum radicale</i>	Long-stalked Fine Wet Moss				S1S2	5 Undetermined	2	34.2 ± 0.0	NB
N	<i>Ditrichum pallidum</i>	Pale Cow-hair Moss				S1S2	2 May Be At Risk	2	78.4 ± 0.0	NB
N	<i>Drummondia prorepens</i>	a Moss				S1S2	2 May Be At Risk	1	89.0 ± 1.0	NB
N	<i>Fissidens taxifolius</i>	Yew-leaved Pocket Moss				S1S2	2 May Be At Risk	1	34.1 ± 0.0	NB
N	<i>Grimmia longirostris</i>	a Moss				S1S2	2 May Be At Risk	1	3.8 ± 1.0	NB
N	<i>Hygrohypnum bestii</i>	Best's Brook Moss				S1S2	3 Sensitive	1	3.8 ± 10.0	NB
N	<i>Oncophorus virens</i>	Green Spur Moss				S1S2	2 May Be At Risk	3	3.8 ± 1.0	NB
N	<i>Platydictya confervoides</i>	a Moss				S1S2	3 Sensitive	5	3.8 ± 1.0	NB
N	<i>Seligeria brevifolia</i>	a Moss				S1S2	3 Sensitive	1	89.1 ± 1.0	NB
N	<i>Timmia austriaca</i>	Austrian Timmia Moss				S1S2	2 May Be At Risk	3	74.2 ± 1.0	NB
N	<i>Tomentypnum falcifolium</i>	Sickle-leaved Golden Moss				S1S2	2 May Be At Risk	2	20.0 ± 1.0	NB
N	<i>Hamatocaulis vernicosus</i>	a Moss				S1S2	2 May Be At Risk	2	39.1 ± 0.0	NB
N	<i>Bryohaplocladium microphyllum</i>	Tiny-leaved Haplocladium Moss				S1S2	2 May Be At Risk	7	15.2 ± 1.0	NB
N	<i>Cystocoleus ebeneus</i>	Rockgossamer Lichen				S1S2		2	70.8 ± 0.0	NB
N	<i>Anaptychia crinalis</i>	Hanging Fringed Lichen				S1S2	5 Undetermined	1	48.1 ± 0.0	NB
N	<i>Frullania selwyniana</i>	Selwyn's Scalewort				S1S3	6 Not Assessed	1	48.1 ± 0.0	NB
N	<i>Lophozia obtusa</i>	Obtuse Notchwort				S1S3	6 Not Assessed	1	75.1 ± 0.0	NB
N	<i>Tritomaria scitula</i>	Mountain Notchwort				S1S3	6 Not Assessed	1	90.1 ± 1.0	NB
N	<i>Anomodon viticulosus</i>	a Moss				S2	2 May Be At Risk	3	78.5 ± 0.0	NB
N	<i>Cirriphyllum piliferum</i>	Hair-pointed Moss				S2	3 Sensitive	2	3.8 ± 1.0	NB
N	<i>Didymodon ferrugineus</i>	a moss				S2	3 Sensitive	1	3.8 ± 1.0	NB
N	<i>Ditrichum flexicaule</i>	Flexible Cow-hair Moss				S2	3 Sensitive	7	3.5 ± 1.0	NB
N	<i>Fontinalis hypnoides</i>	a moss				S2	3 Sensitive	1	69.3 ± 15.0	NB
N	<i>Anomodon tristis</i>	a Moss				S2	2 May Be At Risk	1	47.8 ± 0.0	NB
N	<i>Hypnum pratense</i>	Meadow Plait Moss				S2	3 Sensitive	4	74.4 ± 0.0	NB
N	<i>Isopterygiopsis pulchella</i>	Neat Silk Moss				S2	3 Sensitive	2	77.4 ± 1.0	NB
N	<i>Meesia triquetra</i>	Three-ranked Cold Moss				S2	2 May Be At Risk	1	39.0 ± 100.0	NB
N	<i>Physcomitrium immersum</i>	a Moss				S2	3 Sensitive	2	3.8 ± 1.0	NB

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
N	<i>Pohlia elongata</i>	Long-necked Nodding Moss				S2	3 Sensitive	1	86.1 ± 2.0	NB
N	<i>Pohlia sphagnicola</i>	a moss				S2	3 Sensitive	1	83.1 ± 1.0	NB
N	<i>Seligeria calcarea</i>	Chalk Brittle Moss				S2	3 Sensitive	1	73.9 ± 0.0	NB
N	<i>Sphagnum centrale</i>	Central Peat Moss				S2	3 Sensitive	1	39.3 ± 0.0	NB
N	<i>Tayloria serrata</i>	Serrate Trumpet Moss				S2	3 Sensitive	1	74.1 ± 0.0	NB
N	<i>Tortula mucronifolia</i>	Mucronate Screw Moss				S2	3 Sensitive	3	3.8 ± 1.0	NB
N	<i>Zygodon viridissimus</i> var. <i>rupestris</i>	a moss				S2	3 Sensitive	2	25.0 ± 0.0	NB
N	<i>Anomobryum filiforme</i>	a moss				S2	5 Undetermined	1	3.8 ± 1.0	NB
N	<i>Leptogium milligranum</i>	Stretched Jellyskin Lichen				S2	5 Undetermined	2	69.2 ± 0.0	NB
N	<i>Nephroma laevigatum</i>	Mustard Kidney Lichen				S2	2 May Be At Risk	1	71.9 ± 0.0	NB
N	<i>Peltigera lepidophora</i>	Scaly Pelt Lichen				S2	5 Undetermined	7	47.7 ± 0.0	NB
N	<i>Barbilophozia lycopodioides</i>	Greater Pawwort				S2?	6 Not Assessed	2	52.9 ± 1.0	NB
N	<i>Anomodon minor</i>	Blunt-leaved Anomodon Moss				S2?	2 May Be At Risk	3	15.2 ± 1.0	NB
N	<i>Bryum pallescens</i>	Pale Bryum Moss				S2?	5 Undetermined	1	3.8 ± 1.0	NB
N	<i>Dicranum spurium</i>	Spurred Broom Moss				S2?	3 Sensitive	1	86.8 ± 0.0	NB
N	<i>Hygrohypnum montanum</i>	a Moss				S2?	3 Sensitive	2	74.2 ± 0.0	NB
N	<i>Schistostega pennata</i>	Luminous Moss				S2?	3 Sensitive	1	64.7 ± 1.0	NB
N	<i>Seligeria campylopoda</i>	a Moss				S2?	3 Sensitive	4	3.8 ± 1.0	NB
N	<i>Seligeria diversifolia</i>	a Moss				S2?	3 Sensitive	2	73.0 ± 1.0	NB
N	<i>Trichodon cylindricus</i>	Cylindric Hairy-teeth Moss				S2?	3 Sensitive	3	75.8 ± 0.0	NB
N	<i>Plagiomnium rostratum</i>	Long-beaked Leafy Moss				S2?	3 Sensitive	3	48.2 ± 1.0	NB
N	<i>Collema leptaleum</i>	Crumpled Bat's Wing Lichen				S2?	5 Undetermined	4	79.1 ± 0.0	NB
N	<i>Imshaugia placodioides</i>	Eyed Starburst Lichen				S2?	5 Undetermined	1	46.2 ± 0.0	NB
N	<i>Hypogymnia bitteri</i>	Powdered Tube Lichen				S2?	5 Undetermined	2	95.1 ± 0.0	NB
N	<i>Bryum uliginosum</i>	a Moss				S2S3	3 Sensitive	2	3.8 ± 1.0	NB
N	<i>Bryum weigelii</i>	Weigel's Bryum Moss				S2S3	3 Sensitive	1	72.6 ± 3.0	NB
N	<i>Calliergonella cuspidata</i>	Common Large Wetland Moss				S2S3	3 Sensitive	2	39.3 ± 0.0	NB
N	<i>Campylium polygamum</i>	a Moss				S2S3	3 Sensitive	3	3.5 ± 1.0	NB
N	<i>Didymodon rigidulus</i>	Rigid Screw Moss				S2S3	3 Sensitive	6	3.5 ± 1.0	NB
N	<i>Fissidens bushii</i>	Bush's Pocket Moss				S2S3	3 Sensitive	3	63.0 ± 0.0	NB
N	<i>Orthotrichum speciosum</i>	Showy Bristle Moss				S2S3	5 Undetermined	5	17.5 ± 3.0	NB
N	<i>Pohlia prolifera</i>	Cottony Nodding Moss				S2S3	3 Sensitive	1	86.1 ± 2.0	NB
N	<i>Saelania glaucescens</i>	Blue Dew Moss				S2S3	3 Sensitive	2	69.3 ± 15.0	NB
N	<i>Scorpidium scorpioides</i>	Hooked Scorpion Moss				S2S3	3 Sensitive	4	39.1 ± 0.0	NB
N	<i>Sphagnum subfulvum</i>	a Peatmoss				S2S3	2 May Be At Risk	1	75.4 ± 0.0	NB
N	<i>Taxiphyllum deplanatum</i>	Imbricate Yew-leaved Moss				S2S3	3 Sensitive	1	39.9 ± 5.0	NB
N	<i>Plagiomnium drummondii</i>	Drummond's Leafy Moss				S2S3	3 Sensitive	2	17.5 ± 3.0	NB
N	<i>Cyrtomnium hymenophylloides</i>	Short-pointed Lantern Moss				S2S3	3 Sensitive	2	46.5 ± 0.0	NB
N	<i>Dendriscoaulon umhausense</i>	a lichen				S2S3	3 Sensitive	2	46.4 ± 0.0	NB
N	<i>Parmeliopsis ambigua</i>	Green Starburst Lichen				S2S3	5 Undetermined	1	95.1 ± 0.0	NB
N	<i>Punctelia caseana</i>					S2S3		3	72.6 ± 0.0	NB
N	<i>Hypnum curvifolium</i>	Curved-leaved Plait Moss				S3	3 Sensitive	1	79.1 ± 0.0	NB
N	<i>Tortella fragilis</i>	Fragile Twisted Moss				S3	3 Sensitive	4	3.8 ± 1.0	NB
N	<i>Hymenostylium recurvirostre</i>	Hymenostylium Moss				S3	3 Sensitive	5	3.8 ± 1.0	NB
N	<i>Collema nigrescens</i>	Blistered Tarpaper Lichen				S3	3 Sensitive	6	79.1 ± 0.0	NB
N	<i>Solorina saccata</i>	Woodland Owl Lichen				S3	5 Undetermined	22	46.7 ± 0.0	NB
N	<i>Ahtiana aurescens</i>	Eastern Candlewax Lichen				S3	5 Undetermined	2	52.1 ± 0.0	NB
N	<i>Cladonia strepsilis</i>	Olive Cladonia Lichen				S3	4 Secure	1	76.8 ± 0.0	NB
N	<i>Leptogium lichenoides</i>	Tattered Jellyskin Lichen				S3	5 Undetermined	4	34.2 ± 0.0	NB
N	<i>Nephroma resupinatum</i>	a lichen				S3	3 Sensitive	7	72.6 ± 0.0	NB
N	<i>Usnea strigosa</i>	Bushy Beard Lichen				S3	5 Undetermined	1	71.8 ± 0.0	NB
N	<i>Leptogium laceroides</i>	Short-bearded Jellyskin Lichen				S3	3 Sensitive	4	48.0 ± 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>Peltigera membranacea</i>	Membranous Pelt Lichen				S3	5 Undetermined	8	62.7 ± 0.0	NB
N	<i>Bryum amblyodon</i>	a Moss				S3?	4 Secure	1	46.5 ± 0.0	NB
N	<i>Anomodon rugelii</i>	Rugel's Anomodon Moss				S3S4	3 Sensitive	11	3.5 ± 1.0	NB
N	<i>Barbula convoluta</i>	Lesser Bird's-claw Beard Moss				S3S4	4 Secure	2	3.5 ± 1.0	NB
N	<i>Brachythecium velutinum</i>	Velvet Ragged Moss				S3S4	4 Secure	2	93.4 ± 3.0	NB
N	<i>Calliergon giganteum</i>	Giant Spear Moss				S3S4	3 Sensitive	1	13.9 ± 3.0	NB
N	<i>Dicranella cerviculata</i>	a Moss				S3S4	3 Sensitive	2	63.0 ± 1.0	NB
N	<i>Dicranella varia</i>	a Moss				S3S4	4 Secure	8	3.5 ± 1.0	NB
N	<i>Encalypta ciliata</i>	Fringed Extinguisher Moss				S3S4	3 Sensitive	1	39.9 ± 5.0	NB
N	<i>Fissidens bryoides</i>	Lesser Pocket Moss				S3S4	4 Secure	4	69.3 ± 15.0	NB
N	<i>Helodiium blandowii</i>	Wetland-plume Moss				S3S4	4 Secure	4	25.1 ± 3.0	NB
N	<i>Heterocladium dimorphum</i>	Dimorphous Tangle Moss				S3S4	4 Secure	2	69.3 ± 15.0	NB
N	<i>Isopterygiopsis muelleriana</i>	a Moss				S3S4	4 Secure	4	69.3 ± 15.0	NB
N	<i>Myurella julacea</i>	Small Mouse-tail Moss				S3S4	4 Secure	6	3.8 ± 1.0	NB
N	<i>Physcomitrium pyriforme</i>	Pear-shaped Urn Moss				S3S4	3 Sensitive	1	81.2 ± 1.0	NB
N	<i>Pogonatum dentatum</i>	Mountain Hair Moss				S3S4	4 Secure	1	63.0 ± 1.0	NB
N	<i>Splachnum rubrum</i>	Red Collar Moss				S3S4	4 Secure	1	81.2 ± 2.0	NB
N	<i>Tomentypnum nitens</i>	Golden Fuzzy Fen Moss				S3S4	4 Secure	4	25.1 ± 3.0	NB
N	<i>Weissia controversa</i>	Green-Cushioned Weissia				S3S4	4 Secure	4	3.5 ± 1.0	NB
N	<i>Abietinella abietina</i>	Wiry Fern Moss				S3S4	4 Secure	6	3.5 ± 1.0	NB
N	<i>Trichostomum tenuirostre</i>	Acid-Soil Moss				S3S4	4 Secure	2	69.3 ± 15.0	NB
N	<i>Limprichtia revolvens</i>	a Moss				S3S4	4 Secure	2	39.1 ± 0.0	NB
N	<i>Rauvella scita</i>	Smaller Fern Moss				S3S4	3 Sensitive	5	24.8 ± 0.0	NB
N	<i>Pannaria rubiginosa</i>	Brown-eyed Shingle Lichen				S3S4	3 Sensitive	10	48.0 ± 0.0	NB
N	<i>Vahlia leucophaea</i>	Shelter Shingle Lichen				S3S4	5 Undetermined	6	70.9 ± 0.0	NB
N	<i>Montanelia panniformis</i>	Shingled Camouflage Lichen				S3S4	5 Undetermined	1	70.8 ± 0.0	NB
N	<i>Nephroma parile</i>	Powdery Kidney Lichen				S3S4	4 Secure	8	24.8 ± 0.0	NB
N	<i>Protopannaria pezizoides</i>	Brown-gray Moss-shingle Lichen				S3S4	4 Secure	6	48.4 ± 0.0	NB
N	<i>Pseudocyphellaria holarctica</i>	Yellow Specklebelly Lichen				S3S4	3 Sensitive	4	35.7 ± 0.0	NB
N	<i>Fuscopannaria soredata</i>	a Lichen				S3S4	5 Undetermined	1	47.9 ± 0.0	NB
N	<i>Pannaria conoplea</i>	Mealy-rimmed Shingle Lichen				S3S4	3 Sensitive	8	35.5 ± 0.0	NB
N	<i>Anaptychia palmulata</i>	Shaggy Fringed Lichen				S3S4	3 Sensitive	3	63.3 ± 0.0	NB
N	<i>Dermatocarpon luridum</i>	Brookside Stippleback Lichen				S3S4	4 Secure	52	8.2 ± 0.0	NB
P	<i>Juglans cinerea</i>	Butternut	Endangered	Endangered	Endangered	S1	1 At Risk	447	0.5 ± 2.0	NB
P	<i>Pedicularis furbishiae</i>	Furbish Lousewort	Endangered	Endangered	Endangered	S1	1 At Risk	55	0.3 ± 0.0	NB
P	<i>Symphyotrichum anticostense</i>	Anticosti Aster	Threatened	Threatened	Endangered	S2S3	1 At Risk	181	16.9 ± 0.0	NB
P	<i>Fraxinus nigra</i>	Black Ash	Threatened			S4S5	4 Secure	781	0.5 ± 2.0	NB
P	<i>Isoetes prototypus</i>	Prototype Quillwort	Special Concern	Special Concern	Endangered	S2	1 At Risk	1	90.3 ± 0.0	NB
P	<i>Pterospora andromedea</i>	Woodland Pinedrops			Endangered	S1	1 At Risk	6	93.1 ± 0.0	NB
P	<i>Cryptotaenia canadensis</i>	Canada Honewort				S1	2 May Be At Risk	6	13.9 ± 1.0	NB
P	<i>Sanicula trifoliata</i>	Large-Fruited Sanicle				S1	2 May Be At Risk	15	60.2 ± 0.0	NB
P	<i>Antennaria parlinii</i>	a Pussytoes				S1	2 May Be At Risk	1	91.5 ± 0.0	NB
P	<i>Arnica lonchophylla</i>	Northern Arnica				S1	2 May Be At Risk	10	46.4 ± 5.0	NB
P	<i>Hieracium robinsonii</i>	Robinson's Hawkweed				S1	3 Sensitive	3	3.8 ± 1.0	NB
P	<i>Symphyotrichum laeve</i>	Smooth Aster				S1	5 Undetermined	3	45.1 ± 1.0	NB
P	<i>Canadanthus modestus</i>	Great Northern Aster				S1	2 May Be At Risk	56	52.3 ± 0.0	NB
P	<i>Betula glandulosa</i>	Glandular Birch				S1	2 May Be At Risk	5	76.9 ± 0.0	NB
P	<i>Andersonglossum boreale</i>	Northern Wild Comfrey				S1	2 May Be At Risk	13	27.6 ± 1.0	NB
P	<i>Cardamine concatenata</i>	Cut-leaved Toothwort				S1	2 May Be At Risk	15	35.8 ± 1.0	NB
P	<i>Draba arabisans</i>	Rock Whitlow-Grass				S1	2 May Be At Risk	2	99.8 ± 0.0	NB
P	<i>Draba cana</i>	Lance-leaved Draba				S1	2 May Be At Risk	1	82.8 ± 1.0	NB
P	<i>Boechera grahamii</i>	Graham's Rockcress				S1	2 May Be At Risk	2	98.5 ± 1.0	NB
P	<i>Moehringia macrophylla</i>	Large-Leaved Sandwort				S1	2 May Be At Risk	2	85.4 ± 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>Chenopodium simplex</i>	Maple-leaved Goosefoot				S1	2 May Be At Risk	1	84.6 ± 0.0	NB
P	<i>Blitum capitatum</i>	strawberry-bite				S1	2 May Be At Risk	6	25.6 ± 0.0	NB
P	<i>Drosera anglica</i>	English Sundew				S1	2 May Be At Risk	5	39.3 ± 0.0	NB
P	<i>Drosera linearis</i>	Slender-Leaved Sundew				S1	2 May Be At Risk	4	39.3 ± 0.0	NB
P	<i>Vaccinium boreale</i>	Northern Blueberry				S1	2 May Be At Risk	1	87.1 ± 0.0	NB
P	<i>Vaccinium uliginosum</i>	Alpine Bilberry				S1	2 May Be At Risk	1	76.9 ± 0.0	NB
P	<i>Hylodesmum glutinosum</i>	Large Tick-trefoil				S1	2 May Be At Risk	6	94.4 ± 0.0	NB
P	<i>Oxytropis deflexa</i> var. <i>foliolosa</i>	Nodding Locoweed				S1	2 May Be At Risk	8	34.1 ± 0.0	NB
P	<i>Gentiana rubricaulis</i>	Purple-stemmed Gentian				S1	2 May Be At Risk	1	78.5 ± 0.0	NB
P	<i>Hepatica acutiloba</i>	Sharp-lobed Hepatica				S1	2 May Be At Risk	11	70.9 ± 0.0	NB
P	<i>Coptidium lapponicum</i>	Lapland Buttercup				S1	2 May Be At Risk	23	32.8 ± 0.0	NB
P	<i>Amelanchier fernaldii</i>	Fernald's Serviceberry				S1	2 May Be At Risk	1	79.5 ± 0.0	NB
P	<i>Galium brevipes</i>	Limestone Swamp Bedstraw				S1	2 May Be At Risk	2	43.4 ± 0.0	NB
P	<i>Agalinis purpurea</i> var. <i>parviflora</i>	Small-flowered Purple False Foxglove				S1	2 May Be At Risk	1	29.7 ± 0.0	NB
P	<i>Valeriana dioica</i> ssp. <i>sylvatica</i>	northern valerian				S1	2 May Be At Risk	2	93.4 ± 0.0	NB
P	<i>Viola canadensis</i>	Canada Violet				S1	2 May Be At Risk	54	21.7 ± 0.0	NB
P	<i>Carex blanda</i>	Eastern Woodland Sedge				S1	2 May Be At Risk	1	53.0 ± 2.0	NB
P	<i>Carex cephaloidea</i>	Thin-leaved Sedge				S1	2 May Be At Risk	18	14.2 ± 0.0	NB
P	<i>Carex merritt-feraldii</i>	Merritt Fernald's Sedge				S1	2 May Be At Risk	1	38.0 ± 0.0	NB
P	<i>Carex media</i>	Intermediate Sedge				S1	2 May Be At Risk	25	46.7 ± 0.0	NB
P	<i>Carex scirpoidea</i>	Scirpuslike Sedge				S1	2 May Be At Risk	2	28.7 ± 1.0	NB
P	<i>Carex sterilis</i>	Sterile Sedge				S1	2 May Be At Risk	13	24.2 ± 0.0	NB
P	<i>Carex grisea</i>	Inflated Narrow-leaved Sedge				S1	2 May Be At Risk	3	14.3 ± 0.0	NB
P	<i>Carex saxatilis</i>	Russet Sedge				S1	2 May Be At Risk	6	76.0 ± 0.0	NB
P	<i>Carex bigelowii</i>	Bigelow's Sedge				S1	2 May Be At Risk	6	76.7 ± 0.0	NB
P	<i>Rhynchospora capillacea</i>	Slender Beakrush				S1	2 May Be At Risk	5	27.4 ± 1.0	NB
P	<i>Juncus stygius</i> ssp. <i>americanus</i>	Moor Rush				S1	2 May Be At Risk	1	14.3 ± 10.0	NB
P	<i>Allium canadense</i>	Canada Garlic				S1	2 May Be At Risk	5	65.9 ± 0.0	NB
P	<i>Malaxis monophyllos</i> var. <i>brachypoda</i>	North American White Adder's-mouth				S1	2 May Be At Risk	2	64.5 ± 1.0	NB
P	<i>Platanthera macrophylla</i>	Large Round-Leaved Orchid				S1	2 May Be At Risk	1	39.5 ± 1.0	NB
P	<i>Dichanthelium xanthophyllum</i>	Slender Panic Grass				S1	2 May Be At Risk	2	95.2 ± 0.0	NB
P	<i>Elymus hystrix</i>	Spreading Wild Rye				S1	2 May Be At Risk	24	55.8 ± 0.0	NB
P	<i>Festuca subverticillata</i>	Nodding Fescue				S1	2 May Be At Risk	35	13.9 ± 0.0	NB
P	<i>Potamogeton friesii</i>	Fries' Pondweed				S1	2 May Be At Risk	5	87.0 ± 0.0	NB
P	<i>Potamogeton nodosus</i>	Long-leaved Pondweed				S1	2 May Be At Risk	10	93.2 ± 0.0	NB
P	<i>Potamogeton strictifolius</i>	Straight-leaved Pondweed				S1	2 May Be At Risk	2	95.4 ± 1.0	NB
P	<i>Dryopteris clintoniana</i>	Clinton's Wood Fern				S1	2 May Be At Risk	12	14.3 ± 10.0	NB
P	<i>Gymnocarpium continentale</i>	Nahanni Oak Fern				S1	2 May Be At Risk	5	46.7 ± 0.0	NB
P	<i>Gymnocarpium robertianum</i>	Limestone Oak Fern				S1	2 May Be At Risk	14	22.8 ± 0.0	NB
P	<i>Huperzia selago</i>	Northern Firmoss				S1	2 May Be At Risk	9	29.6 ± 0.0	NB
P	<i>Botrychium lunaria</i>	Common Moonwort				S1	2 May Be At Risk	7	21.2 ± 0.0	NB
P	<i>Polygonum aviculare</i> ssp. <i>neglectum</i>	Narrow-leaved Knotweed				S1?	5 Undetermined	1	96.6 ± 1.0	NB
P	<i>Galium trifidum</i> ssp. <i>subbiflorum</i>	Three-petaled Bedstraw				S1?	5 Undetermined	7	79.4 ± 0.0	NB
P	<i>Carex laxiflora</i>	Loose-Flowered Sedge				S1?	5 Undetermined	2	72.9 ± 0.0	NB
P	<i>Carex appalachica</i>	Appalachian Sedge				S1?	5 Undetermined	1	97.7 ± 0.0	NB
P	<i>Sisyrinchium mucronatum</i>	Michaux's Blue-eyed-grass				S1?	5 Undetermined	9	88.0 ± 0.0	NB
P	<i>Micranthes virginensis</i>	Early Saxifrage				S1S2	2 May Be At Risk	5	51.0 ± 0.0	NB
P	<i>Carex crawei</i>	Crawe's Sedge				S1S2	2 May Be At Risk	3	86.9 ± 0.0	NB
P	<i>Selaginella rupestris</i>	Rock Spikemoss				S1S2	2 May Be At Risk	4	72.1 ± 0.0	NB



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P	<i>Cuscuta cephalanthi</i>	Buttonbush Dodder				S1S3	2 May Be At Risk	10	27.0 ± 0.0	NB
P	<i>Osmorhiza depauperata</i>	Blunt Sweet Cicely				S2	3 Sensitive	7	35.1 ± 10.0	NB
P	<i>Osmorhiza longistylis</i>	Smooth Sweet Cicely				S2	3 Sensitive	10	14.2 ± 0.0	NB
P	<i>Sanicula odorata</i>	Clustered Sanicle				S2	2 May Be At Risk	21	13.8 ± 1.0	NB
P	<i>Solidago racemosa</i>	Racemose Goldenrod				S2	2 May Be At Risk	38	27.1 ± 0.0	NB
P	<i>Pseudognaphalium macounii</i>	Macoun's Cudweed				S2	3 Sensitive	1	93.1 ± 0.0	NB
P	<i>Impatiens pallida</i>	Pale Jewelweed				S2	2 May Be At Risk	17	13.9 ± 0.0	NB
P	<i>Betula minor</i>	Dwarf White Birch				S2	3 Sensitive	19	52.4 ± 0.0	NB
P	<i>Boechea stricta</i>	Drummond's Rockcress				S2	3 Sensitive	3	3.9 ± 0.0	NB
P	<i>Stellaria longifolia</i>	Long-leaved Starwort				S2	3 Sensitive	6	83.8 ± 1.0	NB
P	<i>Hypericum x dissimulatum</i>	Disguised St. John's-wort				S2	3 Sensitive	1	79.8 ± 1.0	NB
P	<i>Triosteum aurantiacum</i>	Orange-fruited Tinker's Weed				S2	3 Sensitive	88	27.0 ± 0.0	NB
P	<i>Viburnum lentago</i>	Nannyberry				S2	4 Secure	29	87.5 ± 0.0	NB
P	<i>Shepherdia canadensis</i>	Soapberry				S2	3 Sensitive	27	1.0 ± 0.0	NB
P	<i>Astragalus eucosmus</i>	Elegant Milk-vetch				S2	2 May Be At Risk	16	24.2 ± 0.0	NB
P	<i>Oxytropis campestris</i>	Field Locoweed				S2	3 Sensitive	8	53.3 ± 0.0	NB
P	<i>Oxytropis campestris var. johannensis</i>	Field Locoweed				S2	3 Sensitive	34	20.6 ± 0.0	NB
P	<i>Quercus macrocarpa</i>	Bur Oak				S2	2 May Be At Risk	2	35.7 ± 1.0	NB
P	<i>Gentiana linearis</i>	Narrow-Leaved Gentian				S2	3 Sensitive	1	96.7 ± 1.0	NB
P	<i>Nuphar x rubrodisca</i>	Red-disk Yellow Pond-lily				S2	3 Sensitive	8	41.3 ± 5.0	NB
P	<i>Aphyllon uniflorum</i>	One-flowered Broomrape				S2	3 Sensitive	4	24.9 ± 0.0	NB
P	<i>Polygaloides paucifolia</i>	Fringed Milkwort				S2	3 Sensitive	1	38.3 ± 0.0	NB
P	<i>Polygala senega</i>	Seneca Snakeroot				S2	3 Sensitive	48	26.9 ± 5.0	NB
P	<i>Persicaria amphibia var. emersa</i>	Long-root Smartweed				S2	3 Sensitive	5	28.3 ± 0.0	NB
P	<i>Anemone multifida</i>	Cut-leaved Anemone				S2	3 Sensitive	71	3.9 ± 0.0	NB
P	<i>Anemone parviflora</i>	Small-flowered Anemone				S2	3 Sensitive	15	97.9 ± 1.0	NB
P	<i>Hepatica americana</i>	Round-lobed Hepatica				S2	3 Sensitive	12	54.9 ± 1.0	NB
P	<i>Crataegus scabrada</i>	Rough Hawthorn				S2	3 Sensitive	2	62.8 ± 1.0	NB
P	<i>Rosa acicularis ssp. sayi</i>	Prickly Rose				S2	2 May Be At Risk	38	85.7 ± 0.0	NB
P	<i>Galium kamschaticum</i>	Northern Wild Licorice				S2	3 Sensitive	18	77.4 ± 1.0	NB
P	<i>Salix candida</i>	Sage Willow				S2	3 Sensitive	31	33.3 ± 0.0	NB
P	<i>Castilleja septentrionalis</i>	Northeastern Paintbrush				S2	3 Sensitive	34	25.0 ± 0.0	NB
P	<i>Scrophularia lanceolata</i>	Lance-leaved Figwort				S2	3 Sensitive	4	52.4 ± 0.0	NB
P	<i>Dirca palustris</i>	Eastern Leatherwood				S2	2 May Be At Risk	71	23.3 ± 0.0	NB
P	<i>Phryma leptostachya</i>	American Lopseed				S2	3 Sensitive	57	14.2 ± 0.0	NB
P	<i>Verbena urticifolia</i>	White Vervain				S2	2 May Be At Risk	17	31.4 ± 1.0	NB
P	<i>Viola novae-angliae</i>	New England Violet				S2	3 Sensitive	12	44.2 ± 0.0	NB
P	<i>Symplocarpus foetidus</i>	Eastern Skunk Cabbage				S2	3 Sensitive	3	65.6 ± 0.0	NB
P	<i>Carex comosa</i>	Bearded Sedge				S2	2 May Be At Risk	7	76.9 ± 0.0	NB
P	<i>Carex concinna</i>	Beautiful Sedge				S2	3 Sensitive	57	34.3 ± 0.0	NB
P	<i>Carex granularis</i>	Limestone Meadow Sedge				S2	3 Sensitive	26	68.1 ± 0.0	NB
P	<i>Carex gynocrates</i>	Northern Bog Sedge				S2	3 Sensitive	54	18.2 ± 10.0	NB
P	<i>Carex hirtifolia</i>	Pubescent Sedge				S2	3 Sensitive	46	14.2 ± 0.0	NB
P	<i>Carex livida</i>	Livid Sedge				S2	3 Sensitive	35	14.3 ± 5.0	NB
P	<i>Carex plantaginea</i>	Plantain-Leaved Sedge				S2	3 Sensitive	138	19.1 ± 0.0	NB
P	<i>Carex prairea</i>	Prairie Sedge				S2	3 Sensitive	53	37.1 ± 0.0	NB
P	<i>Carex rostrata</i>	Narrow-leaved Beaked Sedge				S2	3 Sensitive	17	28.5 ± 0.0	NB
P	<i>Carex sprengelii</i>	Longbeak Sedge				S2	3 Sensitive	49	8.1 ± 1.0	NB
P	<i>Carex tenuiflora</i>	Sparse-Flowered Sedge				S2	2 May Be At Risk	27	14.3 ± 5.0	NB
P	<i>Carex albicans var. emmonsii</i>	White-tinged Sedge				S2	3 Sensitive	2	14.3 ± 5.0	NB
P	<i>Eriophorum gracile</i>	Slender Cottongrass				S2	2 May Be At Risk	12	81.1 ± 0.0	NB
P	<i>Elodea nuttallii</i>	Nuttall's Waterweed				S2	3 Sensitive	14	1.0 ± 0.0	NB
P	<i>Juncus vaseyi</i>	Vasey Rush				S2	3 Sensitive	5	90.8 ± 0.0	NB

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P	<i>Allium tricoccum</i>	Wild Leek				S2	2 May Be At Risk	2	86.0 ± 0.0	NB
P	<i>Galearis rotundifolia</i>	Small Round-leaved Orchid				S2	2 May Be At Risk	29	14.3 ± 5.0	NB
P	<i>Calypso bulbosa</i>	Calypso				S2	2 May Be At Risk	2	51.0 ± 0.0	NB
P	<i>Calypso bulbosa</i> var. <i>americana</i>	Calypso				S2	2 May Be At Risk	34	32.8 ± 5.0	NB
P	<i>Coeloglossum viride</i>	Long-bracted Frog Orchid				S2	2 May Be At Risk	9	46.5 ± 1.0	NB
P	<i>Cypripedium parviflorum</i> var. <i>makasin</i>	Small Yellow Lady's-Slipper				S2	2 May Be At Risk	34	14.3 ± 10.0	NB
P	<i>Galearis spectabilis</i>	Showy Orchis				S2	2 May Be At Risk	56	14.2 ± 0.0	NB
P	<i>Goodyera oblongifolia</i>	Menzies' Rattlesnake-plantain				S2	3 Sensitive	18	39.6 ± 0.0	NB
P	<i>Spiranthes lucida</i>	Shining Ladies'-Tresses				S2	3 Sensitive	10	26.3 ± 0.0	NB
P	<i>Agrostis mertensii</i>	Northern Bent Grass				S2	2 May Be At Risk	2	92.8 ± 0.0	NB
P	<i>Dichanthelium linearifolium</i>	Narrow-leaved Panic Grass				S2	3 Sensitive	2	82.3 ± 0.0	NB
P	<i>Elymus canadensis</i>	Canada Wild Rye				S2	2 May Be At Risk	8	14.3 ± 5.0	NB
P	<i>Poa glauca</i>	Glaucous Blue Grass				S2	4 Secure	22	27.1 ± 0.0	NB
P	<i>Schizachyrium scoparium</i>	Little Bluestem				S2	3 Sensitive	56	23.1 ± 0.0	NB
P	<i>Piptatheropsis pungens</i>	Slender Ricegrass				S2	2 May Be At Risk	6	92.0 ± 0.0	NB
P	<i>Asplenium trichomanes</i>	Maidenhair Spleenwort				S2	3 Sensitive	4	54.1 ± 0.0	NB
P	<i>Woodsia alpina</i>	Alpine Cliff Fern				S2	3 Sensitive	48	28.2 ± 0.0	NB
P	<i>Diphasiastrum sitchense</i>	Sitka Ground-cedar				S2	3 Sensitive	17	24.2 ± 0.0	NB
P	<i>Botrychium minganense</i>	Mingan Moonwort				S2	3 Sensitive	25	16.3 ± 0.0	NB
P	<i>Selaginella selaginoides</i>	Low Spikemoss				S2	3 Sensitive	21	18.2 ± 5.0	NB
P	<i>Toxicodendron radicans</i> var. <i>radicans</i>	Eastern Poison Ivy				S2?	3 Sensitive	1	97.8 ± 0.0	NB
P	<i>Symphyotrichum novi-belgii</i> var. <i>crenifolium</i>	New York Aster				S2?	5 Undetermined	1	72.9 ± 1.0	NB
P	<i>Galium obtusum</i>	Blunt-leaved Bedstraw				S2?	4 Secure	1	73.1 ± 1.0	NB
P	<i>Salix myricoides</i>	Bayberry Willow				S2?	3 Sensitive	57	0.5 ± 0.0	NB
P	<i>Platanthera huronensis</i>	Fragrant Green Orchid				S2?	5 Undetermined	1	79.5 ± 0.0	NB
P	<i>Solidago altissima</i>	Tall Goldenrod				S2S3	4 Secure	107	26.9 ± 0.0	NB
P	<i>Callitriche hermaphroditica</i>	Northern Water-starwort				S2S3	4 Secure	18	29.2 ± 0.0	NB
P	<i>Lonicera oblongifolia</i>	Swamp Fly Honeysuckle				S2S3	3 Sensitive	170	16.3 ± 5.0	NB
P	<i>Epilobium coloratum</i>	Purple-veined Willowherb				S2S3	3 Sensitive	8	24.1 ± 5.0	NB
P	<i>Rumex pallidus</i>	Seabeach Dock				S2S3	3 Sensitive	1	55.1 ± 0.0	NB
P	<i>Rumex occidentalis</i>	Western Dock				S2S3	2 May Be At Risk	43	47.1 ± 0.0	NB
P	<i>Amelanchier gaspensis</i>	Gasp  – Serviceberry				S2S3	5 Undetermined	4	64.4 ± 0.0	NB
P	<i>Galium labradoricum</i>	Labrador Bedstraw				S2S3	3 Sensitive	114	37.9 ± 0.0	NB
P	<i>Valeriana uliginosa</i>	Swamp Valerian				S2S3	3 Sensitive	89	30.8 ± 5.0	NB
P	<i>Carex adusta</i>	Lesser Brown Sedge				S2S3	4 Secure	7	21.2 ± 1.0	NB
P	<i>Scirpus atrovirens</i>	Dark-green Bulrush				S2S3	5 Undetermined	34	20.1 ± 0.0	NB
P	<i>Juncus brachycephalus</i>	Small-Head Rush				S2S3	3 Sensitive	67	13.2 ± 0.0	NB
P	<i>Corallorhiza maculata</i> var. <i>maculata</i>	Spotted Coralroot				S2S3	3 Sensitive	10	64.2 ± 0.0	NB
P	<i>Neottia auriculata</i>	Auricled Twayblade				S2S3	3 Sensitive	12	43.2 ± 0.0	NB
P	<i>Spiranthes cernua</i>	Nodding Ladies'-Tresses				S2S3	3 Sensitive	13	21.8 ± 0.0	NB
P	<i>Eragrostis pectinacea</i>	Tufted Love Grass				S2S3	4 Secure	2	23.3 ± 0.0	NB
P	<i>Stuckenia filiformis</i>	Thread-leaved Pondweed				S2S3	3 Sensitive	27	52.8 ± 1.0	NB
P	<i>Potamogeton praelongus</i>	White-stemmed Pondweed				S2S3	4 Secure	28	39.3 ± 1.0	NB
P	<i>Ophioglossum pusillum</i>	Northern Adder's-tongue				S2S3	3 Sensitive	34	17.2 ± 0.0	NB
P	<i>Arnica lanceolata</i>	Lance-leaved Arnica				S3	4 Secure	77	27.7 ± 1.0	NB
P	<i>Artemisia campestris</i> ssp. <i>caudata</i>	Tall Wormwood				S3	4 Secure	7	24.2 ± 0.0	NB
P	<i>Artemisia campestris</i>	Field Wormwood				S3	4 Secure	10	3.3 ± 0.0	NB
P	<i>Erigeron hyssopifolius</i>	Hyssop-leaved Fleabane				S3	4 Secure	142	3.2 ± 0.0	NB
P	<i>Nabalus racemosus</i>	Glaucous Rattlesnakeroot				S3	4 Secure	23	23.0 ± 0.0	NB
P	<i>Tanacetum bipinnatum</i> ssp. <i>huronense</i>	Lake Huron Tansy				S3	4 Secure	132	3.3 ± 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>Symphotrichum boreale</i>	Boreal Aster				S3	3 Sensitive	132	14.3 ± 10.0	NB
P	<i>Betula pumila</i>	Bog Birch				S3	4 Secure	15	39.8 ± 0.0	NB
P	<i>Turritis glabra</i>	Tower Mustard				S3	5 Undetermined	18	37.8 ± 0.0	NB
P	<i>Arabis pycnocarpa</i>	Cream-flowered Rockcress				S3	4 Secure	27	3.8 ± 1.0	NB
P	<i>Cardamine maxima</i>	Large Toothwort				S3	4 Secure	61	54.4 ± 0.0	NB
P	<i>Subularia aquatica</i> ssp. <i>americana</i>	American Water Awlwort				S3	4 Secure	4	94.8 ± 0.0	NB
P	<i>Elatine minima</i>	Small Waterwort				S3	4 Secure	1	83.0 ± 0.0	NB
P	<i>Astragalus alpinus</i> var. <i>brunetianus</i>	Alpine Milk-Vetch				S3	4 Secure	103	3.7 ± 1.0	NB
P	<i>Hedysarum americanum</i>	Alpine Hedysarum				S3	4 Secure	214	4.0 ± 0.0	NB
P	<i>Gentianella amarella</i>	Northern Gentian				S3	4 Secure	6	21.2 ± 0.0	NB
P	<i>Gentianella amarella</i> ssp. <i>acuta</i>	Northern Gentian				S3	4 Secure	17	21.9 ± 0.0	NB
P	<i>Geranium bicknellii</i>	Bicknell's Crane's-bill				S3	4 Secure	1	92.5 ± 0.0	NB
P	<i>Myriophyllum verticillatum</i>	Whorled Water Milfoil				S3	4 Secure	2	82.9 ± 0.0	NB
P	<i>Stachys hispida</i>	Smooth Hedge-Nettle				S3	3 Sensitive	66	0.4 ± 0.0	NB
P	<i>Nuphar microphylla</i>	Small Yellow Pond-lily				S3	4 Secure	13	19.0 ± 0.0	NB
P	<i>Epilobium hornemannii</i>	Hornemann's Willowherb				S3	4 Secure	34	38.6 ± 5.0	NB
P	<i>Epilobium strictum</i>	Downy Willowherb				S3	4 Secure	43	39.8 ± 0.0	NB
P	<i>Fallopia scandens</i>	Climbing False Buckwheat				S3	4 Secure	10	30.1 ± 0.0	NB
P	<i>Littorella americana</i>	American Shoreweed				S3	4 Secure	5	82.6 ± 1.0	NB
P	<i>Primula mistassinica</i>	Mistassini Primrose				S3	4 Secure	43	3.7 ± 0.0	NB
P	<i>Pyrola minor</i>	Lesser Pyrola				S3	4 Secure	30	30.1 ± 0.0	NB
P	<i>Clematis occidentalis</i>	Purple Clematis				S3	4 Secure	12	4.8 ± 0.0	NB
P	<i>Ranunculus gmelinii</i>	Gmelin's Water Buttercup				S3	4 Secure	25	46.0 ± 0.0	NB
P	<i>Thalictrum confine</i>	Northern Meadow-rue				S3	4 Secure	43	0.4 ± 0.0	NB
P	<i>Rosa palustris</i>	Swamp Rose				S3	4 Secure	1	77.3 ± 0.0	NB
P	<i>Rubus occidentalis</i>	Black Raspberry				S3	4 Secure	104	50.1 ± 1.0	NB
P	<i>Galium boreale</i>	Northern Bedstraw				S3	4 Secure	18	37.4 ± 0.0	NB
P	<i>Salix pedicularis</i>	Bog Willow				S3	4 Secure	43	33.3 ± 0.0	NB
P	<i>Salix interior</i>	Sandbar Willow				S3	4 Secure	97	3.8 ± 0.0	NB
P	<i>Comandra umbellata</i>	Bastard's Toadflax				S3	4 Secure	1	99.7 ± 0.0	NB
P	<i>Parnassia glauca</i>	Fen Grass-of-Parnassus				S3	4 Secure	198	0.6 ± 0.0	NB
P	<i>Boehmeria cylindrica</i>	Small-spike False-nettle				S3	3 Sensitive	1	93.6 ± 0.0	NB
P	<i>Pilea pumila</i>	Dwarf Clearweed				S3	4 Secure	25	58.8 ± 0.0	NB
P	<i>Viola adunca</i>	Hooked Violet				S3	4 Secure	6	72.1 ± 1.0	NB
P	<i>Viola adunca</i> var. <i>adunca</i>	Hooked Violet				S3	4 Secure	1	85.7 ± 0.0	NB
P	<i>Viola nephrophylla</i>	Northern Bog Violet				S3	4 Secure	248	3.8 ± 0.0	NB
P	<i>Carex arcta</i>	Northern Clustered Sedge				S3	4 Secure	28	14.3 ± 5.0	NB
P	<i>Carex capillaris</i>	Hairlike Sedge				S3	4 Secure	251	3.7 ± 0.0	NB
P	<i>Carex chordorrhiza</i>	Creeping Sedge				S3	4 Secure	77	12.7 ± 0.0	NB
P	<i>Carex conoidea</i>	Field Sedge				S3	4 Secure	12	61.8 ± 0.0	NB
P	<i>Carex eburnea</i>	Bristle-leaved Sedge				S3	4 Secure	115	0.6 ± 0.0	NB
P	<i>Carex exilis</i>	Coastal Sedge				S3	4 Secure	40	36.9 ± 0.0	NB
P	<i>Carex garberi</i>	Garber's Sedge				S3	3 Sensitive	30	53.3 ± 0.0	NB
P	<i>Carex haydenii</i>	Hayden's Sedge				S3	4 Secure	9	14.3 ± 10.0	NB
P	<i>Carex michauxiana</i>	Michaux's Sedge				S3	4 Secure	6	61.6 ± 1.0	NB
P	<i>Carex ormostachya</i>	Necklace Spike Sedge				S3	4 Secure	23	15.3 ± 0.0	NB
P	<i>Carex rosea</i>	Rosy Sedge				S3	4 Secure	152	14.3 ± 10.0	NB
P	<i>Carex tenera</i>	Tender Sedge				S3	4 Secure	21	14.8 ± 0.0	NB
P	<i>Carex tuckermanii</i>	Tuckerman's Sedge				S3	4 Secure	28	18.5 ± 0.0	NB
P	<i>Carex vaginata</i>	Sheathed Sedge				S3	3 Sensitive	50	18.2 ± 10.0	NB
P	<i>Carex wiegandii</i>	Wiegand's Sedge				S3	4 Secure	7	15.6 ± 5.0	NB
P	<i>Carex atratifomis</i>	Scabrous Black Sedge				S3	4 Secure	251	24.5 ± 8.0	NB
P	<i>Cyperus dentatus</i>	Toothed Flatsedge				S3	4 Secure	1	25.5 ± 0.0	NB
P	<i>Cyperus esculentus</i>	Perennial Yellow Nutsedge				S3	4 Secure	16	19.6 ± 0.0	NB
P	<i>Cyperus esculentus</i> var.	Perennial Yellow Nutsedge				S3	4 Secure	12	7.2 ± 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>leptostachyus</i>									
P	<i>Eleocharis intermedia</i>	Matted Spikerush				S3	4 Secure	37	13.7 ± 0.0	NB
P	<i>Eleocharis quinqueflora</i>	Few-flowered Spikerush				S3	4 Secure	71	25.8 ± 0.0	NB
P	<i>Rhynchospora capitellata</i>	Small-headed Beakrush				S3	4 Secure	17	53.4 ± 0.0	NB
P	<i>Rhynchospora fusca</i>	Brown Beakrush				S3	4 Secure	6	75.4 ± 1.0	NB
P	<i>Trichophorum clintonii</i>	Clinton's Clubrush				S3	4 Secure	68	3.7 ± 0.0	NB
P	<i>Lemna trisulca</i>	Star Duckweed				S3	4 Secure	1	28.1 ± 0.0	NB
P	<i>Triantha glutinosa</i>	Sticky False-Asphodel				S3	4 Secure	133	3.2 ± 0.0	NB
P	<i>Cypripedium reginae</i>	Showy Lady's-Slipper				S3	3 Sensitive	117	14.3 ± 5.0	NB
P	<i>Liparis loeselii</i>	Loesel's Twayblade				S3	4 Secure	18	12.1 ± 0.0	NB
P	<i>Platanthera blephariglottis</i>	White Fringed Orchid				S3	4 Secure	17	23.1 ± 1.0	NB
P	<i>Bromus latiglumis</i>	Broad-Glumed Brome				S3	3 Sensitive	130	10.9 ± 0.0	NB
P	<i>Muhlenbergia richardsonii</i>	Mat Muhly				S3	4 Secure	90	5.7 ± 0.0	NB
P	<i>Potamogeton obtusifolius</i>	Blunt-leaved Pondweed				S3	4 Secure	30	14.1 ± 0.0	NB
P	<i>Potamogeton richardsonii</i>	Richardson's Pondweed				S3	3 Sensitive	42	35.7 ± 0.0	NB
P	<i>Adiantum pedatum</i>	Northern Maidenhair Fern				S3	4 Secure	343	16.3 ± 0.0	NB
P	<i>Cryptogramma stelleri</i>	Steller's Rockbrake				S3	4 Secure	56	3.8 ± 0.0	NB
P	<i>Asplenium viride</i>	Green Spleenwort				S3	4 Secure	38	41.7 ± 0.0	NB
P	<i>Dryopteris fragrans</i>	Fragrant Wood Fern				S3	4 Secure	47	36.3 ± 1.0	NB
P	<i>Dryopteris goldiana</i>	Goldie's Woodfern				S3	3 Sensitive	254	13.8 ± 0.0	NB
P	<i>Woodsia glabella</i>	Smooth Cliff Fern				S3	4 Secure	29	27.2 ± 1.0	NB
P	<i>Equisetum palustre</i>	Marsh Horsetail				S3	4 Secure	19	3.8 ± 0.0	NB
P	<i>Isoetes tuckermanii</i>	Tuckerman's Quillwort				S3	4 Secure	2	82.8 ± 1.0	NB
P	<i>Diphasiastrum x sabinifolium</i>	Savin-leaved Ground-cedar				S3	4 Secure	16	3.8 ± 1.0	NB
P	<i>Huperzia appressa</i>	Mountain Firmoss				S3	3 Sensitive	1	76.7 ± 0.0	NB
P	<i>Sceptridium dissectum</i>	Dissected Moonwort				S3	4 Secure	19	35.3 ± 10.0	NB
P	<i>Botrychium lanceolatum</i>	Triangle Moonwort				S3	3 Sensitive	4	21.4 ± 0.0	NB
P	<i>Botrychium lanceolatum ssp. angustisegmentum</i>	Narrow Triangle Moonwort				S3	3 Sensitive	9	6.8 ± 0.0	NB
P	<i>Botrychium simplex</i>	Least Moonwort				S3	4 Secure	41	11.4 ± 0.0	NB
P	<i>Polypodium appalachianum</i>	Appalachian Polypody				S3	4 Secure	31	45.0 ± 0.0	NB
P	<i>Crataegus submollis</i>	Quebec Hawthorn				S3?	3 Sensitive	1	34.1 ± 1.0	NB
P	<i>Mertensia maritima</i>	Sea Lungwort				S3S4	4 Secure	1	87.5 ± 50.0	NB
P	<i>Lobelia kalmii</i>	Brook Lobelia				S3S4	4 Secure	158	3.3 ± 0.0	NB
P	<i>Myriophyllum sibiricum</i>	Siberian Water Milfoil				S3S4	4 Secure	44	60.8 ± 1.0	NB
P	<i>Stachys pilosa</i>	Hairy Hedge-Nettle				S3S4	5 Undetermined	52	1.2 ± 0.0	NB
P	<i>Stachys pilosa var. pilosa</i>	Marsh Hedge-Nettle				S3S4	5 Undetermined	1	23.3 ± 1.0	NB
P	<i>Drymocallis arguta</i>	Tall Wood Beauty				S3S4	4 Secure	58	27.1 ± 0.0	NB
P	<i>Rubus chamaemorus</i>	Cloudberry				S3S4	4 Secure	1	87.1 ± 0.0	NB
P	<i>Geocaulon lividum</i>	Northern Comandra				S3S4	4 Secure	9	13.5 ± 0.0	NB
P	<i>Cladium mariscoides</i>	Smooth Twigrush				S3S4	4 Secure	41	37.1 ± 0.0	NB
P	<i>Eriophorum russeolum</i>	Russet Cottongrass				S3S4	4 Secure	2	38.0 ± 10.0	NB
P	<i>Spirodela polyrhiza</i>	great duckweed				S3S4	4 Secure	7	19.0 ± 0.0	NB
P	<i>Corallorhiza maculata</i>	Spotted Coralroot				S3S4	3 Sensitive	16	23.3 ± 0.0	NB
P	<i>Calamagrostis stricta</i>	Slim-stemmed Reed Grass				S3S4	4 Secure	14	25.8 ± 0.0	NB
P	<i>Calamagrostis stricta ssp. stricta</i>	Slim-stemmed Reed Grass				S3S4	4 Secure	4	80.3 ± 0.0	NB
P	<i>Potamogeton oakesianus</i>	Oakes' Pondweed				S3S4	4 Secure	1	34.5 ± 1.0	NB
P	<i>Phleum alpinum</i>	Alpine Timothy				SH	2 May Be At Risk	1	94.4 ± 0.0	NB
P	<i>Botrychium lineare</i>	Narrow-leaved Moonwort				SH	2 May Be At Risk	1	66.2 ± 5.0	NB

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

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## **Appendix D**

### ***Public Involvement Documents***





**McCain Foods (Canada)**

*A Division of McCain Foods Limited*

795 Route 108

St-André, N.B. E3Y 4A5

February 7, 2020

Street Address  
Grand Falls, NB  
Postal Code

Re: Grand Falls Complex Environmental Impact Assessment

McCain Foods Canada (McCain) prides itself on being a good neighbor in the communities where we operate. The company is proposing to upgrade their processing facilities within their Grand Falls Complex located along the east side of the Saint John River, northwest of Grand Falls, New Brunswick (Figure 1). The proposed project will directly result in additional employment opportunities at the complex and an increased demand for potatoes from local farmers. The proposed upgrade includes:

- The addition of a new processing line within existing onsite buildings.
- Addition of a digester tank to the existing wastewater system and technology upgrades to the existing system. The new tank will be installed adjacent to the existing system in an area currently used as a parking lot.
- An increase in groundwater use from existing onsite wells of approximately 2200 L/min (no new groundwater extraction wells will be installed as part of the upgrade). A Water Source Supply Assessment is currently underway to assess the local hydrogeology.
- An increase in the volume of treated water being discharged that will remain below the current allowable discharge volume limits and effluent quality criteria in the current approval to operate.

This Project is anticipated to begin in the spring of 2021.

Because the facility may use more than 50 m<sup>3</sup> of water per day, an Environmental Impact Assessment (EIA) is required. Assessment work is currently underway. In the coming weeks, the Project will be registered for a provincial EIA review with the New Brunswick Department of Environment and Local Government (NBDELG). Once registered, the EIA registration document will be available for review on the NBDELG website

([https://www2.gnb.ca/content/gnb/en/departments/elg/environment/content/environmental\\_impact\\_assessment/registrations.html](https://www2.gnb.ca/content/gnb/en/departments/elg/environment/content/environmental_impact_assessment/registrations.html)). Should you wish to receive a copy of the EIA registration document, please contact the undersigned and we will be happy to provide a copy to you.

As part of the EIA, a public involvement process involving direct written communication with stakeholders (local residents, businesses, etc.) regarding the EIA is required. McCain would like to ensure that individuals or groups are able to obtain information and are able to express concerns that they may have. You are considered an important stakeholder because of the proximity of your property to the proposed project.

McCain welcomes the opportunity to further discuss the proposed upgrade with you. Please contact me (Jean Theriault), or our consultant (Kristin Banks - Dillon Consulting), at the numbers provided below to arrange a convenient time and location for further discussion. Thank you for your consideration.

Sincerely,

McCain Foods (Canada)  
A Division of McCain Foods Limited

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Jean Theriault  
Plant Manager  
Office: 506 475 7149  
Cell: 506 475 8742

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Michelle Mazerolle, P. Eng.  
Engineering Manager  
Office: 506 475 7619  
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Kristin Banks, P.Eng.  
Dillon Consulting  
1149 Smythe Street, Suite 200  
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506.444.8820  
[KBanks@Dillon.ca](mailto:KBanks@Dillon.ca)

KB:cjc

Encl. Figure 1: Site Plan

cc: Peter Cormier, Manager of Environmental Engineering, McCain Foods North America

Our file: 20-2077

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