

Seafood Processing Facility Environmental Impact Statement Report

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Prepared for:
Red Chamber Co.

Prepared by:



CBCL LIMITED

Consulting Engineers

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		<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND VALID FOR THE YEAR 2016</p>  <p>Michael Abbott NO. 868</p> <p>LICENCE TO PRACTICE</p> </div>	



CBCL LIMITED

Consulting Engineers

March 18th, 2016

Greg Wilson
PEI Government
Manager, Environment Land Management
PO Box 2000
Charlottetown, PE
C1A 7N8

Dear Mr. Wilson:

RE: Montague Seafood Process Facility – Environmental Impact Statement

We have completed an Environmental Impact Statement (EIS) for the proposed modifications to the Montague Seafood Processing Facility in Brudenell, PE. This EIS is being submitted to the PEI Department Environment, Labour and Justice as part of the Environmental Impact Assessment process.

We are submitting this document on behalf of the Red Chamber Inc. Once you have reviewed the document, please do not hesitate to contact me with any questions.

Yours very truly,

CBCL Limited

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Contents

CHAPTER 1	Introduction	1
1.1	General.....	1
1.2	Background	1
1.3	Proponent Information.....	1
CHAPTER 2	Project Description	3
2.1	Project Scope	3
2.2	Need for Project.....	3
2.3	Project Alternatives	3
	2.3.1 Null Alternative (“do nothing”).....	3
	2.3.2 Alternative Location.....	3
2.4	Project Locations.....	4
2.5	Project Schedule	4
2.6	Project Components	4
	2.6.1 Construction	4
	2.6.2 Process Description	4
	2.6.3 General Operation	5
	2.6.4 Process Operation.....	5
2.7	Decommissioning and Abandonment.....	8
CHAPTER 3	Regulatory Framework.....	9
3.1	Federal	9
	3.1.1 Fisheries Act.....	9
	3.1.2 Canadian Environmental Assessment Act	9
3.2	Provincial.....	9
	3.2.1 Environmental Protection Act	9
3.3	Municipal	10
3.4	Species of Conservation Concern Designation and Legislation	10
	3.4.1 Species at Risk Status.....	10
	3.4.2 Migratory Birds Convention Act	10
	3.4.3 Atlantic Canada Conservation Data Centre	10
	3.4.4 Maritime Breeding Bird Atlas	11
CHAPTER 4	Public Engagement.....	12
4.1	Objectives	12

4.2	Planned Public Consultation	12
4.2.1	Public Notice Announcement	12
4.2.2	Public Open House.....	13
CHAPTER 5	Existing Environment	14
5.1	Atmospheric Environment.....	14
5.1.1	Climate and Meteorological Conditions	14
5.1.2	Air Quality	17
5.2	Geology and Topography.....	17
5.3	Potable Water Supply	18
5.4	Species of Conservation Concern	18
5.5	Hydrology.....	21
5.6	Aquatic Environment	21
5.7	Wetlands.....	21
5.8	Vegetation & Rare Flora.....	22
5.8.1	Rare Flora Desktop Study	22
5.9	Avifauna	22
5.9.1	Avifauna Desktop Study.....	22
5.10	Land Use.....	23
5.11	Socio-economic Environment.....	23
5.11.1	Population Profile	23
5.11.2	Economic Profile	24
5.12	Archaeological and Heritage Resources	24
CHAPTER 6	Environmental Assessment	26
6.1	Environmental Assessment Methods.....	26
6.1.1	Project-Environment Interactions	26
6.1.2	Valued Environmental Components.....	26
6.1.3	Mitigation Measures, Residual Effects and Significance Determination.....	27
6.1.4	Follow-up and Monitoring	27
6.2	Scope of Assessment.....	27
6.2.1	Scope of Factors to be Considered	27
6.2.2	Scope of Projects	28
6.3	Project-Environment Interactions	28
6.3.1	No Interaction Between Project Activity and Environmental Component ('0')	30

6.3.2	No Significant Interaction Between Project Activity and Environmental Component ('1').....	30
6.3.3	Interaction Requiring Further Assessment ('2').....	31
CHAPTER 7	Effects of Accidental Events / Malfunctions And Environment on Project	32
7.1	Accidental Events and Malfunctions.....	32
7.1.1	Hazardous Materials Spills.....	32
7.1.2	Transportation-Related Accidents	33
7.1.3	Fires.....	34
7.1.4	Extreme Weather Event.....	34
7.2	Effects of the Environment on the Project	35
7.2.1	Effects Assessment Boundaries	35
7.2.2	Potential Environmental Effects	35
7.2.3	Mitigation and Residual Environmental Effects	36
7.2.4	Significance Criteria	36
7.2.5	Significance Determination.....	36
7.3	Effects Assessment Summary	37
CHAPTER 8	References.....	38

Appendices

A	Maritime Bird Mapping
B	ACCDC Data Report
C	Proposed Monitoring Plan

List of Acronyms

ACCDC	Atlantic Canada Conservation Data Centre
CCME	Canadian Council of Ministers of the Environment
CEAA	Canadian Environmental Assessment Act
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRA Fisheries	Commercial, recreation, and/or aboriginal fisheries
CWS	Canadian Wildlife Service
DFO	Department of Fisheries and Oceans
EEP	Environmental Emergency Plan
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
MBCA	Migratory Bird Convention Act
MBR	Migratory Bird Regulations
NPA	Navigation Protection Act
SARA	Species at Risk Act
SRANK	Subnational Rarity Rank of Taxon
VEC	Valued Ecosystem Component

CHAPTER 1 INTRODUCTION

1.1 General

CBCL Limited (CBCL) was retained by Red Chamber Co., the Proponent, to complete an Environmental Impact Statement (EIS) for the Seafood Processing Facility in Brudenell, PE. The Proponent has acquired the facility and is currently improving facility operations to meet applicable regulations prior to commencing production. The province has determined that the Works associated with the improvements are an Undertaking as defined in Section 9 of the *Environmental Protection Act*. As such an EIS is required to support the Environment Impact Assessment process will use to make a Determination on whether plant operations can proceed.

1.2 Background

The Cold Storage and Seafood Processing Facility at 150 Central Street in Brudenell, PE is now owned by Red Chamber Co. The facility began operations under different ownership. The facility struggled to meet applicable regulations and ceased operation. The Proponent acquired the facility and has been working with the provincial regulators to develop improvements that will lead to a more efficient operation that meeting applicable guidelines and regulations. At this time the facility is not in operation. The Facility will be retrofitted to process lobster and crab while minimizing risks to the environment. The Proponent's new operation will make use of the same physical footprint as the site's previous seafood operation, contained mainly within existing buildings, and will produce similar types of emissions and discharges as the previous operation. With respect to process wastewater discharges specifically, the Proponent intends to upgrade the existing process wastewater screening and clarification processes at the facility and to improve air quality with the addition of odour control treatment of process wastewater. The previous operation comprised the same discharge plan, with the original screening building, and processes without odour treatment.

1.3 Proponent Information

Project Name	Red Chamber Co. Brudenell Seafood Processing Facility
Project Location	Brudenell, Prince Edward Island
Proponent	Red Chamber Inc. Brudenell Seafood Processing 150 Central Street

	Brudenell, PE COA 1R0
Proponent Contact Person	Mat Cheyne, Special Projects, Red Chamber Co. Telephone: (323) 365 1828 Email: mcheyne@redchamber.com
Consultant	CBCL Limited 1489 Hollis St. Halifax, NS B3J 3M5 Mailing: PO Box 606 Halifax, NS B3J 2R7
Consultant Contact Person	Mike Abbott, M.Eng., P.Eng. Process Engineering Manager Telephone: (902) 421-7241 ext. 7978 Fax: (902) 423-3938 Email: mikea@cbcl.ca

CHAPTER 2 PROJECT DESCRIPTION

2.1 Project Scope

The Project goal is to eventually process lobster and crab seasonally at the Seafood Processing Facility located at 150 Central Street, Brudenell, PE. As noted previously, the facility processed lobster and crab under different ownership and is not currently operating. The project consists of improvements to the existing facility. The Facility will process up to 45,360 kg/d (100,000 lb/d) of crab and lobster products. The wastewater streams produced by the Facility will continue to be treated and/or discharged by the same processes under previous operations with some upgrades to process screening and treatment for odour control. The risk of odours have been identified based on historical complaints under previous operators of the Facility, and the plan to mitigate involves an adding ozone fractionation in the process wastewater system, to be discussed further below.

2.2 Need for Project

The Project is needed to add to the production capability of the Proponent, to produce seafood products for the commercial market. The Project will potentially provide 300 fulltime jobs and will operate at lower risk to the environment, based on the modifications to be made ahead of start-up.

2.3 Project Alternatives

Alternatives to the Project are different methods of achieving the same end with respect to environmental conditions. The project alternations include the null alternative (do nothing), or use an alternative location.

2.3.1 Null Alternative (“do nothing”)

As noted before, the existing operations did not meet current regulations and is therefore not a valid alternative.

2.3.2 Alternative Location

This alternative location method would achieve the need for the Project but would not be desirable as it would require significant design and new construction carrying higher environmental risk. If available, a similar facility could be purchase at an alternative location but this would presumably

carry similar environmental risks to the current Project proposed, in addition to the purchasing costs.

Although other treatment options have been considered, they were determined to be infeasible and cost prohibitive. Hence, the proposed Project property and processing facility with the modifications indicated in this document will be most feasible method to operate and meet regulations.

2.4 Project Locations

The Project is located at 150 Central Street, Brudenell, PE (166389) which includes the processing buildings, wastewater processing equipment and tankage, and irrigation space. The site layout is located in Figure 2.1.

2.5 Project Schedule

Production is scheduled to start on the next processing season, May 1st, 2016, but is dependent on the Approvals Process and having all the modifications completed.

2.6 Project Components

2.6.1 Construction

There are no significant emissions anticipated during the modification and construction phase prior to operation of the Facility for the Project. The following modifications will be completed prior to start-up of the processing Facility:

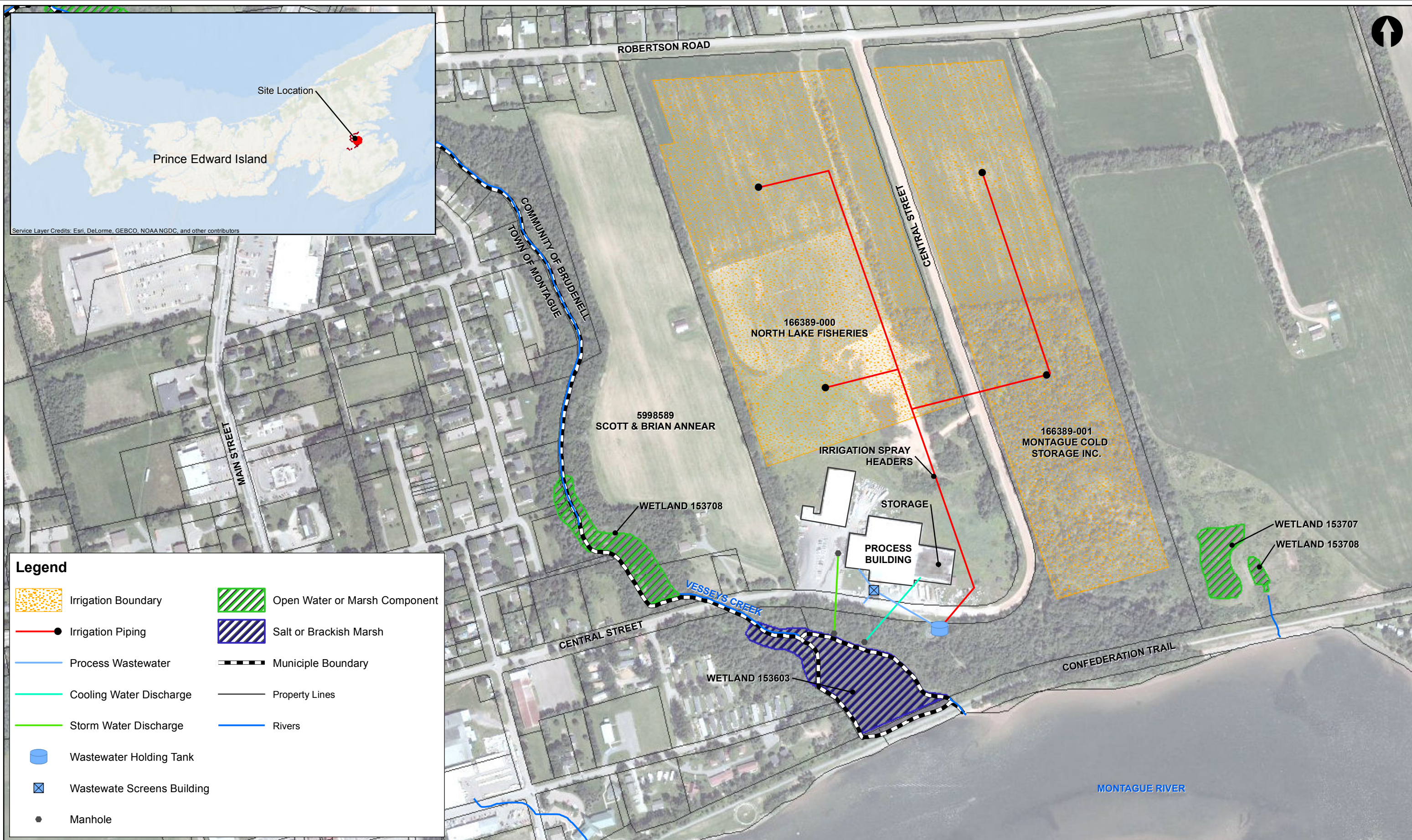
- Two ozone fractionation systems will be installed to reduce odours, one system connected to the screening tank and another connected to the wastewater holding tank;
- A new screening building and new screening processing equipment will replace the aging equipment currently onsite;
- The overflow from the domestic water lift station will be located and disabled;
- Floor drain segregation will be completed to prohibit stream contamination;
- Four new irrigation spray headers, piped from the wastewater holding tank will be installed to provide spray to four locations on the site.

The new screening building will be constructed on the existing foundation. Minor site works, such as digging with a backhoe will be required to install the buried irrigation piping and located and disabling the overflow line.

2.6.2 Process Description

The process production rate will vary according to supply. The plant will be setup to process a maximum of 18,145 -20,415 kg/d (40,000–45,000 lb/d) crab, 18,145 – 20,415 kg/d (40,000–45,000 lb/d) lobster, and 4,540 – 6,800 kg/d (10,000–15,000 lb/d) of meat picking. Crab and lobster arrive at the facility where they are processed and packaged for sale.

Lobster arrives shelled. Sometimes lobsters are pre-cooked and sometimes are cooked at the facility. Lobster is sent out frozen in the shell, or picked and packaged, depending on what the



Legend

Irrigation Boundary	Open Water or Marsh Component
Irrigation Piping	Salt or Brackish Marsh
Process Wastewater	Municiple Boundary
Cooling Water Discharge	Property Lines
Storm Water Discharge	Rivers
Wastewater Holding Tank	
Wastewater Screens Building	
Manhole	

market dictates. Shelled crab is split, eviscerated, and then flash frozen in brine. Packaged products are sent by truck to market.

2.6.3 General Operation

The operating schedule is anticipated to be 10 hours per day, 6 days per week. With respect to the general site and building operation, the energy and utilities are anticipated to operate similarly to the previous operations at this site, possibly at a lower energy consumption based on modifications and process schedule. During operation and maintenance, a small increase in air contaminants and greenhouse gases due to combustion products of machinery is expected while some locally occurring increases in sound during daytime hours can be expected. These emissions are expected to be nominal. Vehicle traffic will increase in comparison to the current non-operational state of the property, but the traffic will be similar to that of when the plant was operational.

2.6.3.1 DOMESTIC WATER

The domestic water is currently segregated from process wastewater and treated by the Town of Montague. The current site layout permits this; however, there is some historic evidence that an overflow exists on the lift station that discharges to Vesseys Creek. The Proponent has confirmed that the lift station is operational and that all domestic wastewater is currently going to the Town system. The overflow will be located and disabled. Domestic wastewater flow is anticipated to be similar to that of the previous operation.

2.6.3.2 COOLING WATER AND STORM WATER

The cooling water discharge (from the boiler and condenser rooms) is fresh water and will continue to be discharged as per its current configuration which directs flow to Vesseys Creek. The line connecting the cooling water discharge and the process wastewater line will be valved closed to ensure no process wastewater can enter the cooling water line during operation. However, this line needs to remain operational for winter maintenance (during non-processing periods) as the floor drains cannot discharge to the frozen wastewater holding tank. There appear to be no other in-flow sources to the cooling water discharge line that could cause contamination from either the domestic or process systems. Cooling water is estimated to be similar in quantity to the previous operation at approximately 15 LPS during processing.

2.6.4 Process Operation

The most significant source of emission from the crab and meat picking operations is the process wastewater. Each source of process wastewater is discussed below. The total process wastewater flow rate is anticipated to average 136.5 m³/d based on the operation of other similar plants.

2.6.4.1 CRAB RINSING

Shelled crabs are rinsed prior to cooking and processing. Rinse water is collected through a trough and pipe collection system, then discharged to a storm drain in the parking lot outside the plant office at an estimated rate of 7.6 LPS. Pollutant levels in rinse water are less than the regulated storm water discharges and as such are being discharged to the storm water system.

2.6.4.2 LOBSTER, CRAB AND MEAT PICKING PROCESSING

Lobster and meat picking produces wastewater as a by-product of cleaning. The volume of this wastewater has been estimated to be approximately 54.6 m³/d.

Crab processing includes cleaning/rinsing, butchering, cooking, and brine freezing. The crab processing wastewater includes a weekly cooker dump, clean-up wastewater similar in volume to the lobster clean-up, and some additional wastewater for fluming materials from the butchering tables. This volume has been estimated to be approximately 81.9 m³/d.

Wastewater Characterization

The process wastewater is to be treated at the Facility and discharged to land. At this time, the new operations are not up and running so there is no historical characterization. Historical wastewater characteristics were gathered from similar operating facilities to provide a basis to estimate process wastewater characteristics for the Project. These characteristics are summarized in Table 2.1. With respect to the available data, it is important to note that the wastewater stream configurations are not known from the sample sets provided. Hence, some concentrations may be different in comparison to the Project operation if waste stream segregation and treatment practices are different.

Table 2.1: Estimated Process Wastewater Characteristics

Parameter	Value	No. of Sample Sets
Carbonaceous Biochemical Oxygen Demand, cBOD (mg/L)	1000	3
Chemical Oxygen Demand, COD (mg/L)	1275	3
Total Suspended Solids, TSS (mg/L)	125	5
Total Nitrogen, TN (mg/L)	25	1
Total Phosphorus, TP (mg/L)	4.4	3
Total Alkalinity (mg/L)	415	2
pH	6.7	2

Wastewater Treatment

Process wastewater will be collected through a series of floor drains where it will then flow into a below grade pit (~6.0 m³). The wastewater in the pit will be continuously cycled through an ozone foam fractionator for odour control with a capacity of 20 LPS and 15 g/h of ozone. The ozonated wastewater will be pumped to a dual screening system that provides initial screening at 1.3 mm (0.05 in) separation and secondary screening at 0.76 mm (0.03 in) separation. The screens have a rated capacity of 15 LPS each. Screenings will be deposited in bins and hauled off site to be disposed of according to Provincial Regulations.

The screened and ozonated process wastewater will flow to a 365 m³ holding tank for storage prior to irrigation. The wastewater will be further treated for odour control while it is in the holding tank by being continuously cycled through a 30 g/h ozone fractionator. The recycle rate for this unit is anticipated to be 40 LPS.

Discharge to Land

Wastewater irrigation systems typically include those systems where wastewater is applied to the ground surface at a rate of 51-102 mm (2-4 inches) per week and a crop is grown. Methods of application include sprinkler systems, ridge and furrow, and surface flooding. The Project will utilize four mobile sprinkler heads each with a capacity of 25 LPS. The pre-treated process wastewater will be discharged to land via spray heads, and will percolate through the soil resulting in biodegradation of organic material. A minimum depth to groundwater of 1.2 m (4 ft) is preferred to prevent saturation of the root zone.

Discharge to land is planned to occur over an area of about 20 hectares, where approximately 5.5 hectares is currently forest cover. The forested cover will remain. The possible irrigation areas are marked on Figure 2.1. The irrigation would operate on approximately 5 hectares at one time, utilizing four spray headers, one per area. Each area will rotate on a 3:1 application day to rest day ratio. The Proponent will ensure these areas comply with Provincial and Atlantic Canadian wastewater spray irrigation guidelines by providing a buffer zone of 15 m from adjacent properties, greater than 50 m from occupied dwellings, 25 m from any public right-of-way, 30 m from any potable water wells, and 20 m from watercourses.

The irrigation disposal system will require storage during periods when wet weather or frozen ground conditions will not allow land application. The current irrigation plan will discharge 455 m³ (100,000 imp gal) per application over 16 hours, or 455 m³/application. Therefore, it is anticipated that irrigation will occur with the following loading conditions from in Table 2.2:

Table 2.2: Irrigation Discharge to Land Loading Estimate

Parameter	Value
Maximum Irrigation Season	8 months per year
Estimated Days Lost Due to Weather	50%
Estimated Irrigation Days (10 h/d)	3.5 to 7 days per week 122 to 243 days per year
Produced Wastewater: Estimated Day Average Year Average	50–500 m ³ /d 200 m ³ /d 30,000 m ³ /a
Total Irrigation Area	20 ha
Sectioned Irrigation Area (4)	5 ha
Hydraulic Loading per Application (5ha)	10 mm/application
Application/Rest Ratio	3:1
cBOD Loading	<10 kg/ha/d (Initial Average 6.3 kg/ha/d)
Nitrogen Loading	< 50 kg/ha/d (Initial Average 35

2.7 Decommissioning and Abandonment

The Proponent's Facility intends to operate for many years with no end-of-life date established. While decommissioning is not currently planned, the Proponent will develop a decommissioning and abandonment plan intended for the end of the Project service life that will accommodate regulations and achieve environmental goals.

CHAPTER 3 REGULATORY FRAMEWORK

The following sections detail the likely regulatory permitting and approval requirements to which the proposed Red Chamber Co. Project will be subject. It also details the environmental legislation and regulations to which the proponent and contractors must comply with during construction and operation activities. The review is based on current legislation; any future amendments to existing legislation may modify permitting and approval requirements for the Project. The permitting and approvals processes described below are not exhaustive and represent the more significant regulatory requirements. Additional permitting and approval requirements may exist.

3.1 Federal

3.1.1 Fisheries Act

The fisheries protection provisions under Section 35 of the Fisheries Act prohibits “serious harm to fish that are part of a commercial, recreational or Aboriginal fishery, or to fish that support such a fishery,” unless otherwise authorized by DFO. The definition of serious harm is, “*death of fish or any permanent alteration to, or destruction of, fish habitat*” (Govt. of Canada, 2013). *Fisheries Act* authorization is under Section 35(2) for this project is unlikely required given the application of standard fish and fish habitat mitigations; In the event that an application is required it must be submitted to DFO which satisfies the information requirements set out in the *Fisheries Act* regulations. The application must also include an appropriate fisheries impact offsetting plan.

3.1.2 Canadian Environmental Assessment Act

It has been determined that the Project does not meet any of the triggering criteria for the *Canadian Environmental Assessment Act* (CEAA) 2012, per *Regulations Designating Physical Activities* (Govt. of Canada, 2014).

3.2 Provincial

3.2.1 Environmental Protection Act

The Project has been defined as an Undertaking by the provincial Department of Communities, Land, and Environment and will be subject to a Review pursuant to Section 9 of the *Environmental Protection Act*. The Act requires that an EIA be completed for the project. The EIA includes submission of an EIS (i.e., the present document) and public consultation to identify potential and

known adverse environmental effects of the project undertakings, and proposed methods for mitigating the adverse effects.

3.3 Municipal

The Project is located in the community of Brudenell, PE. Land use permissions and zoning requirements can be found in the *Brudenell Community Official Plan and Development Bylaws* (Community of Brudenell, 2006). Based on the zoning map, the property where the process facility lies is zoned as Agricultural, or A1. Based on a review of this document, there are no additional municipal requirements to be included in this EIS.

3.4 Species of Conservation Concern Designation and Legislation

3.4.1 Species at Risk Status

The Federal *Species at Risk Act* (SARA) aims to prevent Canadian endangered or threatened species from becoming extinct and to promote their recovery. The Act facilitates the management of species listed as special concern, in order to prevent them from becoming endangered or threatened. The SARA also protects critical habitat and stipulates compensation, permits, and enforcement. Critical habitat is that which is necessary for the survival or recovery of a species listed as endangered, threatened or extirpated on Schedule 1 of SARA. It is an offence to kill, harm, harass, capture, take, possess, collect, buy, sell or trade an individual of a species listed as endangered, threatened or extirpated in Schedule 1 of SARA. The SARA also makes it an offence to damage or destroy the residence of one or more individuals of a species listed in Schedule 1 as endangered, threatened or extirpated (SARA, 2011). The species identified in the ACCDC databases were checked against the SARA database to obtain their species at risk status.

3.4.2 Migratory Birds Convention Act

The *Migratory Birds Convention Act* (MBCA) (Govt. of Canada, 2010) is administered by Environment Canada (EC). The Act protects over 500 species of migratory birds, including the protection of their eggs and their nests (MBCA, 1994). The Canadian Wildlife Service (CWS) is a division of EC and is responsible of administering the Act with assistance from the enforcement branch of EC. It is illegal, under Section 6 of the *Migratory Bird Regulations* (MBR) (Govt. of Canada, 2013) of the MCBA, to disturb, destroy or take migratory birds and their nests and eggs, except by permit for scientific, educational or other specific purposes. Section 5 of the MBCA prohibits the possession, selling, buying or exchanging of a migratory bird or nest, and also prohibits the deposition of substances that may be harmful to migratory birds. Such substances cannot be deposited into waters frequented by migratory birds, or into an area that may enter those waters.

3.4.3 Atlantic Canada Conservation Data Centre

The ACCDC provides technical tracking lists of observations of rare and endangered flora and fauna. An ACCDC listing of rare and endangered species sightings was acquired for a 5 km radius around the proposed study area. Species on the ACCDC list are ranked according to Subnational Rarity Rank (S-Rank) of taxon. Appendix B lists all the species from the ACCDC report. Each entry includes the SARA status, provincial general status, S-Rank, observation data, survey location and reference. The

list is divided by taxon (i.e., birds, mammals, fish, reptiles, invertebrates and vascular plants) and in the case of birds, plants and fish, are discussed further in their respective sections in Chapter 5.

3.4.4 Maritime Breeding Bird Atlas

The Maritime Breeding Bird Atlas (MBBA) is a printed volume (Erskine, 1992) and associated online database used to assess the status and determine distribution and abundance throughout the Maritimes. The current version of the database displays data from 2006 to 2010. The Project area falls into MBBA square 20NS21 (Appendix A).

CHAPTER 4 PUBLIC ENGAGEMENT

4.1 Objectives

This Project requires effective community engagement and public consultation. The objectives of engagement for this Project are to:

- Ensure that those potentially affected by the project are aware of the Project;
- Identify environmental issues not previously addressed by the proponent;
- Advise stakeholders how to obtain additional information about the Project;
- Ensure stakeholders are able to ask any questions or express any concerns they may have about the Project;
- Receive stakeholder input about environmental concerns regarding the proposed Project;
- Respond to stakeholders openly and promptly, resolving as many concerns as possible and identifying those which could not be resolved; and
- Provide a report documenting the public involvement process including comments received to the Department of Communities, Land, and Environment.

While it is recognized that not all concerns can be addressed to the satisfaction of all parties, The Proponent is expected to respond to the public in an open and forthright manner and resolve or address as many of their concerns as possible, while clearly identifying those which could not be resolved.

4.2 Planned Public Consultation

A Level II Public Consultation process has been identified as the method of public consultation to be used during the Environmental Impact Assessment process for the Project. Level II public consultation requires the proponent to hold at least one public information session in the approximate locale of the proposed project.

4.2.1 Public Notice Announcement

A notice of the open house will provided, at minimum, in a public notice in the Guardian and the Eastern Graphic for a minimum of 6 consecutive days which will allow for general circulation in the area of the proposed Project. This notice will include (at minimum) the information outlined below:

- The location, date, and time of the public information session;
- Description of the Project;

- List of the Department of Communities, Land, and Environment contact information for the public to contact regarding the proposed Project;
- A description of where to obtain the EIS report at the Department of Communities, Land, and Environment office and on the Department's website; and,
- The advertisement will be no smaller than four inches by three inches.

A notice of the Open House will also be circulated to residents surrounding the site.

4.2.2 Public Open House

The Proponent will host a public open house to provide an opportunity for the public to become familiar with the proposed Project and ask questions and/or raise potential concerns. The open house will be held at a time convenient to the public and will be located at a facility near the Project site.

This open house offers a visible and effective way to directly engage in two-way communication with key stakeholders associated with the Project. The attendees will learn about the Project from qualified individuals who will provide the following information at the open house: the EIS report, project summary hand-outs, and audio/visual material such as maps of the area, conceptual drawings of the proposed Project, or a formal presentation/video.

Attendees will also be given the opportunity to provide feedback through standardized questionnaire forms with the Department of Communities, Land, and Environment contact information included on them, if they choose to complete them. They can be submitted to the public house host or to the Department directly.

CHAPTER 5 EXISTING ENVIRONMENT

5.1 Atmospheric Environment

The atmospheric environment for the purpose of this environmental assessment consists of climate and meteorological conditions, and air quality. Climate and meteorological baseline conditions were derived from historic climate data.

5.1.1 Climate and Meteorological Conditions

At the regional scale, Atlantic Canada lies within a zone of prevailing westerly winds that carry air from the interior of the North American continent. This zone experiences the passage of high and low pressure systems which are in turn influenced by ocean currents and continental topography. The low pressure systems moving through this area typically track across the continent, or up the seaboard, resulting in the onset of wind from an easterly direction, thickening cloud and a gradual drop in pressure. The frequent movement of such systems through Atlantic Canada brings significant precipitation. Winters are usually cold with frequent snowfall and freezing precipitation. Spring is typically late (sometime in May), cool and cloudy. Summers are short in duration, warm and are characterized by less precipitation than in other seasons.

In recent years, extreme weather events have been occurring more frequently. Tropical weather events are expected to be both more intense and frequent as the effects of climate change influence ocean warming and coastal currents. Climate models predict an increase in extreme local events throughout this century.

This section provides a general description of the region's climate (climate norms) over a 30-year period and the meteorological conditions available near the Project site. Montague and Brudenell do not have weather stations so data from Charlottetown were used. The site is situated inland; however, it is only a few kilometers from the Northumberland Strait.

Climate norms (30-year averages) for the 1981 to 2010 period are from the weather station located in Charlottetown (46°17'19.020" N, 63°07'43.070" W) for temperature, visibility, precipitation and wind; these are tabulated in the sections that follow. Extreme weather data are also provided, with their years of occurrences noted (Environment Canada, 2016).

Precipitation data recorded are summarized in Table 5.1. The total annual precipitation (1158.2 mm) is defined as the total rainfall plus water equivalent of snowfall and other forms of frozen precipitation. Rainfall is generally higher in the spring to the fall with snow and freezing precipitation frequent between November and April.

Table 5.1: Charlottetown Precipitation Normals (1981-2010) and Extremes (years as indicated)

Month	Mean Rainfall (mm)	Mean Snowfall (cm)	Total Precip. (mm)	Extreme Daily Rainfall (mm)	Extreme Daily Snowfall (cm)	Extreme Daily Precipitation (mm)
Jan.	34.1	73.3	101	74.4 (1978)	51.8 (2009)	74.4 (1978)
Feb.	29.8	58.3	83.2	53.1 (1953)	74.4 (2004)	74.4 (2004)
Mar.	44.1	44.1	86.3	44.2 (2008)	33.8 (1967)	44.2 (1968)
Apr.	59.7	24.4	83.7	58.7 (1962)	38.1 (1946)	58.7 (1962)
May	87.2	3.7	91	70.4 (1990)	17.4 (1990)	70.4 (1990)
June	98.8	0	98.8	86.3 (1998)	0 (1943)	86.3 (1998)
July	79.9	0	79.9	74 (2002)	0 (1943)	74 (2002)
Aug.	95.7	0	95.7	94.8 (2010)	0 (1943)	94.8 (2010)
Sept.	95.9	0	95.9	65.4 (1987)	0.4 (1989)	65.4 (1987)
Oct.	110.3	1.7	112.2	106.4 (1967)	21.6 (1974)	106.4 (1967)
Nov.	93	19.2	112.5	65.8 (2005)	30.5 (1955)	65.8 (2005)
Dec.	58.6	65.6	118.1	50.4 (1980)	49.7 (2004)	57.2 (1975)
Year	887.1	290.4	1158.2			

Source: Environment Canada Climate Normals: 1981-2010.

Charlottetown experiences a large annual temperature variation. Daily mean temperatures range from -7.7°C in January to 18.7°C in July. The annual daily mean is 5.7°C. Daily maximums, minimums and extreme temperatures at the Charlottetown weather station are summarized in Table 5.2.

Table 5.2: Charlottetown Temperature Normals (1981-2010) and Extremes (years as indicated)

Month	Daily Mean (°C)	Daily Maximum (°C)	Daily Minimum (°C)	Extreme Maximum (°C)	Extreme Minimum (°C)
Jan.	-7.7	-3.4	-12.1	15.1 (1999)	-30.5 (1982)
Feb.	-7.3	-2.9	-11.7	13.3 (1976)	-29.8 (1993)
Mar.	-3.1	0.9	-7	16.3 (1999)	-23.9 (1948)
Apr.	3.1	7.2	-1.2	24.4 (2004)	-13.6 (1995)
May	9.2	14.3	4.1	31.2 (1977)	-6.7 (1946)
June	14.5	19.4	9.6	32.2 (1944)	-1.1 (1947)
July	18.7	23.3	14.1	33.9 (1975)	3.3 (2009)
Aug.	18.3	22.8	13.7	34.4 (1944)	2 (1989)
Sept.	14.1	18.6	9.6	31.5 (2001)	-0.6 (1950)
Oct.	8.3	12.3	4.4	25.2 (2010)	-6.7 (1974)
Nov.	2.9	6.3	-0.5	21.3 (1982)	-15 (1989)

Month	Daily Mean (°C)	Daily Maximum (°C)	Daily Minimum (°C)	Extreme Maximum (°C)	Extreme Minimum (°C)
Dec.	-3.3	0.5	-7	16.7 (1950)	-28.1 (1980)
Year	5.7	9.9	1.3		

Source: Environment Canada Climate Normals: 1981-2010.

The Charlottetown weather station has recorded visibility statistics from the period of 1981 to 2010. The month with the greatest number of hours with less than 1 km of visibility is January with 29.4 hours. The average number of hours per year with visibility less the 1 km is 190.8 hours, mainly during late fall until early spring. Table 5.3 presents a visibility statistics for the 1981 to 2010 period of record.

Table 5.3: Summary of Visibility Statistics: Charlottetown Weather Station

Month	Hours of Visibility < 1km	Hours of Visibility 1 to 9 km	Hours of Visibility > 9km
Jan.	29.4	136.6	578
Feb.	25.1	117.6	534.2
Mar.	28.4	116.5	599.1
Apr.	25.4	107	587.7
May	17	90.1	636.9
June	10.9	80	629.2
July	5.7	69.2	669.1
Aug.	4.5	73	666.5
Sept.	4.2	56.3	659.5
Oct.	2.8	58.1	683.1
Nov.	11.4	91.6	617
Dec.	26.1	135	582.9
Year	190.8	1130.9	7443.1

Source: Environment Canada Climate Normals: 1981-2010.

Table 5.4 displays wind speeds and frequent direction at the Charlottetown weather station. The highest average wind speeds are in the months of December to March. Wind direction is more often from the west from October until February. The month with the highest number of days with wind speeds greater than 52 km/h and 63 km/h is December.

Table 5.4: Wind Statistics: Charlottetown Weather Station

Month	Mean Speed (km/h)	Most Frequent Direction	Days with Wind >= 52 km/h	Days with Wind >= 63 km/h
Jan.	18	W	1.4	0.4
Feb.	17.9	W	1	0.1
Mar.	18.1	N	0.9	0.2
Apr.	17.7	N	0.8	0.2
May	16.3	S	0.2	0
June	14.9	S	0.1	0

Month	Mean Speed (km/h)	Most Frequent Direction	Days with Wind >= 52 km/h	Days with Wind >= 63 km/h
July	14.1	SW	0	0
Aug.	13.3	SW	0	0
Sept.	14.6	SW	0.3	0.1
Oct.	16.2	W	0.7	0.1
Nov.	17.6	W	1	0.2
Dec.	18.6	W	1.6	0.5
Year	16.5	W	7.9	1.8

Source: Environment Canada Climate Normals: 1981-2010.

5.1.2 Air Quality

There is not any local air quality data with respect to the Facility or land discharge locations. The area in general does not have a great presence of industrial production and is predominantly agricultural and commercial where not residential. Under previous operators, the Facility was subject to complaints of odours in the areas adjacent to the site which the Proponent has factored into the design changes of the operation to mitigate such issues.

5.2 Geology and Topography

The Project site has been described has 34.3 hectares in size based on its property identification number (PID 166389) as shown in the Geomatics Information Center (GEOLINC).

Based on previous studies (CRA, 2009) citing the surficial geology map, the native surficial soils of the Site are primarily of glacio-fluvial deposit of gravel, sand, and silt with the surface soil mapped as coarse-loamy, deep, acid, cool humid. There is coarse and moderately coarse textured (less than 8% clay) strongly acid ground moraine, ablation, or residual material on an undulating rolling relief. The soil is classified as well drained with a permeability of more than 0.5 cm/hr.

The topography of the property mainly contains slightly sloped grassed areas. There is one parking lot on site. On-site surface water will tentatively drain by infiltration and/or overland flow, into the Montague River estuary. A seasonal stream has been previously identified by other studies and was reportedly influenced by the spray irrigation system. The stream reportedly originated down gradient of the sprayed field and flowed to the east toward wetlands on the lower east side of the property (described in following sections). Based on topographic map and site observation, the regional surface drainage (anticipated groundwater flow direction) appears to flow south toward the Montague River.

As cited in previous studies, the local geology is known to generally consist of Upper Pennsylvanian to Early Permian red beds which can be divided into four major cyclic sequences known as Megacyclic (MS) I to IV with the youngest sequence being MS I. Based on the available bedrock geology map, the bedrock in the area of the Site belongs to the Megacyclic Sequence IV. The red bed strata in this area include the Lower Permian conglomerate and sandstone. The depth of the bedrock was not provided on the available mapping.

5.3 Potable Water Supply

The Site water supply consists of three potable groundwater wells, each approximately 180 m deep, located along the northern property boundary south of Robertson Road. Each well is fitted with a pump rated at 12.6 LPS (200 GPM). The site will use two wells at a time at most.

The surrounding community of Brudenell is not supported by a municipal water system. As such, their potable water supply comes from groundwater wells.

5.4 Species of Conservation Concern

A rare taxa sightings report was acquired from ACCDC (Appendix B) to identify species of concern for the study area. References noted in the ACCDC report were used to acquire information on the other databases. A screening of the ACCDC list resulted in a shortlist of 40 species that have been sighted within 5 km of the Project site, listed in Table 5.5 below. Subsequent sections of this report address specific taxa explicitly, and qualify the potential for the species to occur on the Project site.

Table 5.1: Summary of Species of Conservation Concern Recorded within 5 km of the Project Area

Common Name	Scientific Name	ACCDC SRank	NBDNR General Status Rank	NB SARA Designation	COSEWIC	Federal SARA Designation	Schedule
Birds							
Barn Swallow	<i>Hirundo rustica</i>	S3B	Sensitive	–	Threatened	–	–
Canada Warbler	<i>Wilsonia canadensis</i>	S3B	At Risk	–	Threatened	Threatened	Schedule 1
Bobolink	<i>Dolichonyx oryzivorus</i>	S3B	Sensitive	–	Threatened	–	–
Bank Swallow	<i>Riparia riparia</i>	S4B	Secure	–	Threatened	–	–
Eastern Wood-pewee	<i>Contopus virens</i>	S4B	Secure	–	Special Concern	–	–
Baltimore Oriole	<i>Icterus galbula</i>	S2B	Sensitive	–	–	–	–
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	S2B,S4N	Sensitive	–	–	–	–
Northern Pintail	<i>Anas acuta</i>	S3B	Secure	–	–	–	–
Killdeer	<i>Charadrius vociferous</i>	S3B	Sensitive	–	–	–	–
Eastern Kingbird	<i>Tyrannus tyrannus</i>	S3B	Sensitive	–	–	–	–
Tennessee Warbler	<i>Vermivora peregrine</i>	S3B	Sensitive	–	–	–	–
Bay-breasted Warbler	<i>Dendroica castanea</i>	S3B	Sensitive	–	–	–	–
Rose-breasted Grosbeak	<i>Pheucticus ludovicianus</i>	S3B	Sensitive	–	–	–	–
Blue-winged Teal	<i>Anas discors</i>	S3S4B	Secure	–	–	–	–
Spotted Sandpiper	<i>Actitits macularis</i>	S3S4B	Sensitive	–	–	–	–
Wilson’s Snipe	<i>Gallinago delicata</i>	S3S4B	Sensitive	–	–	–	–
Invertebrates							
Monarch	<i>Danaus plexippus</i>	S1B	At Risk	–	Special Concern	Special Concern	Schedule 1
Acadian Hairstreak	<i>Satyrium acadia</i>	S1	May be at Risk	–	–	–	–
Aphrodite Fritillary	<i>Speyeria Aphrodite</i>	S1	May be at Risk	–	–	–	–
Dusky Clubtail	<i>Gomphus spicatus</i>	S2	May be at Risk	–	–	–	–
Least Skipper	<i>Ancloxypha numitor</i>	S3	Sensitive	–	–	–	–

Common Name	Scientific Name	ACCDC SRank	NBDNR General Status Rank	NB SARA Designation	COSEWIC	Federal SARA Designation	Schedule
Two-spotted Spiketail	<i>Cordulegaster maculata</i>	S3	Sensitive	–	–	–	–
Ski-tailed Emerald	<i>Somatochlora elongate</i>	S3	Secure	–	–	–	–
Band-winged Meadowhawk	<i>Sympetrum semicinctum</i>	S3	Sensitive	–	–	–	–
Vascular Plants							
Eastern Cudweed	<i>Pseudognaphalium obtusifolium</i>	S1	May be at Risk	–	–	–	–
Bearded Sedge	<i>Carex comosa</i>	S1	May be at Risk	–	–	–	–
Macoun's Cudweed	<i>Pseudognaphalium macounii</i>	S2	May be at Risk	–	–	–	–
Cut-leaved Coneflower	<i>Rudbeckia laciniata</i>	S2	May be at Risk	–	–	–	–
Southern Mudwort	<i>Limosella australis</i>	S2	Sensitive	–	–	–	–
Daisy-leaved Moonwort	<i>Botrychium matricariifolium</i>	S2	May be at Risk	–	–	–	–
Heart-leaved Birch	<i>Betula papyrifera</i> var. <i>cordifolia</i>	S2?	Undetermined	–	–	–	–
Canada Rush	<i>Juncus canadensis</i>	S2?	Sensitive	–	–	–	–
Hooded Ladies'-tresses	<i>Spiranthes romanzoffiana</i>	S2S3	Sensitive	–	–	–	–
Club Spur Orchid	<i>Platanthera clavellata</i>	S3	Sensitive	–	–	–	–
Rattlesnake Fern	<i>Botrychium virginianum</i>	S3	Secure	–	–	–	–
Smooth Serviceberry	<i>Amelanchier laevis</i>	S3?	Undetermined	–	–	–	–
Common Juniper	<i>Juniperus communis</i> var. <i>depressa</i>	S3?	Undetermined	–	–	–	–
Blue Groundcedar	<i>Lycopodium tristachyum</i>	S3?	Sensitive	–	–	–	–
Alder-leaved Buckthorn	<i>Rhamnus alnifolia</i>	S3S4	Secure	–	–	–	–
Knotted Rush	<i>Juncus nodosus</i>	S3S4	Secure	–	–	–	–

* Sightings as recorded with the Atlantic Canada Conservation Data Centre (ACCDC)

5.5 Hydrology

The Project property slopes toward the Montague River to the south. Storm water and cooling water will discharge to Vesseys Creek, which is within the Montague Valleyfield watershed (Figure 2.2). The Montague River is part of Canadian Heritage River System called the Three Rivers, which consists of the tidal estuaries of the Montague/Valleyfield River, the Brudenell River, and the Georgetown River. Montague/Valleyfield is the largest of the three rivers in the system, draining 197 m².

The shore of the Three Rivers is a mixture of woodland with few cliffs while containing farmland, sand pits, beaches, and shaled outcroppings rounds out the landscapes found along the shores. Salt marches on this system are small and sporadic.

5.6 Aquatic Environment

There is one freshwater stream, Vesseys Creek, located immediately to the West of the Project site. The stream is buffered from the commercial, agricultural and residential development that surround it by a thin band of forested area. The storm water, cooling wastewater, and crab rinse water are proposed to discharge into Vesseys Creek. Approximately 200 m downstream from the discharge location Vesseys Creek flows through a culvert under the Confederation Trail into the Montague River.

While Vessey's Creek may provide habitat for a number of species identified in the ACCDC Rare Taxa Report (Appendix B) such as the southern mudwort, dusky clubtail, two-spotted spiketail, ski-tailed emerald and band-winged meadowhawk, none of these species are anticipated to be negatively impacted by the proposed activities given that the composition of water inputs the Vesseys Creek system will not be altered by the Project.

5.7 Wetlands

The ecologically sensitive areas surrounding the processing plant include Vesseys Creek which drains into the Montague River of the Mantague/Valleyfield River watershed. There are also four (4) wetlands identified from PEI Land On-line, listed below and shown on Figure 2.1. The storm water, cooling wastewater, and crab rinse water will discharge to Vesseys Creek.

ID No.: 153602

Type: Freshwater

Hectares: 0.55

ID No.: 153603

Type: Salt Marsh

Hectares: 1.16

ID No.: 153607
Type: Freshwater
Hectares: 0.33

ID No.: 153708
Type: Freshwater
Hectares: 0.05

5.8 Vegetation & Rare Flora

Vegetation and Rare Flora within the study area has been characterized through desktop research and is detailed below.

5.8.1 Rare Flora Desktop Study

The lack of baseline botanical surveys on PEI, combined with the high percentage of agricultural development, has resulted in rare rankings for many species that are considered common in adjacent provinces. As such, the ACCDC Rare Taxa Report indicates that 16 plant species of conservation concern have been observed within a 5km radius of the Project site.

None of the plants identified are listed pursuant the Federal or Provincial *Species at Risk Acts*. No plant species of conservation concern are expected to be present within the previously developed Project site boundaries of the proposed processing facility. However, the possibility does exist that plant species of conservation concern do inhabit undeveloped adjacent properties and nearby natural area; in particular, the nearby wetlands, waterbodies and riparian areas.

5.9 Avifauna

A desktop review of available data was used determine if species at risk or conservation concern are presently using the Project area. The databases used for this review include the following:

- ACCDC Rare Taxa Report (Appendix B)
- Maritime Breeding Bird Atlas (Square 20NS21)
- Ebird.org

5.9.1 Avifauna Desktop Study

Bird habitat in the area of the Project site primarily consists of agricultural fields and residential properties. Other habitat in the immediate area includes small patches of discontinuous forested land, hedgerows between agricultural fields and some small, nearby wetlands. Larger, continuous tracts of forested land are located approximately 750m north of the Project site.

16 bird species of conservation concern were identified in the ACCDC Rare taxa (Appendix B), of which only the Canada Warbler (Threatened) is listed pursuant the Federal *Species at Risk Act*. While the habitat available to birds in the immediate vicinity of the Project site may be used by some migratory birds for both nesting and feeding, these areas would not be considered critical habitat. It is likely that some of the species identified by the ACCDC Rare Taxa Report (Appendix B)

currently make use of the adjacent agricultural fields, (i.e., bobolink and killdeer), however it is not anticipated that the proposed activities will negatively impact these species.

5.10 Land Use

The Project site is zoned as per Brudenell Official Plan & Development Bylaws (2006) as Agricultural or A1. Brudenell has been described as a community consisting of approximately 5000 acres of rolling farm fields with 52% forest cover. It is located east of the Town of Montague and 40 km from Charlottetown. The processing facility is located along the south end of the property, above Central street, but water discharged-to-land can be at the mid to north sections of the property, extending east and west, and to the south-east forest covered section of the property. The land use in the Brudenell vicinity of the Project is a mixture of residential, agricultural, and commercial properties. The closest resident to the proposed Proponent property is located approximately 20 m from the site on the north western edge of the property, greater than 300 m from the processing facility buildings.

The Project site is located directly adjacent to agricultural and residential properties, but mainly agricultural. One public road (Central Street) cuts through the south section and turns north, dividing the property east-west prior to intersecting with Provincial Route 319 which runs along the north property line

It is important to take into consideration the proximity to the Town of Montague. The Project site is located a distance of 150-250 m from the town line of Montague, along the west side of the Project property. A forest-covered area and a freshwater stream, Vesseys Creek, separate this area of Brudenell from the Town of Montague. The areas of Montague closest in proximity to the Project site are zoned as Residential and Waterfront Development properties. However within 300-400 m, there are Central Business District zoned properties which house restaurants, banking, and shopping to the local area.

5.11 Socio-economic Environment

5.11.1 Population Profile

In determining the population profile, the communities of Brudenell and surrounding areas and Montague will be evaluated as they are anticipated to be impacted the greatest by the Project in comparison to other communities in the area. The population of Brudenell and surrounding areas was 798 in 2011, a decrease of 3% since the 2006 census. The population of Montague was 1900 in 2011, an increase of 4.9% since the 2006 census.

In Prince Edward Island, outside of international and interprovincial immigration, population growth is at risk due to similar birth and death rates and high rates of outmigration. Towns and more population centres are anticipated to benefit from immigration as well as the anticipated change from a more rural lifestyle to urban, as can be seen by the increase in population in Montague.

The median age in Brudenell and surrounding area and Montague is 46 and 47 respectively (2001 Census). In Brudenell, there is a higher percentage of retirement age residents (> 65 years) at 17% of the total population than that of Montague at 6.3%. The Provincial median age is 43.7. Since 1971, the median age has risen by 18.9 years, from 24.8 to 43.7.

5.11.2 Economic Profile

Economically, the Project is anticipated to positively affect the communities nearby and in the Province by increasing employment by about 300 positions. The Project jobs will be either seasonal or fulltime in the Processing, Manufacturing and Utilities sector in Prince Edward Island. The occupations in Processing, Manufacturing and Utilities led the way in employment increases in 2015, increasing by 800 jobs or 30.8 per cent.

With job creation, economic growth and job creation should affect local businesses as well. Job creation is desperately needed in Prince Edward Island based on the Labour Force Surveys conducted by the Province. As high unemployment rates continue, it brings with it the risk of continually reducing the population of the labour-force age group, increasing the rate of retirement versus that of workers entering the labour force. In Montague and Brudenell, the labour force age was 55% and 65% of the respectively populations. Local employment rates are unknown, but provincial statistics are available.

Based on the PEI 2015 Labour Force Survey Annual Report, employment declined by 1.1 per cent in 2015, averaging 73,200:

- PEI's unemployment rate averaged 10.4% in 2015, down 0.2 percentage points from 2014.
- Total labour force averaged 81,700 persons, a decrease of 1.3% from 2014.
- Total unemployed persons on PEI averaged 8,500 in 2015, a 3.4% decrease.
- Notable employment gains were seen in Accommodation and Food Services (9.1%) Public Administration (5.7%) and Manufacturing (7.1%).
- Notable losses occurred in Construction (-10.3%), Educational Services (-5.7%), and Agriculture (-13.5%).
- Average weekly wages have increased 38.2% since 2005, slightly higher than the national average of 31.2%.
- In 2015 national employment increased by 144,400, or 0.8%, over 2014. The national unemployment rate averaged 6.9%.

5.12 Archaeological and Heritage Resources

According to the Historic Places of PEI mapping tool, there are no historical or archaeologically significant sites on the Project property. There are numerous heritage sites within 1 km of the Project property but they are located in Montague, upstream of the Project. In Brudenell, there is one historical site, an old schoolhouse, but it is located about 2 km north of the Project. The closest heritage site to the Project is a historical railway turntable in Montague, located on a the Confederation Trail along the Montague River, upstream and about 280 m south-west of the Project property. Both sites are listed below with location details.

1. Confederation Trail
Montague
Also called: Former PEI Railway Turntable
Construction Date: circa 1908
Latitude: 46.16660
Longitude: -62.64330

2. 415 Brudenell Point Road - Route 319
Brudenell
Also called: Former Brudenell School
Construction Date: 1863
Latitude: 46.19120
Longitude: -62.62942

CHAPTER 6 ENVIRONMENTAL ASSESSMENT

6.1 Environmental Assessment Methods

The assessment of environmental effects of a project requires a clear understanding and description of all project components and activities, and the environment as it exists prior to undertaking the project. The remaining steps in undertaking the evaluation of a proposed project's environmental effects involve:

- Scoping the assessment: identifying interactions between project activities and the existing environment; establishing parameters against which to measure potential effects;
- Assessing Project-related effects: describing mechanisms by which project/environment could result in an environmental effect; proposing measures to mitigate adverse effects and enhance positive effects; and predicting whether, following the application of mitigation measures, significant adverse environmental effects may result;
- Establishing follow-up and/or monitoring programs.

6.1.1 Project-Environment Interactions

A project can only result in an environmental effect where a linkage or pathway exists between a project component or activity (identified in Chapter 2) and the receiving environment (described in Chapter 5). Identifying these project/environment interactions and focusing the assessment on those issues of greatest potential impact and concern is accomplished through scoping of the assessment (Sadar, 1994), a mechanism to support meaningful and effective evaluation of environmental effects accomplished by:

- Identifying potential interactions between the Project and the physical, ecological and socio-economic environments; and
- Determining which project/environment interactions will be carried forward through the assessment as Valued Ecosystem Components (VECs).

6.1.2 Valued Environmental Components

Environmental assessments generally follow the method originally proposed by Beanlands and Duinker (1983), whereby the assessment focuses on those components that have the greatest potential for environmental effects and which, should they be altered by the project, would be of concern or interest to stakeholders (e.g., regulators, scientists, special interest groups, and/or members of the public). VECs can include both biophysical and human environments, and are

selected based on consideration of factors such as regulatory guidelines and legislative requirement; regulatory and stakeholder direction and consultation; field reconnaissance; professional judgment; and vulnerability of the potential VEC to project effects. Each VEC is subject to spatial boundaries (probable geographical extent of the environmental effects) and temporal boundaries (timing and duration of the environmental effects). Temporal boundaries for VECs may include one or more of the identified Project phases. Spatial boundaries are VEC-dependent but generally include the Project footprint, its immediate environs, and an area potentially affected by the undertaking. This report aims to determine the significance of environmental effects to the evaluated VECs associated with improvements and operation of the Seafood Processing Facility.

6.1.3 Mitigation Measures, Residual Effects and Significance Determination

Mitigation considers temporal or spatial procedures or changes that can be incorporated into the project, or means by which project construction, operation or decommissioning activities can limit or correct project-related effects. It is the environmental effects following the application of proposed mitigation measures (i.e., residual effects) for which a significance determination is made regarding whether, following the application of mitigation measures, the effect is likely to be of a significant nature.

6.1.4 Follow-up and Monitoring

Follow-up and monitoring, in some cases developed in conjunction with regulators, may be recommended to assess effectiveness of measures implemented to mitigate adverse environmental effects.

6.2 Scope of Assessment

6.2.1 Scope of Factors to be Considered

This assessment is being completed to satisfy part of the provincial environmental impact assessment pursuant to the *Environmental Protection Act*. The assessment includes consideration of the following factors:

- The environmental effects of the Project, including the environmental effects of accidental events or malfunctions that may occur in connection with the Project, and cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out;
- Measures that are technically and economically feasible and that would mitigate any significant Project-related adverse environmental effects;
- Significance determination of residual environmental effects (i.e., following the application of mitigation); and
- Any other matter relevant to the assessment, such as the need for the project (Section 2.2), alternatives to the project (Section 2.3), and effects of the environment on the project (Section 7.2).

6.2.2 Scope of Projects

Project components and associated activities are outlined in Chapter 2 and summarized below in Table 6.1. Accidental events and malfunctions (Section 7.1) and potential effects of the environment on the Project (Section 7.2) have been assessed for the Project.

Table 6.1: Project Components and Activities

Project Phase	Project Activity
Construction	Construction of screening building
	Installation of irrigation piping
	Locating and disabling domestic overflow line
Operation	General Machinery Operation
	Storm water discharge (including crab rinse and cooling water)
	Process waste water treatment and irrigation
Maintenance	Standard building, site and equipment maintenance
Decommissioning	Removal of aboveground infrastructure

6.3 Project-Environment Interactions

The following details the results of the assessment of interactions between the Project activities described in Chapter 2 and summarized above, and environmental components determined through a review of the existing environment as detailed in Chapter 5. Potential Project/ environment interactions are identified in Table 6.2 below, which also details the nature of the potential interaction between the Project activity and environmental components. A number representing the degree of potential effect to each Project/environment interaction is assigned, whereby:

- 0 = no interaction occurs between project activities and the environment;
- 1 = interaction occurs between project activities and the environment; however, based on professional judgment and past experience, the interaction would either not result in a significant effect, even without mitigation, or would not be significant due to project design elements that have inherently mitigated the potential effect; and
- 2 = interaction occurs between project activities and the environment that requires further assessment.

Table 6.2: Project/Environmental Component Interaction Matrix

Project Phase	Project Activity	Soil Quality	Groundwater Quality/Quantity	Water Quality/Quantity	Vegetation/Wetlands	Fish and Fish Habitat	Avifauna	Land Use	Socio-economic Environment	Archaeological, Cultural and Paleontological Resources
Construction	Construction of screening building	0	0	0	0	0	0	0	1	0
	Installation of irrigation piping	1	0	0	0	0	0	0	0	0
	Locating and disabling domestic overflow line	1	0	0	0	0	0	0	0	0
Operation	General Machinery Operation	0	0	0	0	0	0	0	1	0
	Storm water discharge (including crab rinse and cooling water)	0	0	1	1	1	0	0	0	0
	Process waste water treatment and irrigation	1	1	0	1	0	1	0	1	0
Maintenance	Standard building, site and equipment maintenance	0	0	0	0	0	0	0	0	0
Decommissioning	Removal of aboveground infrastructure	1	0	0	0	0	0	0	1	0

'0' = no project/environment interaction; '1' = interaction occurs however would not result in significant effect (even without mitigation) or project design elements have mitigated potential adverse effect; '2' = potential effect to be assessed.

6.3.1 No Interaction Between Project Activity and Environmental Component ('0')

Project activities are not anticipated to interact with land use or archaeological, cultural or paleontological resources.

6.3.2 No Significant Interaction Between Project Activity and Environmental Component ('1')

Based on professional judgment and past experience, the interactions between Project activities and the following environmental components are not anticipated to result in significant adverse effects, even without mitigation, and/or due to Project design elements that have inherently mitigated the potential effect, as discussed in the sub-sections below:

- Soil quality;
- Groundwater quality and quantity;
- Water quality / quantity;
- Vegetation/Wetlands;
- Fish and Fish habitat; and
- Avifauna.

6.3.2.1 SOIL QUALITY/ GROUNDWATER QUALITY AND QUANTITY

Project activities are not anticipated to result in significant adverse effects to soil quality and groundwater quality and quantity. During construction, there will be minimal digging. If contaminated soil is encountered during the excavation it will be properly managed and disposed of, as necessary, at an approved facility.

The process waste water spray system is designed to apply loads at a rate to not saturate the ground or effect groundwater. A monitoring plan will be required during operations that will periodically measure parameters in the holding tank. This plan will be linked to the Approval to Operate and will track plant performance. A proposed monitoring plan is included in Appendix C.

The spray application is also weather dependent. During periods of precipitation or frozen ground, spraying will stop.

6.3.2.2 GROUNDWATER QUALITY / QUANTITY

Project activities are not anticipated to result in significant adverse effects to groundwater quality. Design of the spray system, described in Chapter 2 includes consideration for application loads and times that will not adversely impact groundwater.

6.3.2.3 WATER QUALITY / QUANTITY AND FISH AND FISH HABITAT

Project activities are not anticipated to result in significant adverse effects to water quality and fish/fish habitat. The only discharge to the natural aquatic environment is storm water, cooling water and crab rinse water, all of which are similar to the general Town storm water system that discharges to the environment. A water monitoring plan will be required during operations that will periodically measure parameters in the discharge stream. This plan will be linked to the Approval to Operate and will track plant performance. A proposed monitoring plan is included in Appendix C.

It is possible, however, that an accidental event or malfunction, such as a hazardous materials spill, could result in adverse effects to water quality, as discussed in Section 7.1.1.

6.3.2.4 AVIFAUNA

Project activities are not anticipated to result in significant adverse effects to terrestrial mammals and birds even without mitigation. There are minimal construction activities and process operations are not anticipated to have any impact.

6.3.2.5 WETLANDS/VEGETATION

Project activities are not anticipated to result in significant adverse effects to wetlands and vegetation, even without mitigation. The vegetation of the land based disposal areas are largely anthropogenic in origin and not anticipated to contain rare species, so effects of irrigation are expected to be benign. Wetlands, being generally aligned with the aquatic environment of the area, and are expected to be largely unaffected, as their hydrological inputs will remain essentially unaltered (refer to water quality/quantity and fish and fish habitat VEC above).

6.3.2.6 SOCIO-ECONOMIC ENVIRONMENT

The approval of the surrounding community is imperative for the success of this facility. As noted in Chapter 2, operation of the facility will employ 300 full time employees, which is a positive effect of the project. Based on the historical operation of the facility, odour is likely a major concern of the neighboring community. The Project includes improvements and modifications to the process waste water treatment system so that an ozone system will be used to eliminate odour issues.

6.3.3 *Interaction Requiring Further Assessment ('2')*

Interactions that may occur between Project activities and those environmental components identified in Table 6.3 require further assessment. Upon completion of the assessment, there were no valued environmental components that were determined to be significant.

CHAPTER 7 EFFECTS OF ACCIDENTAL EVENTS / MALFUNCTIONS AND ENVIRONMENT ON PROJECT

7.1 Accidental Events and Malfunctions

Accidental events and malfunctions are unplanned events with a low probability for occurrence. Although unlikely, an accidental event or malfunction can cause significant adverse environmental effects and have the potential to affect all environmental components identified in Table 6.2. This section details the potential adverse environmental effects associated with accidents and malfunctions during construction phase activities and provides mitigation measures to reduce potential impacts. This section details the proposed environmental protection measures that will be implemented to reduce the likelihood of occurrence and to limit potential adverse effects should an accidental event or malfunction occur.

7.1.1 Hazardous Materials Spills

Project activities could result in a hazardous material spill. Fuel storage, refuelling and the operation of vehicles and construction equipment have the potential to be involved in a hazardous material spill. Hazardous material spills have the potential to adversely affect air quality, soil quality, and water quality and could pose risks to human health and safety. Such events could also result in the alteration of terrestrial and aquatic habitat and the direct mortality of wildlife. A hazardous material spill has the potential to cause significant adverse environmental effects depending the size and location of the spill. The likelihood and significance of the environmental effects associated with a hazardous material spill can be reduced with the application of appropriate mitigation measures.

7.1.1.1 MITIGATION MEASURES

The construction contractor will be required to include an Emergency Response Plan as part of the site-specific Environmental Protection Plan. The Emergency Response Plan will include, but not be limited to, the following mitigation measures to minimize the likelihood of, and contingency measures to minimize effects in the event of, a hazardous material spill:

- Description of the handling and storage procedures for hazardous materials in use;
- Detailed description of spill prevention, containment and clean-up equipment to be kept on site and include, at a minimum:
 - Absorbent materials for immediate response in the event of a spill or leak;
 - Adequate personal protective equipment (e.g., face masks, gloves, protective suits); and

- Suitable equipment to contain and gather contaminants (e.g., open-ended barrels, shovels, bags, buckets, rakes, tarps, floating booms).
- Location of on-site spill response equipment, in an easy to access area close to the Project activities;
- Spill response procedures including, but not limited to, the following:
 - Stop work;
 - Adhere to health and safety policy procedures;
 - Stop further discharge and contain spill if safe to do so;
 - Attempt to ventilate area if necessary;
 - Initiate clean-up if safe/feasible to do so (dependent on material type and quantity of spill);
 - Remain at the site at a safe distance and wait for response crew; and
 - Report spill of any quantity to owner or owner’s designate and appropriate regulatory authorities.
- Communication and response procedures to be implemented in the event of a hazardous material spill:
 - Hazardous material spills in an outdoor terrestrial environment shall be reported to the joint federal/provincial environmental emergencies contact centre (1-800-565-1633); and
 - All spills or releases of a potentially deleterious substance entering fresh or marine waters frequented by fish must also be reported to the joint federal/provincial environmental emergencies contact centre (1-800-565-1633).

7.1.2 Transportation-Related Accidents

Accidents and malfunctions of vehicles, vessels and construction equipment have the potential to adversely affect the Project and the environment, and could pose human health and safety risks. Accidents and malfunction can cause the release of fuels, oils and lubricants. Accidents leading to the release of hazardous materials, including impacted sediment and soil, could result in contamination of soil, groundwater, terrestrial habitat and aquatic habitat.

7.1.2.1 MITIGATION MEASURES

The construction contractor will be required to include an Emergency Response Plan as part of the site-specific Environmental Protection Plan. The Emergency Response Plan will include, but not be limited to the following mitigation measures, to minimize the likelihood of, and contingency measures, to minimize effects in the event of, a transportation accident:

- Accident, collision and malfunction response procedures;
- Vehicles will travel at speeds no greater than posted speed limits and will reduce speeds during inclement weather conditions; and
- Spill response procedures in the event of an accident during the transportation of impacted soil.

Communication and response procedures to be implemented in the event of a transportation accident or malfunction include:

- In the event of an emergency, PEI Emergency Services will be contacted immediately (911);
- The Department of Natural Resources will be contacted in the event of a collision with wildlife; and

- Hazardous material communication procedures will be implemented in the event of a hazardous material spill resulting from a transportation accident.

7.1.3 Fires

Project activities could result in fires and explosions; although unlikely to occur, fires and explosions have the potential to adversely affect air quality and soil quality and could pose risks to human health and safety. Such events could also result in terrestrial habitat alteration and the direct mortality of wildlife. Firefighting chemicals and spilled materials could enter aquatic habitat and adversely affect biota and habitat. Sustained fire events and those that lead to explosions may cause significant adverse environmental impacts.

Construction activities could potentially cause a fire, and fuel storage, buildings, mechanical shops, construction equipment and vehicles all have the potential to be involved in a fire. The contractor's Emergency Response Plan will include fire prevention and response procedures to be implemented during construction activities.

7.1.3.1 MITIGATION MEASURES

The construction contractor will be required to include an Emergency Response Plan as part of the site-specific Environmental Protection Plan. The Emergency Response Plan will include, but not be limited to the following mitigation measures, to minimize the likelihood of, and contingency measures, to minimize effects in the event of, a fire:

- Fire response procedures;
- Flammable waste will be disposed in an appropriate manner;
- Fire prevention and response training will be provided for all on-site personnel; and
- Firefighting equipment, sufficient to mitigate on-site fire hazards, will be maintained in proper operating condition and to the manufacturer's / National Fire Protection Association standards.
- Communication and response procedures to be implemented in the event of a fire:
 - Local Fire Department will be contacted immediately (911); and
 - All nearby personnel will be notified immediately.

7.1.4 Extreme Weather Event

Extreme weather events have the potential to adversely affect the Project and could pose risks to human health and safety. Extreme weather events may include high wind, heavy rainfall or snowfall, extreme cold, lightning and fog. Severe weather could cause failure of sediment containment and catchment basins, thereby releasing contaminants and adversely impacting water quality, aquatic habitat and terrestrial habitat. Extreme weather will also affect driving/navigating conditions and increase the likelihood of vehicle and vessel accidents. The likelihood and significance of the environmental effects associated with a potential extreme weather event can be reduced with the application of the following mitigations.

7.1.4.1 MITIGATION MEASURES

The construction contractor will be required to include an Emergency Response Plan as part of the site-specific Environmental Protection Plan. The Emergency Response Plan will include, but not be

limited to the following mitigation measures, to minimize the likelihood of, and contingency measures, to minimize effects in the event of, weather events:

- Weather conditions will be assessed on a daily basis to determine the potential risk of extreme weather on the Project;
- Work will be scheduled to avoid extreme weather events; and
- The Project site will be secured during periods of extreme weather.

7.2 Effects of the Environment on the Project

Environmental events which could potentially have an adverse effect on the Project and Project activities include: Extreme weather events, fire and flooding. Some of the identified environmental events have influenced the design of the structures for the proposed Project.

7.2.1 Effects Assessment Boundaries

The effects assessment of the Effects of the Environment is subject to the spatial and temporal limitations described below.

7.2.1.1 SPATIAL BOUNDARIES

The spatial boundary of the assessment of impacts for Effects of the Environment is limited to the Project footprint.

7.2.1.2 TEMPORAL BOUNDARIES

The temporal boundary of the assessment of impacts for Effects of the Environment includes the construction and operational phases of the proposed Project. Some environmental events such as flooding, fire and extreme weather events could adversely impact the Project schedule, especially during the construction phase, but such events are likely to be of short duration.

7.2.2 Potential Environmental Effects

Environmental events which have the potential to cause adverse effects to the construction and operational phases of the Project include:

- Extreme weather;
- Fire;
- Wave action; and
- Flooding.

7.2.2.1 EXTREME WEATHER

Extreme weather includes events such as severe thunderstorms, tornados, high winds and hurricanes. During construction, these events could delay construction or damage equipment and materials being used during construction. During operation, any of these events has the potential to cause damage to the facilities which could delay shipments and/or Project activities to be temporarily shut down.

7.2.2.2 FIRE

Fires could be initiated naturally (e.g., lightning) or by humans. Fires could occur during the construction or operational phase of the Project. During the construction phase, fires could delay construction or damage equipment and materials being used during construction. During the operational phase, a fire could potentially damage the installed facilities, delay shipments and/or cause operation of the Project to be temporarily shut down.

7.2.2.3 FLOODING

Flooding can be caused by events such as heavy rain fall, storm surges and extreme high tides (usually in combination with flooding or storm surges). Flooding could occur during any of the Project phases. Flooding could delay construction activities occurring in the Project area. During operations, flooding could cause parts of the Project area to be temporarily underwater.

7.2.3 *Mitigation and Residual Environmental Effects*

Potential adverse effects of environmental events can be minimized with the application of appropriate mitigation measures.

An Emergency Response Plan for construction will be prepared by the contractor and will include response protocol during extreme weather and environmental events, such as ceasing work activities during extreme weather events, referring to weather forecasts regularly, and taking measures to protect certain equipment and infrastructure from anticipated severe weather.

Mitigation measures to prevent the risk of fires in the Project area include the following:

- During construction and operation have a fire response plan and protocol in place to ensure fires are reported immediately and that an efficient emergency response is activated; and
- Install lightning rods on buildings when deemed appropriate.

7.2.4 *Significance Criteria*

An adverse significant residual effect with respect to Effects of the Environment would be a catastrophic event that causes long-term damage to facilities or long-term disruption of day-to-day operations.

7.2.5 *Significance Determination*

With the implementation of mitigation measures, the identified environmental events are not anticipated to pose a significant adverse effect on the Project, as most of the identified events would only cause repairable damages and temporary delays in construction or operation. However, even with the implementation of mitigation measures, some rare environmental events have the potential to cause significant residual effects to the Project, although the likelihood of occurrence is considered very low:

- Catastrophic, uncontrollable fires; and
- Hurricanes or tornadoes with high wind speeds (e.g., hurricanes Category 2 [154-177 km/h] to Category 5 [252 km/h+] and tornadoes F1 [138–177km/h] to F5 [322km/hr+]).

7.3 Effects Assessment Summary

It was determined that with the application of appropriate mitigation measures, the project will not have any significant effects on the environment, either positive or adverse.

CHAPTER 8 REFERENCES

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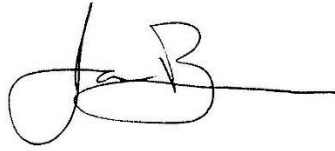
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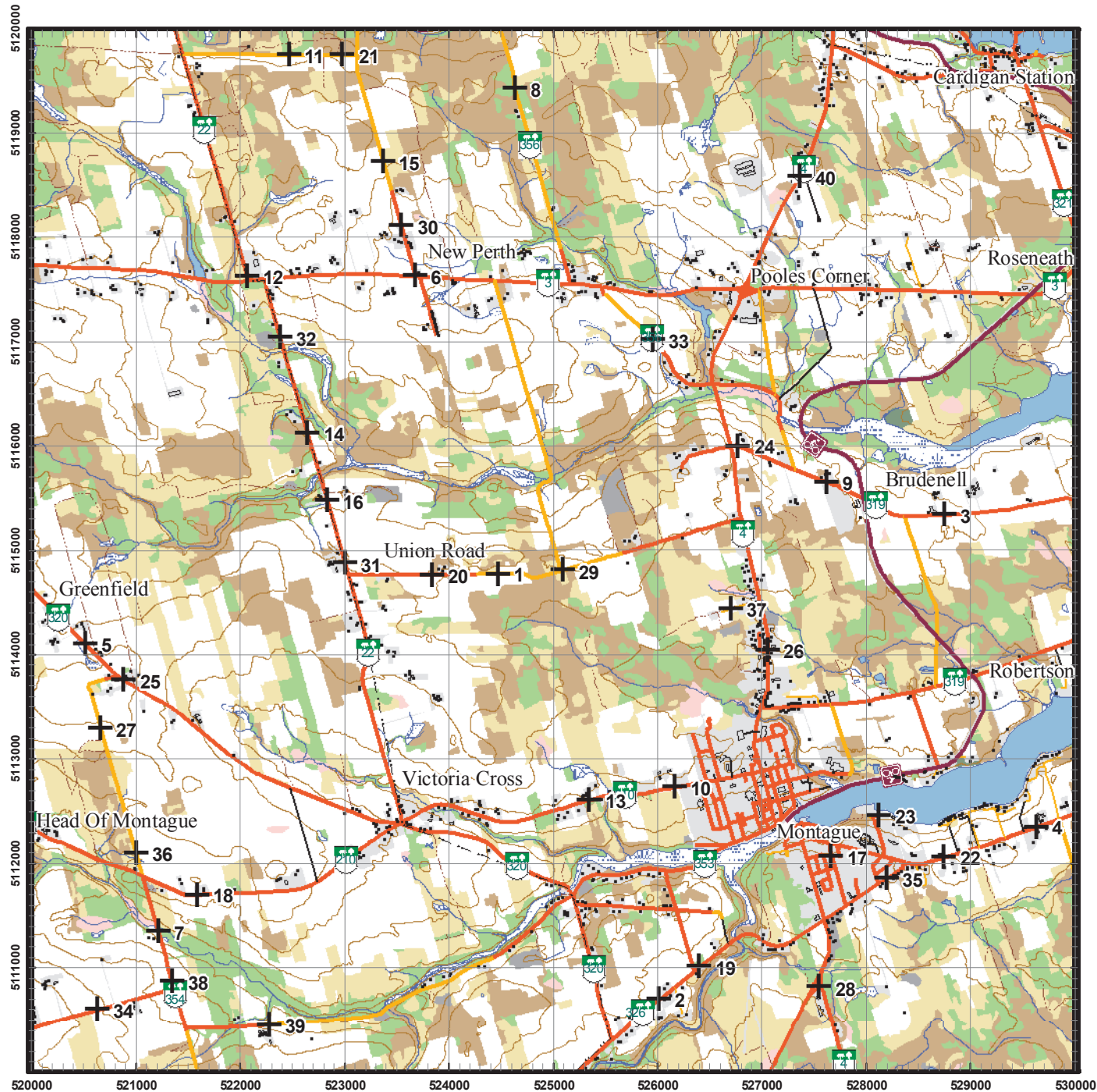


Reviewed by:
Ian Bryson, M.Sc.
Senior Environmental Lead

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APPENDIX A

Maritime Bird Mapping

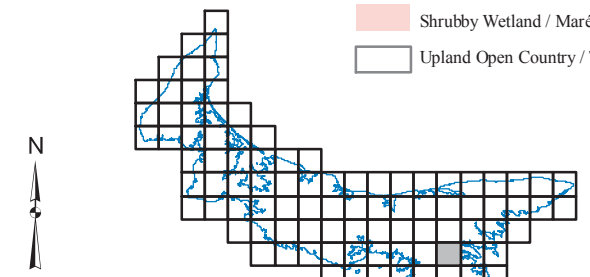


Maritimes Breeding Bird Atlas 2006 - 2010 Atlas des Oiseaux Nicheurs des Maritimes

TERRAIN POINT	ABSCISSE EASTING	ORDONNÉE NORTHING
1	524469	5114775
2	526012	5110710
3	528743	5115346
4	529626	5112355
5	520514	5114109
6	523677	5117633
7	521214	5111354
8	524628	5119421
9	527615	5115658
10	526159	5112734
11	522464	5119748
12	522063	5117628
13	525343	5112613
14	522642	5116125
15	523366	5118723
16	522829	5115481
17	527659	5112076
18	521584	5111706
19	526396	5111019
20	523834	5114769
21	522978	5119747
22	528740	5112068
23	528118	5112461
24	526769	5116004
25	520884	5113756
26	527051	5114049
27	520659	5113301
28	527544	5110821
29	525087	5114811
30	523540	5118114
31	523002	5114878
32	522379	5117041
33	525950	5117021
34	520628	5110608
35	528187	5111865
36	521001	5112107
37	526694	5114443
38	521345	5110878
39	522276	5110463
40	527357	5118579

Legend Légende

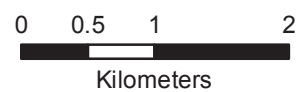
+	— Private - Paved / Route revêtue (privée)
○	— Private - Unpaved / Route non revêtue (privée)
⊞	— Public - Unpaved / Route non revêtue (publique)
•	— Public - Paved / Route revêtue (publique)
□	■ Sand Dune / Dune de sable
—	■ Open Water / Eaux libres
⊞	■ Young Forest / Jeune forêt
—	■ Mature Coniferous / Forêt de conifères mature
—	■ Mature Deciduous / Forêt de feuillus mature
—	■ Mature Pine / Forêt de pins mature
—	■ Open Wetland / Marécage
	■ Other / Autre
	■ Gravel Pit / Gravière
	■ Shrubby Wetland / Marécage arbustif
	□ Upland Open Country / Terrain sec dégagé



Atlas Square / Carré UTM: 20NS21
Region / Région: 27 Montague

North American Datum 1983
 Universal Transverse Mercator projection
 Zone 20, Central Meridian 63 degrees W.
 Grid Interval 1000 metres
 Contour Interval 10 metres

Projection universel transverse de Mercator (UTM), Zone 20
 Système de référence nord-américain de 1983
 Équidistance des quadrillage 1000 mètres
 Équidistance des courbes 10 mètres



This map is not intended for legal description or to calculate exact land dimensions.
 La présente carte n'est pas destinée à être utilisée à des fins de descriptions officielles ou de calculs exacts de dimensions de terres.



APPENDIX B

ACCDC Data Report



DATA REPORT 5532: Montague, PE

Prepared 15 March 2016
by J. Churchill, Data Manager

CONTENTS OF REPORT

1.0 Preface

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

2.0 Rare and Endangered Species

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

3.0 Special Areas

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

4.0 Rare Species Lists

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

5.0 Rare Species within 100 km

- 5.1 Source Bibliography



Map 1. A 100 km buffer around the study area

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (ACCDC) 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 ACCDC 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 ACCDC is supported by 6 federal agencies and 4 provincial governments, as well as through outside grants and data processing fees. URL: www.ACCDC.com.

Upon request and for a fee, the ACCDC 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 ACCDC includes locations of managed areas with some level of protection, and known sites of ecological interest or sensitivity.

1.1 DATA LIST

Included datasets:

Filename	Contents
MontaguePE_5532ob.xls	All Rare and legally protected <i>Flora and Fauna</i> within 5 km of your study area
MontaguePE_5532ob100km.xls	A list of Rare and legally protected <i>Flora and Fauna</i> within 100 km of your study area
MontaguePE_5532ma.xls	All <i>Managed Areas</i> in your study area
MontaguePE_5532ff.xls	Rare and common <i>Freshwater Fish</i> in your study area (DFO database)

1.2 RESTRICTIONS

The ACCDC 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 ACCDC 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 ACCDC 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) ACCDC 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) ACCDC 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 ACCDC data response.

1.3 ADDITIONAL INFORMATION

The attached file DataDictionary 2.1.pdf provides metadata for the data provided.

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

Plants, Lichens, Ranking Methods, All other Inquiries

Sean Blaney, Senior Scientist, Executive Director

Tel: (506) 364-2658

sblaney@mta.ca

Animals (Fauna)

John Klymko, Zoologist

Tel: (506) 364-2660

jklymko@mta.ca

Plant Communities

Sarah Robinson, Community Ecologist

Tel: (506) 364-2664

srobinson@mta.ca

Data Management, GIS

James Churchill, Data Manager

Tel: (902) 679-6146

jlchurchill@mta.ca

Billing

Jean Breau

Tel: (506) 364-2657

jrbreau@mta.ca

Questions on the biology of Federal Species at Risk can be directed to ACCDC: (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 Stewart Lusk, Natural Resources: (506) 453-7110.

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 Sherman Boates, NSDNR: (902) 679-6146. To determine if location-sensitive species (section 4.3) occur near your study site please contact a NSDNR Regional Biologist:

Western: Duncan Bayne

(902) 648-3536

baynedz@gov.ns.ca

Western: Donald Sam

(902) 634-7525

samdx@gov.ns.ca

Central: Shavonne Meyer

(902) 893-6353

meyersj@gov.ns.ca

Central: Kimberly George

(902) 893-5630

georgeka@gov.ns.ca

Eastern: Mark Pulsifer

(902) 863-7523

pulsifmd@gov.ns.ca

Eastern: Donald Anderson

(902) 295-3949

andersdg@gov.ns.ca

Eastern: Terry Power

(902) 563-3370

powertd@gov.ns.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.

3.0 SPECIAL AREAS

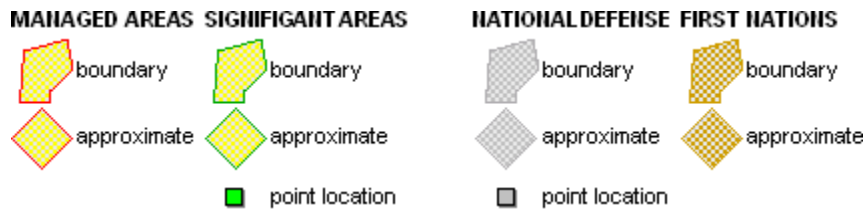
3.1 MANAGED AREAS

The GIS scan identified 4 managed areas in the vicinity of the study area (Map 3 and attached file: *ma*.xls).

3.2 SIGNIFICANT AREAS

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

Map 3: Boundaries and/or locations of known Managed and Significant Areas within 5 km of the study area.



4.0 RARE SPECIES LISTS

Rare and/or endangered taxa (excluding “location-sensitive” species, section 4.3) within the 5 km-buffered area listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (\pm the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files *ob.xls/*ob.shp only.

4.1 FLORA

	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	<i>Pseudognaphalium obtusifolium</i>	Eastern Cudweed				S1	2 May Be At Risk	1	4.2 \pm 1.0
P	<i>Carex comosa</i>	Bearded Sedge				S1	2 May Be At Risk	1	4.5 \pm 0.0
P	<i>Pseudognaphalium macounii</i>	Macoun's Cudweed				S2	2 May Be At Risk	1	4.2 \pm 1.0
P	<i>Rudbeckia laciniata</i>	Cut-Leaved Coneflower				S2	2 May Be At Risk	1	1.2 \pm 3.0
P	<i>Limosella australis</i>	Southern Mudwort				S2	3 Sensitive	2	0.7 \pm 3.0
P	<i>Botrychium matricariifolium</i>	Daisy-leaved Moonwort				S2	2 May Be At Risk	1	0.7 \pm 5.0
P	<i>Betula papyrifera var. cordifolia</i>	Heart-leaved Birch				S2?	5 Undetermined	1	3.3 \pm 6.0
P	<i>Juncus canadensis</i>	Canada Rush				S2?	3 Sensitive	1	4.5 \pm 0.0
P	<i>Spiranthes romanzoffiana</i>	Hooded Ladies'-Tresses				S2S3	3 Sensitive	1	2.9 \pm 5.0
P	<i>Platanthera clavellata</i>	Club Spur Orchid				S3	3 Sensitive	1	4.7 \pm 5.0
P	<i>Botrychium virginianum</i>	Rattlesnake Fern				S3	4 Secure	1	1.6 \pm 5.0
P	<i>Amelanchier laevis</i>	Smooth Serviceberry				S3?	5 Undetermined	1	1.7 \pm 5.0
P	<i>Juniperus communis var. depressa</i>	Common Juniper				S3?	5 Undetermined	2	2.2 \pm 5.0
P	<i>Lycopodium tristachyum</i>	Blue Groundcedar				S3?	3 Sensitive	1	3.2 \pm 0.0
P	<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn				S3S4	4 Secure	1	3.9 \pm 5.0
P	<i>Juncus nodosus</i>	Knotted Rush				S3S4	4 Secure	1	4.5 \pm 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>Hirundo rustica</i>	Barn Swallow	Threatened			S3B	3 Sensitive	6	3.4 \pm 7.0
A	<i>Wilsonia canadensis</i>	Canada Warbler	Threatened	Threatened		S3B	1 At Risk	1	3.4 \pm 7.0
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened			S3B	3 Sensitive	4	3.4 \pm 7.0
A	<i>Riparia riparia</i>	Bank Swallow	Threatened			S4B	4 Secure	2	3.4 \pm 7.0
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern			S4B	4 Secure	2	3.4 \pm 7.0
A	<i>Icterus galbula</i>	Baltimore Oriole				S2B	3 Sensitive	1	3.4 \pm 7.0
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak				S2B,S4N	3 Sensitive	3	3.4 \pm 7.0
A	<i>Anas acuta</i>	Northern Pintail				S3B	4 Secure	3	3.4 \pm 7.0
A	<i>Charadrius vociferus</i>	Killdeer				S3B	3 Sensitive	3	3.4 \pm 7.0
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3B	3 Sensitive	2	3.4 \pm 7.0
A	<i>Vermivora peregrina</i>	Tennessee Warbler				S3B	3 Sensitive	1	3.4 \pm 7.0
A	<i>Dendroica castanea</i>	Bay-breasted Warbler				S3B	3 Sensitive	1	3.4 \pm 7.0
A	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak				S3B	3 Sensitive	1	3.4 \pm 7.0
A	<i>Anas discors</i>	Blue-winged Teal				S3S4B	4 Secure	5	3.4 \pm 7.0
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B	3 Sensitive	3	3.4 \pm 7.0
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B	3 Sensitive	2	3.4 \pm 7.0
I	<i>Danaus plexippus</i>	Monarch	Special Concern	Special Concern		S1B	1 At Risk	1	0.8 \pm 0.0
I	<i>Satyrrium acadica</i>	Acadian Hairstreak				S1	2 May Be At Risk	2	2.4 \pm 5.0
I	<i>Speyeria aphrodite</i>	Aphrodite Fritillary				S1	2 May Be At Risk	2	2.4 \pm 5.0
I	<i>Gomphus spicatus</i>	Dusky Clubtail				S2	2 May Be At Risk	1	4.7 \pm 0.0
I	<i>Ancyloxypha numitor</i>	Least Skipper				S3	3 Sensitive	1	3.9 \pm 0.0
I	<i>Cordulegaster maculata</i>	Twin-Spotted Spiketail				S3	3 Sensitive	2	3.8 \pm 1.0
I	<i>Somatochlora elongata</i>	Ski-Tailed Emerald				S3	4 Secure	1	3.8 \pm 1.0
I	<i>Sympetrum semicinctum</i>	Band-Winged Meadowhawk				S3	3 Sensitive	1	4.7 \pm 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 a 5 km buffer of your study area are indicated below with “YES”.

Prince Edward Island

Scientific Name	Common Name	SARA	Prov Legal Prot	Known within 5 km of Study Site?
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Na

4.4 SOURCE BIBLIOGRAPHY

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

# recs	CITATION
27	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
13	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs.
10	Catling, P.M., Erskine, D.S. & MacLaren, R.B. 1985. The Plants of Prince Edward Island with new records, nomenclatural changes & corrections & deletions, 1st Ed. Research Branch, Agriculture Canada, Ottawa, Publication 1798. 22pp.
5	Brunelle, P.-M. (compiler). 2009. ADIP/MDDS Odonata Database: data to 2006 inclusive. Atlantic Dragonfly Inventory Program (ADIP), 24200 recs.
4	Speers, L. 2001. Butterflies of Canada database. Agriculture & Agri-Food Canada, Biological Resources Program, Ottawa, 190 recs.
3	Stevens, C. 1999. Cam Stevens field data from PEI vegetation plots. Sent along with specimens to C.S. Blaney. UNB masters research project, 732 recs.
2	Atlantic Canada Conservation Area Database (ARCAD)
2	Erskine, D. 1960. The plants of Prince Edward Island, 1st Ed. Research Branch, Agriculture Canada, Ottawa., Publication 1088. 1238 recs.
2	Guignon, D. et al. 2010. Distribution & Abundance of Salmonids in PEI Streams. NE.Nat. 17(2):313ff.
1	Glen, W. 1991. 1991 Prince Edward Island Forest Biomass Inventory Data. PEI Dept of Energy and Forestry, 10059 recs.
1	Harding, R.W. 2008. Harding Personal Insect Collection 1999-2007. R.W. Harding, 309 recs.
1	Layberry, R.A. 2012. Lepidopteran records for the Maritimes, 1974-2008. Layberry Collection, 1060 recs.
1	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014.
1	NSDNR website
1	PEI Fish & Wildlife. 1999
1	Roland, A.E. & Smith, E.C. 1969. The Flora of Nova Scotia, 1st Ed. Nova Scotia Museum, Halifax, 743pp.

5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 14377 records of 76 vertebrate and 862 records of 61 invertebrate fauna; 7031 records of 363 vascular, 244 records of 74 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. All ranks correspond to the province in which the study site falls, even for out-of-province records. Taxa are listed in order of concern, beginning with legally listed taxa, with the number of observations per taxon and the distance in kilometers from study area centroid to the closest observation (\pm the precision, in km, of the record).

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
A	<i>Myotis lucifugus</i>	Little Brown Myotis	Endangered	Endangered		S1	1 At Risk	69	0.7 \pm 0.0	PE
A	<i>Myotis septentrionalis</i>	Northern Long-eared Myotis	Endangered	Endangered		S1	1 At Risk	99	0.7 \pm 0.0	PE
A	<i>Charadrius melodus melodus</i>	Piping Plover melodus ssp	Endangered	Endangered		S1B	1 At Risk	2960	13.9 \pm 0.0	PE
A	<i>Calidris canutus rufa</i>	Red Knot rufa ssp	Endangered			S2N	1 At Risk	426	27.9 \pm 0.0	PE
A	<i>Chordeiles minor</i>	Common Nighthawk	Threatened	Threatened		S1B	1 At Risk	117	12.4 \pm 7.0	PE
A	<i>Contopus cooperi</i>	Olive-sided Flycatcher	Threatened	Threatened		S3B	1 At Risk	508	10.8 \pm 7.0	PE
A	<i>Hirundo rustica</i>	Barn Swallow	Threatened			S3B	3 Sensitive	583	3.4 \pm 7.0	PE
A	<i>Wilsonia canadensis</i>	Canada Warbler	Threatened	Threatened		S3B	1 At Risk	329	3.4 \pm 7.0	PE
A	<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened			S3B	3 Sensitive	579	3.4 \pm 7.0	PE
A	<i>Riparia riparia</i>	Bank Swallow	Threatened			S4B	4 Secure	436	3.4 \pm 7.0	PE
A	<i>Anguilla rostrata</i>	American Eel	Threatened			S4S5	4 Secure	1	67.6 \pm 0.0	PE
A	<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened		SHB,SNAN	8 Accidental	69	42.7 \pm 7.0	PE
A	<i>Catharus bicknelli</i>	Bicknell's Thrush	Threatened	Special Concern		SUB	8 Accidental	1	96.8 \pm 7.0	NS
A	<i>Caprimulgus vociferus</i>	Whip-Poor-Will	Threatened	Threatened		SXB	8 Accidental	5	41.8 \pm 0.0	PE
A	<i>Asio flammeus</i>	Short-eared Owl	Special Concern	Special Concern		S1S2B	3 Sensitive	13	12.4 \pm 7.0	PE
A	<i>Euphagus carolinus</i>	Rusty Blackbird	Special Concern	Special Concern		S2B	3 Sensitive	107	7.6 \pm 7.0	PE
A	<i>Bucephala islandica</i> (Eastern pop.)	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern		S2N	3 Sensitive	5	16.9 \pm 0.0	PE
A	<i>Contopus virens</i>	Eastern Wood-Pewee	Special Concern			S4B	4 Secure	478	3.4 \pm 7.0	PE
A	<i>Falco peregrinus pop. 1</i>	Peregrine Falcon - anatum/tundrius	Special Concern	Special Concern		SNA	4 Secure	4	37.7 \pm 0.0	PE
A	<i>Tryngites subruficollis</i>	Buff-breasted Sandpiper	Special Concern			SNA	4 Secure	2	71.9 \pm 0.0	PE
A	<i>Phalaropus lobatus</i>	Red-necked Phalarope	Special Concern			SNA	4 Secure	11	49.7 \pm 0.0	PE
A	<i>Phocoena phocoena</i> (NW Atlantic pop.)	Harbour Porpoise - Northwest Atlantic pop.	Special Concern	Threatened		SNR		1	25.5 \pm 5.0	PE
A	<i>Ammodramus savannarum pratensis</i>	Grasshopper Sparrow, pratensis subspecies	Special Concern					1	48.9 \pm 1.0	PE
A	<i>Lithobates palustris</i>	Pickerel Frog	Not At Risk			S1	2 May Be At Risk	63	14.7 \pm 0.0	PE
A	<i>Sialia sialis</i>	Eastern Bluebird	Not At Risk			S1?B	8 Accidental	23	39.5 \pm 7.0	PE
A	<i>Fulica americana</i>	American Coot	Not At Risk			S1B	4 Secure	15	12.4 \pm 7.0	PE
A	<i>Gavia immer</i>	Common Loon	Not At Risk			S1B,S4N	4 Secure	218	11.1 \pm 14.0	PE
A	<i>Sterna hirundo</i>	Common Tern	Not At Risk			S2B	2 May Be At Risk	427	14.1 \pm 7.0	PE
A	<i>Buteo jamaicensis</i>	Red-tailed Hawk	Not At Risk			S3B	4 Secure	239	8.4 \pm 7.0	PE
A	<i>Picoides dorsalis</i>	American Three-toed Woodpecker				S1	3 Sensitive	13	39.5 \pm 7.0	PE
A	<i>Dryocopus pileatus</i>	Pileated Woodpecker				S1	3 Sensitive	255	15.0 \pm 7.0	PE
A	<i>Sitta carolinensis</i>	White-breasted Nuthatch				S1	2 May Be At Risk	44	8.4 \pm 7.0	PE
A	<i>Sorex palustris</i>	American Water Shrew				S1?	4 Secure	4	9.8 \pm 0.0	PE
A	<i>Buteo platypterus</i>	Broad-winged Hawk				S1?B	4 Secure	72	15.0 \pm 7.0	PE
A	<i>Wilsonia pusilla</i>	Wilson's Warbler				S1?B	4 Secure	26	15.0 \pm 7.0	PE
A	<i>Pinicola enucleator</i>	Pine Grosbeak				S1?B,S4N	4 Secure	38	15.0 \pm 7.0	PE
A	<i>Oxyura jamaicensis</i>	Ruddy Duck				S1B	4 Secure	10	25.5 \pm 7.0	PE
A	<i>Bartramia longicauda</i>	Upland Sandpiper				S1B	3 Sensitive	10	14.1 \pm 7.0	PE
A	<i>Sterna paradisaea</i>	Arctic Tern				S1B	2 May Be At Risk	37	30.4 \pm 0.0	PE
A	<i>Lophodytes cucullatus</i>	Hooded Merganser				S1B,S4M	4 Secure	119	12.2 \pm 0.0	PE

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				S1B,S5N	4 Secure	39	19.1 ± 0.0	PE
A	<i>Vireo philadelphicus</i>	Philadelphia Vireo				S1S2B	3 Sensitive	33	7.6 ± 7.0	PE
A	<i>Pooecetes gramineus</i>	Vesper Sparrow				S1S2B	2 May Be At Risk	33	15.0 ± 7.0	PE
A	<i>Eremophila alpestris</i>	Horned Lark				S1S2B,S4N	4 Secure	5	15.0 ± 7.0	PE
A	<i>Loxia curvirostra</i>	Red Crossbill				S1S2B,SNAN	5 Undetermined	39	39.5 ± 7.0	PE
A	<i>Asio otus</i>	Long-eared Owl				S2	3 Sensitive	30	10.8 ± 7.0	PE
A	<i>Picoides arcticus</i>	Black-backed Woodpecker				S2	3 Sensitive	67	14.1 ± 7.0	PE
A	<i>Phalacrocorax carbo</i>	Great Cormorant				S2B	2 May Be At Risk	203	17.5 ± 0.0	PE
A	<i>Rallus limicola</i>	Virginia Rail				S2B	3 Sensitive	34	12.4 ± 7.0	PE
A	<i>Cepphus grylle</i>	Black Guillemot				S2B	4 Secure	87	17.8 ± 10.0	PE
A	<i>Mimus polyglottos</i>	Northern Mockingbird				S2B	4 Secure	37	17.5 ± 7.0	PE
A	<i>Icterus galbula</i>	Baltimore Oriole				S2B	3 Sensitive	40	3.4 ± 7.0	PE
A	<i>Coccothraustes vespertinus</i>	Evening Grosbeak				S2B,S4N	3 Sensitive	267	3.4 ± 7.0	PE
A	<i>Mergus serrator</i>	Red-breasted Merganser				S2B,S5N	4 Secure	75	7.6 ± 7.0	PE
A	<i>Calidris maritima</i>	Purple Sandpiper				S2N	4 Secure	14	36.7 ± 0.0	PE
A	<i>Salmo salar</i>	Atlantic Salmon				S2S3	3 Sensitive	40	17.4 ± 50.0	PE
A	<i>Sorex hoyi</i>	American Pygmy Shrew				S2S3	4 Secure	3	8.0 ± 5.0	PE
A	<i>Carduelis pinus</i>	Pine Siskin				S2S3B,S4N	4 Secure	189	12.9 ± 7.0	PE
A	<i>Perisoreus canadensis</i>	Gray Jay				S3	4 Secure	190	7.6 ± 7.0	PE
A	<i>Pluvialis dominica</i>	American Golden-Plover				S3?M	4 Secure	130	19.7 ± 0.0	PE
A	<i>Anas acuta</i>	Northern Pintail				S3B	4 Secure	59	3.4 ± 7.0	PE
A	<i>Anas clypeata</i>	Northern Shoveler				S3B	4 Secure	34	25.1 ± 7.0	PE
A	<i>Charadrius vociferus</i>	Killdeer				S3B	3 Sensitive	516	3.4 ± 7.0	PE
A	<i>Tyrannus tyrannus</i>	Eastern Kingbird				S3B	3 Sensitive	252	3.4 ± 7.0	PE
A	<i>Vermivora peregrina</i>	Tennessee Warbler				S3B	3 Sensitive	182	3.4 ± 7.0	PE
A	<i>Dendroica castanea</i>	Bay-breasted Warbler				S3B	3 Sensitive	196	3.4 ± 7.0	PE
A	<i>Seiurus noveboracensis</i>	Northern Waterthrush				S3B	4 Secure	239	7.6 ± 7.0	PE
A	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak				S3B	3 Sensitive	432	3.4 ± 7.0	PE
A	<i>Molothrus ater</i>	Brown-headed Cowbird				S3B	3 Sensitive	122	7.6 ± 7.0	PE
A	<i>Larus argentatus</i>	Herring Gull				S3B,S5N	4 Secure	178	18.5 ± 0.0	PE
A	<i>Anas discors</i>	Blue-winged Teal				S3S4B	4 Secure	333	3.4 ± 7.0	PE
A	<i>Actitis macularius</i>	Spotted Sandpiper				S3S4B	3 Sensitive	643	3.4 ± 7.0	PE
A	<i>Gallinago delicata</i>	Wilson's Snipe				S3S4B	3 Sensitive	424	3.4 ± 7.0	PE
A	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo				S3S4B	4 Secure	74	7.6 ± 7.0	PE
A	<i>Limosa haemastica</i>	Hudsonian Godwit				S3S4M	4 Secure	567	27.0 ± 0.0	PE
A	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow				SHB,SNAN	2 May Be At Risk	154	12.4 ± 7.0	PE
I	<i>Danaus plexippus</i>	Monarch	Special Concern	Special Concern		S1B	1 At Risk	18	0.8 ± 0.0	PE
I	<i>Bombus terricola</i>	Yellow-banded Bumblebee	Special Concern			SNR	3 Sensitive	2	38.6 ± 0.0	PE
I	<i>Satyrium acadica</i>	Acadian Hairstreak				S1	2 May Be At Risk	9	2.4 ± 5.0	PE
I	<i>Satyrium calanus</i>	Banded Hairstreak				S1	5 Undetermined	1	38.1 ± 0.0	PE
I	<i>Callophrys polios</i>	Hoary Elfin				S1	6 Not Assessed	2	11.0 ± 0.0	PE
I	<i>Callophrys henrici</i>	Henry's Elfin				S1	2 May Be At Risk	2	28.0 ± 0.0	PE
I	<i>Callophrys nippon</i>	Eastern Pine Elfin				S1	2 May Be At Risk	1	27.4 ± 1.0	PE
I	<i>Callophrys lanoraieensis</i>	Bog Elfin				S1	2 May Be At Risk	3	19.6 ± 0.0	PE
I	<i>Erora laeta</i>	Early Hairstreak				S1	2 May Be At Risk	1	53.7 ± 0.0	PE
I	<i>Speyeria aphrodite</i>	Aphrodite Fritillary				S1	2 May Be At Risk	10	2.4 ± 5.0	PE
I	<i>Polygonia faunus</i>	Green Comma				S1	2 May Be At Risk	8	31.0 ± 1.0	PE
I	<i>Nymphalis l-album</i>	Compton Tortoiseshell				S1	2 May Be At Risk	5	31.0 ± 1.0	PE
I	<i>Oeneis jutta</i>	Jutta Arctic				S1	2 May Be At Risk	7	19.9 ± 0.0	PE
I	<i>Aeshna subarctica</i>	Subarctic Darner				S1	2 May Be At Risk	7	20.0 ± 0.0	PE
I	<i>Basiaeschna janata</i>	Springtime Darner				S1	2 May Be At Risk	28	13.5 ± 1.0	PE

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
I	<i>Boyeria grafiana</i>	Ocellated Darner				S1	2 May Be At Risk	4	19.6 ± 0.0	PE
I	<i>Boyeria vinosa</i>	Fawn Darner				S1	2 May Be At Risk	13	13.4 ± 1.0	PE
I	<i>Gomphaeschna furcillata</i>	Harlequin Darner				S1	2 May Be At Risk	1	22.8 ± 0.0	PE
I	<i>Dorocordulia lepida</i>	Petite Emerald				S1	2 May Be At Risk	12	20.0 ± 1.0	PE
I	<i>Somatochlora cingulata</i>	Lake Emerald				S1	2 May Be At Risk	3	15.8 ± 0.0	PE
I	<i>Somatochlora forcipata</i>	Forcipate Emerald				S1	2 May Be At Risk	3	13.0 ± 0.0	PE
I	<i>Somatochlora franklini</i>	Delicate Emerald				S1	2 May Be At Risk	6	14.8 ± 1.0	PE
I	<i>Somatochlora kennedyi</i>	Kennedy's Emerald				S1	2 May Be At Risk	2	15.5 ± 1.0	PE
I	<i>Somatochlora minor</i>	Ocellated Emerald				S1	2 May Be At Risk	4	17.6 ± 1.0	PE
I	<i>Celithemis elisa</i>	Calico Pennant				S1	2 May Be At Risk	2	15.8 ± 0.0	PE
I	<i>Leucorrhinia frigida</i>	Frosted Whiteface				S1	2 May Be At Risk	9	15.8 ± 0.0	PE
I	<i>Sympetrum danae</i>	Black Meadowhawk				S1	2 May Be At Risk	5	13.4 ± 1.0	PE
I	<i>Calopteryx maculata</i>	Ebony Jewelwing				S1	2 May Be At Risk	17	19.8 ± 0.0	PE
I	<i>Lestes eurinus</i>	Amber-Winged Spreadwing				S1	2 May Be At Risk	9	20.0 ± 1.0	PE
I	<i>Enallagma minusculum</i>	Little Bluet				S1	2 May Be At Risk	33	15.8 ± 0.0	PE
I	<i>Enallagma aspersum</i>	Azure Bluet				S1	2 May Be At Risk	14	20.0 ± 1.0	PE
I	<i>Satyrium liparops</i>	Striped Hairstreak				S1S2	2 May Be At Risk	4	77.6 ± 1.0	NS
I	<i>Satyrium liparops strigosum</i>	Striped Hairstreak				S1S2		1	38.8 ± 10.0	PE
I	<i>Aglais milberti milberti</i>	Milbert's Tortoise Shell				S1S2		5	21.2 ± 0.0	PE
I	<i>Lycaena dospassosi</i>	Salt Marsh Copper				S2	2 May Be At Risk	57	28.9 ± 0.0	PE
I	<i>Plebejus idas</i>	Northern Blue				S2	4 Secure	8	32.9 ± 0.0	PE
I	<i>Plebejus idas empetri</i>	Crowberry Blue				S2	6 Not Assessed	11	23.2 ± 1.0	PE
I	<i>Polygonia satyrus</i>	Satyr Comma				S2	2 May Be At Risk	5	15.8 ± 0.0	PE
I	<i>Polygonia progne</i>	Grey Comma				S2	2 May Be At Risk	15	31.0 ± 1.0	PE
I	<i>Gomphus spicatus</i>	Dusky Clubtail				S2	2 May Be At Risk	24	4.7 ± 0.0	PE
I	<i>Somatochlora incurvata</i>	Incurvate Emerald				S2	2 May Be At Risk	6	17.9 ± 0.0	PE
I	<i>Leucorrhinia glacialis</i>	Crimson-Ringed Whiteface				S2	3 Sensitive	29	13.4 ± 1.0	PE
I	<i>Chromagrion conditum</i>	Aurora Damsel				S2	2 May Be At Risk	10	20.8 ± 1.0	PE
I	<i>Pantala flavescens</i>	Wandering Glider				S2B	2 May Be At Risk	3	31.2 ± 1.0	PE
I	<i>Feniseca tarquinius</i>	Harvester				S2S3	2 May Be At Risk	6	20.5 ± 1.0	PE
I	<i>Ancyloxypha numitor</i>	Least Skipper				S3	3 Sensitive	43	3.9 ± 0.0	PE
I	<i>Euphyes vestris</i>	Dun Skipper				S3	3 Sensitive	36	12.1 ± 0.0	PE
I	<i>Pieris oleracea</i>	Mustard White				S3	3 Sensitive	48	8.3 ± 0.0	PE
I	<i>Lycaena hyllus</i>	Bronze Copper				S3	3 Sensitive	13	22.4 ± 0.0	PE
I	<i>Cordulegaster maculata</i>	Twin-Spotted Spiketail				S3	3 Sensitive	36	3.8 ± 1.0	PE
I	<i>Aeshna eremita</i>	Lake Darner				S3	4 Secure	36	7.6 ± 1.0	PE
I	<i>Dorocordulia libera</i>	Racket-Tailed Emerald				S3	3 Sensitive	26	7.5 ± 0.0	PE
I	<i>Epitheca spinigera</i>	Spiny Baskettail				S3	3 Sensitive	14	17.6 ± 1.0	PE
I	<i>Somatochlora elongata</i>	Ski-Tailed Emerald				S3	4 Secure	16	3.8 ± 1.0	PE
I	<i>Somatochlora walshii</i>	Brush-Tipped Emerald				S3	4 Secure	18	7.9 ± 0.0	PE
I	<i>Somatochlora williamsoni</i>	Williamson's Emerald				S3	4 Secure	13	26.6 ± 0.0	PE
I	<i>Sympetrum semicinctum</i>	Band-Winged Meadowhawk				S3	3 Sensitive	20	4.7 ± 0.0	PE
I	<i>Nehalennia gracilis</i>	Sphagnum Sprite				S3	3 Sensitive	34	5.7 ± 1.0	PE
I	<i>Colias eurytheme</i>	Orange Sulphur				S3B	8 Accidental	16	17.7 ± 10.0	PE
I	<i>Polygonia interrogationis</i>	Question Mark				S3B	8 Accidental	35	11.2 ± 0.0	PE
I	<i>Nymphalis antiopa</i>	Mourning Cloak				S3S4	3 Sensitive	33	24.1 ± 0.0	PE
N	<i>Bryhnia graminicolor</i>	a Moss				S1	2 May Be At Risk	1	13.7 ± 0.0	PE
N	<i>Dicranum</i>	Condensed Broom Moss				S1	2 May Be At Risk	1	47.2 ± 0.0	PE

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
N	<i>condensatum</i> <i>Ditrichum</i>	a Moss				S1	2 May Be At Risk	1	23.2 ± 0.0	PE
N	<i>rhynchostegium</i> <i>Gymnostomum</i>	Tufted Rock Beardless Moss				S1	2 May Be At Risk	5	41.7 ± 0.0	PE
N	<i>aeruginosum</i> <i>Tetradontium</i>	Little Georgia				S1	2 May Be At Risk	1	41.7 ± 0.0	PE
N	<i>brownianum</i> <i>Campyllum</i>	a Moss				S1?	2 May Be At Risk	1	51.2 ± 0.0	PE
N	<i>polygamum</i> <i>Dicranum</i>	Bonjean's Broom Moss				S1?	5 Undetermined	3	28.3 ± 0.0	PE
N	<i>bonjeanii</i> <i>Dicranum</i>	a <i>Dicranum</i> Moss				S1?	5 Undetermined	1	46.9 ± 1.0	PE
N	<i>leioneuron</i> <i>Fontinalis</i>	a Moss				S1?	5 Undetermined	2	15.4 ± 0.0	PE
N	<i>antipyretica</i> <i>var. gigantea</i> <i>Hygrohypnum</i>	Claw Brook Moss				S1?	2 May Be At Risk	1	60.7 ± 0.0	PE
N	<i>ochraceum</i> <i>Pohlia</i>	a Moss				S1?	5 Undetermined	2	11.3 ± 0.0	PE
N	<i>filum</i> <i>Sphagnum</i>	a Peatmoss				S1?	5 Undetermined	1	46.9 ± 1.0	PE
N	<i>flavicomans</i> <i>Sphagnum</i>	Soft Peat Moss				S1?	2 May Be At Risk	1	46.9 ± 1.0	PE
N	<i>tenellum</i> <i>Tetraphis</i>	Geniculate Four-tooth Moss				S1?	5 Undetermined	1	51.2 ± 0.0	PE
N	<i>geniculata</i> <i>Schistidium</i>	Radiate Bloom Moss				S1?	2 May Be At Risk	5	44.6 ± 0.0	PE
N	<i>apocarpum</i> <i>Bryoria</i>	Wire Horsehair Lichen				S1?	2 May Be At Risk	1	30.3 ± 0.0	PE
N	<i>glabra</i> <i>Bryoria</i>	Smooth Horsehair Lichen				S1?	2 May Be At Risk	4	30.4 ± 0.0	PE
N	<i>salazinic</i> <i>Anomodon</i>	Slender <i>Anomodon</i> Moss				S1S2	2 May Be At Risk	3	39.1 ± 0.0	PE
N	<i>attenuatus</i> <i>Atrichum</i>	Slender Smoothcap Moss				S1S2	5 Undetermined	2	16.5 ± 0.0	PE
N	<i>tenellum</i> <i>Aulacomnium</i>	Little Groove Moss				S1S2	5 Undetermined	3	41.7 ± 0.0	PE
N	<i>androgynum</i> <i>Brachythecium</i>	Long-capsuled Ragged Moss				S1S2	2 May Be At Risk	3	42.6 ± 0.0	PE
N	<i>oxycladon</i> <i>Campyllum</i>	Golden Creeping Moss				S1S2	2 May Be At Risk	7	11.3 ± 0.0	PE
N	<i>chrysophyllum</i> <i>Campylostelium</i>	a Moss				S1S2	2 May Be At Risk	3	41.7 ± 0.0	PE
N	<i>saxicola</i> <i>Dicranum</i>	Spurred Broom Moss				S1S2	5 Undetermined	6	53.6 ± 0.0	PE
N	<i>spurium</i> <i>Orthotrichum</i>	a Moss				S1S2	5 Undetermined	2	13.7 ± 0.0	PE
N	<i>stellatum</i> <i>Platydictya</i>	Bark Willow Moss				S1S2	2 May Be At Risk	2	53.2 ± 95.0	PE
N	<i>subtilis</i> <i>Polytrichum</i>	Bank Haircap Moss				S1S2	5 Undetermined	1	53.6 ± 0.0	PE
N	<i>formosum</i> <i>Pterigynandrum</i>	Capillary Wing Moss				S1S2	5 Undetermined	4	53.6 ± 0.0	PE
N	<i>filiforme</i> <i>Pseudotaxiphyllum</i>	Elegant Silk Moss				S1S2	2 May Be At Risk	2	41.7 ± 0.0	PE
N	<i>elegans</i> <i>Schistidium</i>	River Bloom Moss				S1S2	2 May Be At Risk	2	22.4 ± 0.0	PE
N	<i>rivulare</i> <i>Hypnum</i>	Cypress-leaved Plait Moss				S1S3	5 Undetermined	4	41.7 ± 0.0	PE
N	<i>cupressiforme</i> <i>Atrichum</i>	a Moss				S2?	5 Undetermined	3	11.3 ± 0.0	PE
N	<i>crispum</i> <i>Brachythecium</i>	Whitish Ragged Moss				S2?	4 Secure	4	42.8 ± 0.0	PE
N	<i>albicans</i> <i>Brachythecium</i>	Rusty Ragged Moss				S2?	3 Sensitive	5	44.4 ± 0.0	PE
N	<i>plumosum</i> <i>Buxbaumia</i>	Brown Shield Moss				S2?	5 Undetermined	3	11.3 ± 0.0	PE
N	<i>aphylla</i> <i>Calliergon</i>	Giant Spear Moss				S2?	3 Sensitive	1	13.5 ± 2.0	PE
N	<i>giganteum</i> <i>Leucodon</i>	a Moss				S2?	5 Undetermined	4	39.1 ± 0.0	PE
N	<i>andrewsianus</i> <i>Paraleucobryum</i>	Long-leaved Notchleaf Moss				S2?	3 Sensitive	5	41.7 ± 0.0	PE
N	<i>longifolium</i> <i>Pseudobryum</i>	River Thyme Moss				S2?	3 Sensitive	1	51.2 ± 0.0	PE
N	<i>cinclidioides</i> <i>Evermia</i>	Valley Oakmoss Lichen				S2?	3 Sensitive	1	52.4 ± 4.0	PE
N	<i>prunastri</i> <i>Amblystegium</i>	Willow Feather Moss				S2S3	5 Undetermined	3	13.7 ± 0.0	PE
N	<i>varium</i> <i>Brachythecium</i>	Matted Ragged Moss				S2S3	3 Sensitive	7	16.5 ± 0.0	PE

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N	<i>populeum</i> <i>Brachythecium oedipodium</i>	Short-leaved Ragged Moss				S2S3	4 Secure	1	66.9 ± 0.0	PE
N	<i>Dichodontium pellucidum</i>	Transparent Fork Moss				S2S3	3 Sensitive	7	16.5 ± 0.0	PE
N	<i>Dicranella subulata</i>	Awl-leaved Forklet Moss				S2S3	5 Undetermined	3	11.3 ± 0.0	PE
N	<i>Fissidens bryoides</i>	Lesser Pocket Moss				S2S3	5 Undetermined	3	41.7 ± 0.0	PE
N	<i>Heterocladium dimorphum</i>	Dimorphous Tangle Moss				S2S3	5 Undetermined	3	18.0 ± 2.0	PE
N	<i>Hygroamblystegium tenax</i>	Fountain Feather Moss				S2S3	3 Sensitive	7	13.7 ± 0.0	PE
N	<i>Lobaria scrobiculata</i>	Textured Lungwort Lichen				S2S3	3 Sensitive	2	52.4 ± 4.0	PE
N	<i>Calliergonella cuspidata</i>	Common Large Wetland Moss				S2S4	5 Undetermined	3	90.8 ± 2.0	NS
N	<i>Dicranum viride</i>	Green Broom Moss				S2S4	5 Undetermined	6	48.1 ± 1.0	PE
N	<i>Dicranum ontariense</i>	Ontario Broom Moss				S2S4	5 Undetermined	2	41.7 ± 0.0	PE
N	<i>Leptodictyum riparium</i>	Kneiff's Feather Moss				S2S4	5 Undetermined	7	16.5 ± 0.0	PE
N	<i>Mnium spinulosum</i>	a Moss				S2S4	5 Undetermined	3	41.7 ± 0.0	PE
N	<i>Oncophorus wahlenbergii</i>	Wahlenberg's Spur Moss				S2S4	5 Undetermined	5	11.3 ± 0.0	PE
N	<i>Plagiothecium cavifolium</i>	Round Silk Moss				S2S4	5 Undetermined	1	13.7 ± 0.0	PE
N	<i>Pogonatum pensilvanicum</i>	a Moss				S2S4	5 Undetermined	5	13.5 ± 2.0	PE
N	<i>Polytrichum ohioense</i>	Ohio Haircap Moss				S2S4	5 Undetermined	2	53.6 ± 0.0	PE
N	<i>Pylaisiella polyantha</i>	Many-flowered Leskea Moss				S2S4	5 Undetermined	5	44.6 ± 0.0	PE
N	<i>Sphagnum capillifolium</i>	Northern Peatmoss				S2S4	5 Undetermined	3	20.6 ± 0.0	PE
N	<i>Sphagnum compactum</i>	Compact Peat Moss				S2S4	5 Undetermined	2	20.6 ± 0.0	PE
N	<i>Sphagnum cuspidatum</i>	Feathery Peat Moss				S2S4	5 Undetermined	6	9.9 ± 0.0	PE
N	<i>Sphagnum russowii</i>	Russow's Peat Moss				S2S4	5 Undetermined	5	9.9 ± 0.0	PE
N	<i>Trematodon ambiguus</i>	a Moss				S2S4	5 Undetermined	4	13.5 ± 2.0	PE
N	<i>Plagiomnium ciliare</i>	Toothed Leafy Moss				S2S4	5 Undetermined	2	53.6 ± 0.0	PE
N	<i>Plagiomnium medium</i>	Common Leafy Moss				S2S4	5 Undetermined	7	13.5 ± 2.0	PE
N	<i>Rhizomnium punctatum</i>	Dotted Leafy Moss				S2S4	5 Undetermined	7	13.5 ± 2.0	PE
N	<i>Rhizomnium appalachianum</i>	Appalachian Leafy Moss				S2S4	5 Undetermined	5	13.5 ± 2.0	PE
N	<i>Diphyscium foliosum</i>	a Moss				S3S4	5 Undetermined	3	39.1 ± 0.0	PE
N	<i>Leptobryum pyriforme</i>	Golden Thread Moss				S3S4	4 Secure	5	41.7 ± 0.0	PE
N	<i>Leucobryum glaucum</i>	White Pincushion Moss				S3S4	4 Secure	7	53.6 ± 0.0	PE
N	<i>Orthotrichum obtusifolium</i>	Blunt-leaved Bristle Moss				S3S4	4 Secure	5	44.4 ± 0.0	PE
N	<i>Pogonatum urnigerum</i>	Urn Hair Moss				S3S4	4 Secure	4	11.3 ± 0.0	PE
N	<i>Hypnum fauriei</i>	a Moss				SH	5 Undetermined	1	58.4 ± 3.0	PE
P	<i>Symphotrichum laurentianum</i>	Gulf of St Lawrence Aster	Threatened	Threatened		S1	1 At Risk	71	37.5 ± 0.0	PE
P	<i>Lechea maritima</i> var. <i>subcylindrica</i>	Beach Pinweed	Special Concern			S1	2 May Be At Risk	41	40.3 ± 0.0	PE
P	<i>Angelica lucida</i>	Seaside Angelica				S1	2 May Be At Risk	13	25.4 ± 0.0	PE
P	<i>Conioselinum chinense</i>	Chinese Hemlock-parsley				S1	2 May Be At Risk	1	73.4 ± 5.0	NS
P	<i>Osmorhiza longistylis</i>	Smooth Sweet Cicely				S1	2 May Be At Risk	18	32.0 ± 1.0	PE
P	<i>Asclepias incarnata</i>	Swamp Milkweed				S1	2 May Be At Risk	10	12.2 ± 1.0	PE
P	<i>Antennaria howellii</i> ssp. <i>canadensis</i>	Howell's Pussytoes				S1	2 May Be At Risk	1	8.6 ± 1.0	PE
P	<i>Symphotrichum subulatum</i> (non-Bathurst pop)	Annual Saltmarsh Aster				S1	2 May Be At Risk	15	17.6 ± 0.0	PE

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P	<i>Erigeron annuus</i>	Annual Fleabane				S1	5 Undetermined	20	21.9 ± 0.0	PE
P	<i>Erigeron philadelphicus</i>	Philadelphia Fleabane				S1	2 May Be At Risk	3	43.0 ± 0.0	PE
P	<i>Pseudognaphalium obtusifolium</i>	Eastern Cudweed				S1	2 May Be At Risk	8	4.2 ± 1.0	PE
P	<i>Hieracium umbellatum</i>	Umbellate Hawkweed				S1	3 Sensitive	3	18.8 ± 5.0	PE
P	<i>Packera schweinitziana</i>	Schweinitz's Groundsel				S1	2 May Be At Risk	24	17.0 ± 0.0	PE
P	<i>Solidago altissima</i>	Tall Goldenrod				S1	2 May Be At Risk	2	29.2 ± 0.0	PE
P	<i>Solidago juncea</i>	Early Goldenrod				S1	2 May Be At Risk	32	5.5 ± 1.0	PE
P	<i>Solidago macrophylla</i>	Large-leaved Goldenrod				S1	2 May Be At Risk	13	48.8 ± 0.0	PE
P	<i>Ostrya virginiana</i>	Ironwood				S1	2 May Be At Risk	35	59.9 ± 1.0	NS
P	<i>Cardamine diphylla</i>	Two-leaved Toothwort				S1	2 May Be At Risk	15	22.0 ± 0.0	PE
P	<i>Cardamine maxima</i>	Large Toothwort				S1	2 May Be At Risk	2	99.1 ± 0.0	PE
P	<i>Campanula rotundifolia</i>	Common Harebell				S1	5 Undetermined	9	51.4 ± 0.0	PE
P	<i>Lobelia dortmanna</i>	Water Lobelia				S1	2 May Be At Risk	11	16.1 ± 1.0	PE
P	<i>Stellaria humifusa</i>	Saltmarsh Starwort				S1	2 May Be At Risk	5	36.2 ± 5.0	PE
P	<i>Chenopodium rubrum</i>	Red Pigweed				S1	2 May Be At Risk	7	17.8 ± 0.0	PE
P	<i>Hudsonia ericoides</i>	Pinebarren Golden Heather				S1	2 May Be At Risk	12	31.3 ± 25.0	PE
P	<i>Hypericum ellipticum</i>	Pale St John's-Wort				S1	2 May Be At Risk	18	31.3 ± 1.0	PE
P	<i>Hypericum mutilum</i>	Dwarf St John's-wort				S1	2 May Be At Risk	14	20.2 ± 0.0	PE
P	<i>Cornus rugosa</i>	Round-leaved Dogwood				S1	2 May Be At Risk	20	31.0 ± 0.0	PE
P	<i>Crassula aquatica</i>	Water Pygmyweed				S1	2 May Be At Risk	6	28.0 ± 5.0	PE
P	<i>Drosera intermedia</i>	Spoon-Leaved Sundew				S1	2 May Be At Risk	10	28.0 ± 5.0	PE
P	<i>Elatine minima</i>	Small Waterwort				S1	2 May Be At Risk	8	20.4 ± 0.0	PE
P	<i>Apios americana</i>	American Groundnut				S1	2 May Be At Risk	18	54.1 ± 0.0	NS
P	<i>Dicentra cucullaria</i>	Dutchman's Breeches				S1	2 May Be At Risk	7	65.4 ± 1.0	PE
P	<i>Myriophyllum heterophyllum</i>	Variable-leaved Water Milfoil				S1	5 Undetermined	1	20.3 ± 0.0	PE
P	<i>Myriophyllum tenellum</i>	Slender Water Milfoil				S1	2 May Be At Risk	2	16.2 ± 0.0	PE
P	<i>Myriophyllum quitense</i>	Andean Water Milfoil				S1	5 Undetermined	2	22.0 ± 0.0	PE
P	<i>Hamamelis virginiana</i>	American Witch-Hazel				S1	2 May Be At Risk	12	15.7 ± 0.0	PE
P	<i>Utricularia geminiscapa</i>	Twin-stemmed Bladderwort				S1	2 May Be At Risk	5	27.8 ± 10.0	PE
P	<i>Utricularia macrorhiza</i>	Greater Bladderwort				S1	2 May Be At Risk	31	31.4 ± 0.0	PE
P	<i>Decodon verticillatus</i>	Swamp Loosestrife				S1	2 May Be At Risk	1	33.5 ± 0.0	PE
P	<i>Nuphar lutea ssp. rubrodisca</i>	Red-disked Yellow Pond-lily				S1	2 May Be At Risk	4	65.2 ± 1.0	NS
P	<i>Nymphaea odorata</i>	Fragrant Water-lily				S1	2 May Be At Risk	10	20.0 ± 5.0	PE
P	<i>Orobanche uniflora</i>	One-Flowered Broomrape				S1	2 May Be At Risk	6	23.7 ± 0.0	PE
P	<i>Polygala sanguinea</i>	Blood Milkwort				S1	2 May Be At Risk	11	53.2 ± 7.0	NS
P	<i>Polygonum fowleri</i>	Fowler's Knotweed				S1	5 Undetermined	6	28.0 ± 5.0	PE
P	<i>Polygonum scandens</i>	Climbing False Buckwheat				S1	2 May Be At Risk	30	31.9 ± 0.0	PE
P	<i>Samolus valerandi ssp. parviflorus</i>	Seaside Brookweed				S1	2 May Be At Risk	11	32.2 ± 5.0	PE
P	<i>Anemone canadensis</i>	Canada Anemone				S1	2 May Be At Risk	1	99.5 ± 1.0	NS
P	<i>Ranunculus pensylvanicus</i>	Pennsylvania Buttercup				S1	2 May Be At Risk	3	90.3 ± 0.0	NS
P	<i>Thalictrum venulosum</i>	Northern Meadow-rue				S1	2 May Be At Risk	1	72.8 ± 1.0	PE
P	<i>Amelanchier fernaldii</i>	Fernald's Serviceberry				S1	5 Undetermined	5	30.9 ± 0.0	PE
P	<i>Crataegus holmesiana</i>	Holmes' Hawthorn				S1	5 Undetermined	4	38.9 ± 5.0	PE
P	<i>Dalibarda repens</i>	Dewdrop				S1	2 May Be At Risk	3	31.4 ± 0.0	PE
P	<i>Rubus elegantulus</i>	Showy Blackberry				S1	5 Undetermined	2	17.5 ± 1.0	PE
P	<i>Galium aparine</i>	Common Bedstraw				S1	5 Undetermined	8	58.5 ± 4.0	NS
P	<i>Galium boreale</i>	Northern Bedstraw				S1	2 May Be At Risk	1	31.2 ± 3.0	PE
P	<i>Galium obtusum</i>	Blunt-leaved Bedstraw				S1	2 May Be At Risk	1	91.5 ± 1.0	NB
P	<i>Parnassia palustris var. parviflora</i>	Marsh Grass-of-Parnassus				S1	2 May Be At Risk	9	58.4 ± 1.0	NS

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P	<i>Lindernia dubia</i>	Yellow-seeded False Pimperel				S1	2 May Be At Risk	17	31.3 ± 0.0	PE
P	<i>Laportea canadensis</i>	Canada Wood Nettle				S1	2 May Be At Risk	15	58.6 ± 0.0	NS
P	<i>Pilea pumila</i>	Dwarf Clearweed				S1	3 Sensitive	44	6.6 ± 0.0	PE
P	<i>Verbena hastata</i>	Blue Vervain				S1	2 May Be At Risk	66	56.9 ± 5.0	NS
P	<i>Viola lanceolata</i>	Lance-leaved Violet				S1	2 May Be At Risk	5	45.8 ± 0.0	PE
P	<i>Sagittaria graminea</i>	Grass-leaved Arrowhead				S1	2 May Be At Risk	5	16.1 ± 1.0	PE
P	<i>Carex adusta</i>	Lesser Brown Sedge				S1	2 May Be At Risk	1	92.9 ± 0.0	NS
P	<i>Carex argyrantha</i>	Silvery-flowered Sedge				S1	2 May Be At Risk	2	12.0 ± 5.0	PE
P	<i>Carex bromoides</i>	Bromelike Sedge				S1	2 May Be At Risk	33	16.2 ± 0.0	PE
P	<i>Carex chordorrhiza</i>	Creeping Sedge				S1	2 May Be At Risk	1	35.2 ± 1.0	PE
P	<i>Carex comosa</i>	Bearded Sedge				S1	2 May Be At Risk	1	4.5 ± 0.0	PE
P	<i>Carex cumulata</i>	Dense Sedge				S1	2 May Be At Risk	7	26.5 ± 0.0	PE
P	<i>Carex folliculata</i>	Northern Long Sedge				S1	2 May Be At Risk	10	56.0 ± 2.0	NS
P	<i>Carex haydenii</i>	Hayden's Sedge				S1	2 May Be At Risk	2	53.2 ± 0.0	PE
P	<i>Carex livida</i> var. <i>radicaulis</i>	Livid Sedge				S1	2 May Be At Risk	1	28.4 ± 5.0	PE
P	<i>Carex lurida</i>	Sallow Sedge				S1	2 May Be At Risk	27	21.4 ± 100.0	PE
P	<i>Carex pauciflora</i>	Few-Flowered Sedge				S1	2 May Be At Risk	3	18.4 ± 0.0	PE
P	<i>Carex radiata</i>	Eastern Star Sedge				S1	2 May Be At Risk	19	17.0 ± 0.0	PE
P	<i>Carex rostrata</i>	Narrow-leaved Beaked Sedge				S1	2 May Be At Risk	1	30.2 ± 5.0	PE
P	<i>Carex tenuiflora</i>	Sparse-Flowered Sedge				S1	2 May Be At Risk	3	99.9 ± 0.0	PE
P	<i>Carex tinctoria</i>	Tinged Sedge				S1	2 May Be At Risk	3	58.2 ± 5.0	PE
P	<i>Carex wiegandii</i>	Wiegand's Sedge				S1	2 May Be At Risk	3	17.1 ± 5.0	PE
P	<i>Cladium mariscoides</i>	Smooth Twigrush				S1	2 May Be At Risk	1	99.9 ± 0.0	NS
P	<i>Eleocharis nitida</i>	Quill Spikerush				S1	2 May Be At Risk	1	71.1 ± 5.0	PE
P	<i>Eleocharis</i> <i>quinqueflora</i>	Few-flowered Spikerush				S1	2 May Be At Risk	4	31.8 ± 3.0	PE
P	<i>Eleocharis ovata</i>	Ovate Spikerush				S1	2 May Be At Risk	3	77.7 ± 0.0	NS
P	<i>Trichophorum alpinum</i>	Alpine Clubrush				S1	2 May Be At Risk	3	92.6 ± 0.0	NB
P	<i>Eriophorum gracile</i>	Slender Cottongrass				S1	2 May Be At Risk	4	22.7 ± 5.0	PE
P	<i>Schoenoplectus</i> <i>subterminalis</i>	Water Bulrush				S1	2 May Be At Risk	4	16.1 ± 0.0	PE
P	<i>Eriocaulon aquaticum</i>	White Buttons				S1	2 May Be At Risk	15	16.1 ± 0.0	PE
P	<i>Elodea nuttallii</i>	Nuttall's Waterweed				S1	2 May Be At Risk	2	35.2 ± 1.0	PE
P	<i>Juncus greenii</i>	Greene's Rush				S1	2 May Be At Risk	8	86.4 ± 5.0	NS
P	<i>Juncus militaris</i>	Bayonet Rush				S1	3 Sensitive	12	16.1 ± 5.0	PE
P	<i>Najas flexilis</i>	Slender Naiad				S1	2 May Be At Risk	15	34.9 ± 0.0	PE
P	<i>Goodyera oblongifolia</i>	Menzies' Rattlesnake-plantain				S1	2 May Be At Risk	1	37.0 ± 0.0	PE
P	<i>Listera australis</i>	Southern Twayblade				S1	2 May Be At Risk	2	19.1 ± 0.0	PE
P	<i>Malaxis brachypoda</i>	White Adder's-Mouth				S1	2 May Be At Risk	1	43.7 ± 0.0	PE
P	<i>Platanthera hookeri</i>	Hooker's Orchid				S1	2 May Be At Risk	4	74.0 ± 0.0	NS
P	<i>Spiranthes cernua</i>	Nodding Ladies'-Tresses				S1	2 May Be At Risk	8	7.5 ± 1.0	PE
P	<i>Spiranthes ochroleuca</i>	Yellow Ladies'-tresses				S1	2 May Be At Risk	7	23.9 ± 0.0	PE
P	<i>Alopecurus aequalis</i>	Short-awned Foxtail				S1	2 May Be At Risk	12	36.4 ± 5.0	PE
P	<i>Brachyelytrum</i> <i>septentrionale</i>	Northern Shorthusk				S1	2 May Be At Risk	34	56.0 ± 2.0	NS
P	<i>Catabrosa aquatica</i>	Water Whorl Grass				S1	2 May Be At Risk	6	43.1 ± 0.0	PE
P	<i>Catabrosa aquatica</i> var. <i>laurentiana</i>	Water Whorl Grass				S1	2 May Be At Risk	4	16.9 ± 5.0	PE
P	<i>Danthonia compressa</i>	Flattened Oat Grass				S1	2 May Be At Risk	15	53.4 ± 5.0	PE
P	<i>Deschampsia</i> <i>caespitosa</i>	Tufted Hair Grass				S1	2 May Be At Risk	20	25.8 ± 0.0	PE
P	<i>Elymus virginicus</i>	Virginia Wild Rye				S1	2 May Be At Risk	23	25.8 ± 0.0	PE
P	<i>Glyceria laxa</i>	Northern Mannagrass				S1	2 May Be At Risk	3	65.5 ± 1.0	NS
P	<i>Milium effusum</i> var. <i>cisatlanticum</i>	Tall Millet Grass				S1	2 May Be At Risk	48	63.4 ± 0.0	NS
P	<i>Oryzopsis asperifolia</i>	White-grained Mountain Rice				S1	2 May Be At Risk	30	28.2 ± 5.0	PE

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P	<i>Poa alsodes</i>	Grove Blue Grass				S1	2 May Be At Risk	35	17.0 ± 0.0	PE
P	<i>Schizachne purpurascens</i>	Purple Oat Grass				S1	2 May Be At Risk	9	30.2 ± 5.0	PE
P	<i>Sphenopholis intermedia</i>	Slender Wedge Grass				S1	2 May Be At Risk	46	26.1 ± 0.0	PE
P	<i>Pontederia cordata</i>	Pickerelweed				S1	2 May Be At Risk	8	20.0 ± 5.0	PE
P	<i>Stuckenia filiformis</i>	Thread-leaved Pondweed				S1	2 May Be At Risk	4	16.6 ± 0.0	PE
P	<i>Stuckenia filiformis ssp. alpina</i>	Thread-leaved Pondweed				S1	2 May Be At Risk	5	35.2 ± 1.0	PE
P	<i>Stuckenia filiformis ssp. occidentalis</i>	Thread-leaved Pondweed				S1	2 May Be At Risk	2	39.5 ± 0.0	PE
P	<i>Potamogeton oakesianus</i>	Oakes' Pondweed				S1	2 May Be At Risk	3	27.8 ± 10.0	PE
P	<i>Potamogeton vaseyi</i>	Vasey's Pondweed				S1	2 May Be At Risk	1	17.5 ± 0.0	PE
P	<i>Potamogeton zosteriformis</i>	Flat-stemmed Pondweed				S1	2 May Be At Risk	2	35.7 ± 1.0	PE
P	<i>Sparganium fluctuans</i>	Floating Burreed				S1	2 May Be At Risk	22	14.2 ± 2.0	PE
P	<i>Sparganium natans</i>	Small Burreed				S1	2 May Be At Risk	8	15.8 ± 0.0	PE
P	<i>Cystopteris tenuis</i>	A Bladderfern				S1	2 May Be At Risk	11	59.4 ± 1.0	NS
P	<i>Dryopteris filix-mas</i>	Male Fern				S1	2 May Be At Risk	3	45.3 ± 0.0	PE
P	<i>Polystichum braunii</i>	Braun's Holly Fern				S1	2 May Be At Risk	16	59.4 ± 1.0	NS
P	<i>Equisetum scirpoides</i>	Dwarf Scouring-Rush				S1	2 May Be At Risk	15	28.0 ± 5.0	PE
P	<i>Equisetum variegatum</i>	Variegated Horsetail				S1	2 May Be At Risk	39	70.6 ± 0.0	NS
P	<i>Isoetes lacustris</i>	Lake Quillwort				S1	2 May Be At Risk	8	20.4 ± 0.0	PE
P	<i>Lycopodium sitchense</i>	Sitka Clubmoss				S1	2 May Be At Risk	6	31.5 ± 3.0	PE
P	<i>Botrychium dissectum</i>	Cut-leaved Moonwort				S1	2 May Be At Risk	5	66.4 ± 5.0	NS
P	<i>Botrychium simplex</i>	Least Moonwort				S1	2 May Be At Risk	2	61.2 ± 1.0	NS
P	<i>Ophioglossum pusillum</i>	Northern Adder's-tongue				S1	2 May Be At Risk	7	27.1 ± 0.0	PE
P	<i>Polypodium virginianum</i>	Rock Polypody				S1	2 May Be At Risk	16	59.9 ± 1.0	NS
P	<i>Polypodium appalachianum</i>	Appalachian Polypody				S1	2 May Be At Risk	3	74.0 ± 0.0	NS
P	<i>Suaeda calceoliformis</i>	Horned Sea-blite				S1?	5 Undetermined	18	17.2 ± 5.0	PE
P	<i>Hudsonia tomentosa var. intermedia</i>	Woolly Beach-heath				S1?	5 Undetermined	1	50.9 ± 1.0	PE
P	<i>Hypericum majus</i>	Large St John's-wort				S1?	2 May Be At Risk	3	25.7 ± 0.0	PE
P	<i>Epilobium coloratum</i>	Purple-veined Willowherb				S1?	2 May Be At Risk	3	59.6 ± 1.0	NS
P	<i>Polygonum raii</i>	Sharp-fruited Knotweed				S1?	5 Undetermined	9	40.6 ± 5.0	PE
P	<i>Rumex pallidus</i>	Seabeach Dock				S1?	0.1 Extirpated	3	79.5 ± 0.0	NS
P	<i>Ranunculus recurvatus</i>	Hooked Buttercup				S1?	2 May Be At Risk	16	29.0 ± 5.0	PE
P	<i>Amelanchier canadensis</i>	Canada Serviceberry				S1?	5 Undetermined	26	28.4 ± 5.0	PE
P	<i>Amelanchier stolonifera</i>	Running Serviceberry				S1?	5 Undetermined	13	19.4 ± 1.0	PE
P	<i>Crataegus chrysocarpa</i>	Fireberry Hawthorn				S1?	5 Undetermined	69	24.5 ± 5.0	PE
P	<i>Rubus pensilvanicus</i>	Pennsylvania Blackberry				S1?	5 Undetermined	14	17.1 ± 5.0	PE
P	<i>Euphrasia randii</i>	Rand's Eyebright				S1?	5 Undetermined	3	41.6 ± 5.0	PE
P	<i>Viola sagittata var. ovata</i>	Arrow-Leaved Violet				S1?	0.1 Extirpated	3	31.3 ± 25.0	PE
P	<i>Carex tonsa var. tonsa</i>	Shaved Sedge				S1?	2 May Be At Risk	3	26.6 ± 0.0	PE
P	<i>Scirpus pedicellatus</i>	Stalked Bulrush				S1?	5 Undetermined	2	79.4 ± 0.0	NS
P	<i>Puccinellia americana</i>	Seaside Alkali Grass				S1?	5 Undetermined	5	35.2 ± 5.0	PE
P	<i>Rhus typhina</i>	Staghorn Sumac				S1S2	2 May Be At Risk	35	17.3 ± 5.0	PE
P	<i>Sagina nodosa</i>	Knotted Pearlwort				S1S2	2 May Be At Risk	1	29.2 ± 0.0	PE
P	<i>Sagina nodosa ssp. borealis</i>	Knotted Pearlwort				S1S2	2 May Be At Risk	5	29.6 ± 5.0	PE
P	<i>Atriplex franktonii</i>	Frankton's Saltbush				S1S2	5 Undetermined	8	8.3 ± 5.0	PE

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P	<i>Callitriche hermaphroditica</i>	Northern Water-starwort				S1S2	2 May Be At Risk	9	28.1 ± 0.0	PE
P	<i>Viburnum lantanoides</i>	Hobblebush				S1S2	2 May Be At Risk	22	13.8 ± 0.0	PE
P	<i>Utricularia cornuta</i>	Horned Bladderwort				S1S2	2 May Be At Risk	3	31.1 ± 5.0	PE
P	<i>Rumex maritimus</i> var. <i>fueginus</i>	Tierra del Fuego Dock				S1S2	3 Sensitive	8	31.3 ± 25.0	PE
P	<i>Rumex maritimus</i> var. <i>persicarioides</i>	Peach-leaved Dock				S1S2	3 Sensitive	6	29.6 ± 2.0	PE
P	<i>Claytonia caroliniana</i>	Carolina Spring Beauty				S1S2	2 May Be At Risk	9	19.7 ± 1.0	PE
P	<i>Pyrola chlorantha</i>	Green-flowered Pyrola				S1S2	2 May Be At Risk	4	30.2 ± 0.0	PE
P	<i>Rubus vermontanus</i>	Vermont Blackberry				S1S2	5 Undetermined	10	17.0 ± 3.0	PE
P	<i>Galium labradoricum</i>	Labrador Bedstraw				S1S2	2 May Be At Risk	17	16.7 ± 0.0	PE
P	<i>Mitchella repens</i>	Partridgeberry				S1S2	2 May Be At Risk	33	31.3 ± 0.0	PE
P	<i>Salix petiolaris</i>	Meadow Willow				S1S2	2 May Be At Risk	8	15.5 ± 0.0	PE
P	<i>Viola nephrophylla</i>	Northern Bog Violet				S1S2	2 May Be At Risk	8	27.5 ± 0.0	PE
P	<i>Carex hystericina</i>	Porcupine Sedge				S1S2	2 May Be At Risk	32	17.1 ± 5.0	PE
P	<i>Carex lasiocarpa</i> var. <i>americana</i>	Slender Sedge				S1S2	2 May Be At Risk	12	20.3 ± 0.0	PE
P	<i>Carex vesicaria</i>	Inflated Sedge				S1S2	2 May Be At Risk	8	68.6 ± 2.0	NS
P	<i>Carex recta</i>	Estuary Sedge				S1S2	3 Sensitive	10	17.8 ± 0.0	PE
P	<i>Eriophorum russeolum</i>	Russet Cottongrass				S1S2	2 May Be At Risk	13	31.6 ± 5.0	PE
P	<i>Juncus dudleyi</i>	Dudley's Rush				S1S2	5 Undetermined	53	59.6 ± 0.0	PE
P	<i>Platanthera obtusata</i>	Blunt-leaved Orchid				S1S2	2 May Be At Risk	8	31.3 ± 0.0	PE
P	<i>Dichanthelium depauperatum</i>	Starved Panic Grass				S1S2	2 May Be At Risk	8	13.0 ± 5.0	PE
P	<i>Muhlenbergia glomerata</i>	Spiked Muhly				S1S2	2 May Be At Risk	7	16.6 ± 0.0	PE
P	<i>Potamogeton alpinus</i>	Alpine Pondweed				S1S2	2 May Be At Risk	19	22.7 ± 5.0	PE
P	<i>Lycopodium obscurum</i>	Flat-branched Tree-clubmoss				S1S2	2 May Be At Risk	22	17.0 ± 0.0	PE
P	<i>Lycopodium sabinifolium</i>	Ground-Fir				S1S2	2 May Be At Risk	12	17.2 ± 5.0	PE
P	<i>Botrychium lanceolatum</i> var. <i>angustisegmentum</i>	Lance-Leaf Grape-Fern				S1S2	2 May Be At Risk	11	31.0 ± 0.0	PE
P	<i>Atriplex acadensis</i>	Maritime Saltbush				S1S3	5 Undetermined	1	60.5 ± 7.0	NS
P	<i>Angelica atropurpurea</i>	Purple-stemmed Angelica				S2	3 Sensitive	24	16.8 ± 5.0	PE
P	<i>Osmorhiza claytonii</i>	Hairy Sweet Cicely				S2	2 May Be At Risk	24	30.5 ± 0.0	PE
P	<i>Aralia racemosa</i>	American Spikenard				S2	2 May Be At Risk	6	58.2 ± 5.0	PE
P	<i>Panax trifolius</i>	Dwarf Ginseng				S2	2 May Be At Risk	249	15.7 ± 5.0	PE
P	<i>Bidens heterodoxa</i>	Connecticut Beggar-Ticks				S2	2 May Be At Risk	11	30.3 ± 1.0	PE
P	<i>Eupatorium perfoliatum</i>	Common Boneset				S2	3 Sensitive	39	20.1 ± 0.0	PE
P	<i>Pseudognaphalium macounii</i>	Macoun's Cudweed				S2	2 May Be At Risk	4	4.2 ± 1.0	PE
P	<i>Rudbeckia laciniata</i>	Cut-Leaved Coneflower				S2	2 May Be At Risk	17	1.2 ± 3.0	PE
P	<i>Symphotrichum boreale</i>	Boreal Aster				S2	2 May Be At Risk	16	16.4 ± 0.0	PE
P	<i>Oclemena nemoralis</i>	Bog Aster				S2	2 May Be At Risk	5	90.2 ± 0.0	NS
P	<i>Betula pumila</i>	Bog Birch				S2	3 Sensitive	17	15.9 ± 0.0	PE
P	<i>Cuscuta gronovii</i>	Swamp Dodder				S2	2 May Be At Risk	10	27.3 ± 0.0	PE
P	<i>Corema conradii</i>	Broom Crowberry				S2	3 Sensitive	19	17.1 ± 5.0	PE
P	<i>Empetrum eamesii</i>	Pink Crowberry				S2	3 Sensitive	14	31.0 ± 0.0	PE
P	<i>Empetrum eamesii</i> ssp. <i>atropurpureum</i>	Pink Crowberry				S2	5 Undetermined	6	31.0 ± 5.0	PE
P	<i>Empetrum eamesii</i> ssp. <i>eamesii</i>	Pink Crowberry				S2	5 Undetermined	2	44.8 ± 5.0	PE
P	<i>Andromeda polifolia</i> var. <i>glaucophylla</i>	Bog Rosemary				S2	2 May Be At Risk	1	46.6 ± 1.0	PE

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P	<i>Gaylussacia bigeloviana</i>	Dwarf Huckleberry				S2	4 Secure	7	17.1 ± 5.0	PE
P	<i>Chamaesyce polygonifolia</i>	Seaside Spurge				S2	3 Sensitive	19	24.8 ± 1.0	PE
P	<i>Corydalis sempervirens</i>	Pale Corydalis				S2	3 Sensitive	8	31.3 ± 0.0	PE
P	<i>Hippuris vulgaris</i>	Common Mare's-Tail				S2	3 Sensitive	12	16.5 ± 3.0	PE
P	<i>Teucrium canadense</i>	Canada Germander				S2	2 May Be At Risk	32	54.6 ± 5.0	NS
P	<i>Utricularia minor</i>	Lesser Bladderwort				S2	3 Sensitive	14	5.7 ± 10.0	PE
P	<i>Fraxinus nigra</i>	Black Ash				S2	2 May Be At Risk	62	18.2 ± 0.0	PE
P	<i>Circaea lutetiana</i>	Broad-leaved Enchanter's Nightshade				S2	3 Sensitive	1	95.8 ± 0.0	PE
P	<i>Circaea lutetiana ssp. canadensis</i>	Broad-leaved Enchanter's Nightshade				S2	3 Sensitive	35	17.0 ± 0.0	PE
P	<i>Epilobium strictum</i>	Downy Willowherb				S2	3 Sensitive	22	16.2 ± 0.0	PE
P	<i>Polygonum arifolium</i>	Halberd-leaved Tearthumb				S2	3 Sensitive	14	16.8 ± 0.0	PE
P	<i>Pyrola asarifolia</i>	Pink Pyrola				S2	3 Sensitive	12	16.5 ± 0.0	PE
P	<i>Actaea pachypoda</i>	White Baneberry				S2	2 May Be At Risk	17	19.9 ± 0.0	PE
P	<i>Ranunculus gmelinii</i>	Gmelin's Water Buttercup				S2	3 Sensitive	37	15.4 ± 0.0	PE
P	<i>Agrimonia gryposepala</i>	Hooked Agrimony				S2	3 Sensitive	120	31.4 ± 1.0	PE
P	<i>Rubus chamaemorus</i>	Cloudberry				S2	4 Secure	2	17.2 ± 5.0	PE
P	<i>Limosella australis</i>	Southern Mudwort				S2	3 Sensitive	41	0.7 ± 3.0	PE
P	<i>Viola pubescens</i>	Downy Yellow Violet				S2	2 May Be At Risk	23	45.9 ± 0.0	PE
P	<i>Juniperus horizontalis</i>	Creeping Juniper				S2	2 May Be At Risk	33	27.4 ± 3.0	PE
P	<i>Pinus resinosa</i>	Red Pine				S2	3 Sensitive	17	16.6 ± 5.0	PE
P	<i>Carex deflexa</i>	Northern Sedge				S2	3 Sensitive	26	29.3 ± 1.0	PE
P	<i>Carex flava</i>	Yellow Sedge				S2	2 May Be At Risk	27	21.3 ± 5.0	PE
P	<i>Carex limosa</i>	Mud Sedge				S2	2 May Be At Risk	34	19.2 ± 0.0	PE
P	<i>Carex pedunculata</i>	Long-stalked Sedge				S2	2 May Be At Risk	31	59.9 ± 1.0	NS
P	<i>Dulichium arundinaceum</i>	Three-Way Sedge				S2	3 Sensitive	36	16.1 ± 0.0	PE
P	<i>Eriophorum viridicarinatum</i>	Green-keeled Cottongrass				S2	2 May Be At Risk	14	16.4 ± 0.0	PE
P	<i>Trichophorum caespitosum</i>	Tufted Clubrush				S2	3 Sensitive	5	19.5 ± 0.0	PE
P	<i>Blysmus rufus</i>	Red Bulrush				S2	2 May Be At Risk	6	50.0 ± 5.0	PE
P	<i>Arethusa bulbosa</i>	Arethusa				S2	2 May Be At Risk	2	46.5 ± 0.0	PE
P	<i>Corallorhiza maculata</i>	Spotted Coralroot				S2	2 May Be At Risk	23	31.4 ± 1.0	PE
P	<i>Corallorhiza trifida</i>	Early Coralroot				S2	3 Sensitive	19	26.8 ± 0.0	PE
P	<i>Cypripedium parviflorum</i>	Yellow Lady's-slipper				S2	3 Sensitive	20	16.8 ± 0.0	PE
P	<i>Cypripedium parviflorum var. pubescens</i>	Yellow Lady's-slipper				S2	3 Sensitive	7	30.3 ± 0.0	PE
P	<i>Cypripedium reginae</i>	Showy Lady's-Slipper				S2	3 Sensitive	52	16.6 ± 0.0	PE
P	<i>Goodyera repens</i>	Lesser Rattlesnake-plantain				S2	2 May Be At Risk	19	24.5 ± 1.0	PE
P	<i>Goodyera tessellata</i>	Checkered Rattlesnake-Plantain				S2	2 May Be At Risk	27	20.0 ± 0.0	PE
P	<i>Liparis loeselii</i>	Loesel's Twayblade				S2	2 May Be At Risk	24	21.2 ± 0.0	PE
P	<i>Listera convallarioides</i>	Broad-Leaved Twayblade				S2	2 May Be At Risk	26	27.1 ± 0.0	PE
P	<i>Listera cordata</i>	Heart-leaved Twayblade				S2	3 Sensitive	24	18.8 ± 0.0	PE
P	<i>Platanthera blephariglottis</i>	White Fringed Orchid				S2	3 Sensitive	12	17.5 ± 0.0	PE
P	<i>Platanthera orbiculata</i>	Small Round-leaved Orchid				S2	3 Sensitive	35	7.2 ± 1.0	PE
P	<i>Platanthera aquilonis</i>	Tall Northern Green Orchid				S2	3 Sensitive	32	15.5 ± 0.0	PE
P	<i>Pogonia ophioglossoides</i>	Rose Pogonia				S2	3 Sensitive	23	19.1 ± 0.0	PE
P	<i>Elymus trachycaulus</i>	Slender Wild Rye				S2	3 Sensitive	30	16.5 ± 0.0	PE
P	<i>Glyceria canadensis</i>	Canada Manna Grass				S2	2 May Be At Risk	29	28.4 ± 5.0	PE

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P	<i>Muhlenbergia mexicana</i>	Mexican Muhly				S2	5 Undetermined	19	19.8 ± 0.0	PE
P	<i>Potamogeton ephedrus</i>	Ribbon-leaved Pondweed				S2	2 May Be At Risk	62	31.4 ± 0.0	PE
P	<i>Potamogeton obtusifolius</i>	Blunt-leaved Pondweed				S2	3 Sensitive	12	68.3 ± 0.0	PE
P	<i>Woodwardia virginica</i>	Virginia Chain Fern				S2	2 May Be At Risk	8	17.5 ± 0.0	PE
P	<i>Botrychium matricariifolium</i>	Daisy-leaved Moonwort				S2	2 May Be At Risk	17	0.7 ± 5.0	PE
P	<i>Botrychium multifidum</i>	Leathery Moonwort				S2	2 May Be At Risk	26	6.2 ± 5.0	PE
P	<i>Hieracium canadense</i>	Canada Hawkweed				S2?	5 Undetermined	35	9.8 ± 0.0	PE
P	<i>Betula papyrifera</i> var. <i>cordifolia</i>	Heart-leaved Birch				S2?	5 Undetermined	10	3.3 ± 6.0	PE
P	<i>Geum macrophyllum</i>	Large-Leaved Avens				S2?	4 Secure	35	15.5 ± 0.0	PE
P	<i>Mimulus ringens</i>	Square-stemmed Monkeyflower				S2?	3 Sensitive	26	15.9 ± 0.0	PE
P	<i>Juniperus communis</i> var. <i>montana</i>	Common Juniper				S2?	5 Undetermined	3	59.8 ± 5.0	PE
P	<i>Carex aquatilis</i>	Water Sedge				S2?	2 May Be At Risk	16	16.5 ± 1.0	PE
P	<i>Carex foenea</i>	Fernald's Hay Sedge				S2?	2 May Be At Risk	9	26.6 ± 0.0	PE
P	<i>Eleocharis tenuis</i>	Slender Spikerush				S2?	3 Sensitive	16	31.3 ± 0.0	PE
P	<i>Triglochin palustris</i>	Marsh Arrowgrass				S2?	2 May Be At Risk	5	25.4 ± 1.0	PE
P	<i>Juncus canadensis</i>	Canada Rush				S2?	3 Sensitive	67	4.5 ± 0.0	PE
P	<i>Sparganium americanum</i>	American Burreed				S2?	5 Undetermined	30	19.8 ± 0.0	PE
P	<i>Zannichellia palustris</i>	Horned Pondweed				S2?	2 May Be At Risk	19	19.8 ± 0.0	PE
P	<i>Cirsium muticum</i>	Swamp Thistle				S2S3	3 Sensitive	31	16.7 ± 0.0	PE
P	<i>Petasites frigidus</i> var. <i>palmaris</i>	Northern Sweet Coltsfoot				S2S3	3 Sensitive	8	35.3 ± 5.0	PE
P	<i>Eurybia macrophylla</i>	Large-leaved Aster				S2S3	3 Sensitive	42	19.4 ± 0.0	PE
P	<i>Honckenya peploides</i>	Seabeach Sandwort				S2S3	3 Sensitive	6	38.5 ± 0.0	PE
P	<i>Honckenya peploides</i> ssp. <i>robusta</i>	Seabeach Sandwort				S2S3	3 Sensitive	20	23.7 ± 5.0	PE
P	<i>Stellaria alsine</i>	Trailing Stitchwort				S2S3	3 Sensitive	15	20.8 ± 0.0	PE
P	<i>Stellaria borealis</i>	Boreal Stitchwort				S2S3	2 May Be At Risk	15	16.9 ± 5.0	PE
P	<i>Polygonum punctatum</i>	Dotted Smartweed				S2S3	3 Sensitive	13	15.4 ± 0.0	PE
P	<i>Polygonum punctatum</i> var. <i>confertiflorum</i>	Dotted Smartweed				S2S3	3 Sensitive	35	23.4 ± 0.0	PE
P	<i>Polygonum ramosissimum</i>	Bushy Knotweed				S2S3	3 Sensitive	13	27.6 ± 3.0	PE
P	<i>Rumex maritimus</i>	Sea-Side Dock				S2S3	3 Sensitive	48	17.4 ± 0.0	PE
P	<i>Clematis virginiana</i>	Virginia Clematis				S2S3	3 Sensitive	40	21.0 ± 0.0	PE
P	<i>Geum canadense</i>	White Avens				S2S3	3 Sensitive	66	17.5 ± 1.0	PE
P	<i>Rosa carolina</i>	Carolina Rose				S2S3	3 Sensitive	31	27.5 ± 5.0	PE
P	<i>Populus balsamifera</i>	Balsam Poplar				S2S3	3 Sensitive	12	7.4 ± 5.0	PE
P	<i>Carex aurea</i>	Golden Sedge				S2S3	3 Sensitive	10	29.2 ± 5.0	PE
P	<i>Carex mackenziei</i>	Mackenzie's Sedge				S2S3	2 May Be At Risk	21	26.0 ± 0.0	PE
P	<i>Carex tonsa</i> var. <i>rugosperma</i>	Deep Green Sedge				S2S3	3 Sensitive	11	31.8 ± 0.0	PE
P	<i>Carex stricta</i>	Tussock Sedge				S2S3	2 May Be At Risk	25	19.2 ± 0.0	PE
P	<i>Carex trisperma</i> var. <i>billingsii</i>	Three-Seed Sedge				S2S3	3 Sensitive	6	18.4 ± 0.0	PE
P	<i>Carex vulpinoidea</i>	Fox Sedge				S2S3	3 Sensitive	21	34.4 ± 5.0	PE
P	<i>Carex utriculata</i>	Northern Beaked Sedge				S2S3	3 Sensitive	16	25.8 ± 0.0	PE
P	<i>Carex tonsa</i>	Deep Green Sedge				S2S3	3 Sensitive	29	20.2 ± 0.0	PE
P	<i>Eleocharis parvula</i>	Dwarf Spikerush				S2S3	3 Sensitive	63	17.7 ± 0.0	PE
P	<i>Iris setosa</i> var. <i>canadensis</i>	Hooker's Iris				S2S3	5 Undetermined	6	31.0 ± 5.0	PE

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>Triglochin gaspensis</i>	Gasp Arrowgrass				S2S3	3 Sensitive	8	31.5 ± 1.0	PE
P	<i>Juncus filiformis</i>	Thread Rush				S2S3	3 Sensitive	36	20.9 ± 0.0	PE
P	<i>Lemna trisulca</i>	Star Duckweed				S2S3	3 Sensitive	26	15.5 ± 0.0	PE
P	<i>Malaxis unifolia</i>	Green Adder's-Mouth				S2S3	3 Sensitive	24	5.2 ± 5.0	PE
P	<i>Spiranthes romanoffiana</i>	Hooded Ladies'-Tresses				S2S3	3 Sensitive	23	2.9 ± 5.0	PE
P	<i>Calamagrostis stricta</i>	Slim-stemmed Reed Grass				S2S3	3 Sensitive	17	11.0 ± 0.0	PE
P	<i>Calamagrostis stricta ssp. stricta</i>	Slim-stemmed Reed Grass				S2S3	3 Sensitive	1	50.6 ± 2.0	PE
P	<i>Calamagrostis stricta var. stricta</i>	Slim-stemmed Reed Grass				S2S3	3 Sensitive	29	26.0 ± 0.0	PE
P	<i>Distichlis spicata</i>	Salt Grass				S2S3	4 Secure	26	5.5 ± 1.0	PE
P	<i>Glyceria borealis</i>	Northern Manna Grass				S2S3	3 Sensitive	58	20.0 ± 0.0	PE
P	<i>Lycopodium complanatum</i>	Northern Clubmoss				S2S3	3 Sensitive	8	18.9 ± 0.0	PE
P	<i>Lycopodium hickeyi</i>	Hickey's Tree-clubmoss				S2S3	2 May Be At Risk	10	19.9 ± 0.0	PE
P	<i>Lycopodium lagopus</i>	One-cone clubmoss				S2S3	3 Sensitive	12	18.8 ± 0.0	PE
P	<i>Lycopodiella inundata</i>	Northern Bog Clubmoss				S2S3	4 Secure	24	17.2 ± 5.0	PE
P	<i>Hydrocotyle americana</i>	American Marsh Pennywort				S3	3 Sensitive	30	16.7 ± 5.0	PE
P	<i>Sanicula marilandica</i>	Maryland Sanicle				S3	4 Secure	67	16.7 ± 0.0	PE
P	<i>Bidens connata</i>	Purple-stemmed Beggarticks				S3	3 Sensitive	84	15.4 ± 0.0	PE
P	<i>Xanthium strumarium var. canadense</i>	Rough Cocklebur				S3	4 Secure	24	17.4 ± 0.0	PE
P	<i>Eurybia radula</i>	Low Rough Aster				S3	3 Sensitive	14	19.1 ± 0.0	PE
P	<i>Rorippa palustris</i>	Bog Yellowcress				S3	5 Undetermined	17	32.2 ± 5.0	PE
P	<i>Rorippa palustris ssp. palustris</i>	Bog Yellowcress				S3	5 Undetermined	2	27.8 ± 5.0	PE
P	<i>Hudsonia tomentosa</i>	Woolly Beach-heath				S3	4 Secure	57	31.0 ± 0.0	PE
P	<i>Arctostaphylos uva-ursi</i>	Common Bearberry				S3	3 Sensitive	26	26.5 ± 0.0	PE
P	<i>Vaccinium vitis-idaea ssp. minus</i>	Mountain Cranberry				S3	4 Secure	17	16.5 ± 5.0	PE
P	<i>Monotropa hypopithys</i>	Pinesap				S3	4 Secure	32	5.5 ± 1.0	PE
P	<i>Epifagus virginiana</i>	Beechdrops				S3	3 Sensitive	11	35.5 ± 3.0	PE
P	<i>Moneses uniflora</i>	One-flowered Wintergreen				S3	4 Secure	50	6.5 ± 3.0	PE
P	<i>Comandra umbellata</i>	Bastard's Toadflax				S3	3 Sensitive	35	28.3 ± 5.0	PE
P	<i>Comandra umbellata ssp. umbellata</i>	Bastard's Toadflax				S3	3 Sensitive	1	54.5 ± 20.0	PE
P	<i>Ulmus americana</i>	White Elm				S3	3 Sensitive	50	5.0 ± 3.0	PE
P	<i>Viola labradorica</i>	Labrador Violet				S3	3 Sensitive	15	21.8 ± 0.0	PE
P	<i>Viola renifolia</i>	Kidney-leaved White Violet				S3	4 Secure	9	13.5 ± 3.0	PE
P	<i>Pinus banksiana</i>	Jack Pine				S3	3 Sensitive	7	54.3 ± 20.0	PE
P	<i>Maianthemum stellatum</i>	Starry False Solomon's Seal				S3	4 Secure	46	19.0 ± 0.0	PE
P	<i>Calopogon tuberosus</i>	Tuberous Grass Pink				S3	4 Secure	13	17.1 ± 5.0	PE
P	<i>Platanthera clavellata</i>	Club Spur Orchid				S3	3 Sensitive	57	4.7 ± 5.0	PE
P	<i>Platanthera dilatata</i>	White Bog Orchid				S3	3 Sensitive	47	18.4 ± 0.0	PE
P	<i>Deparia acrostichoides</i>	Silvery Glade Fern				S3	3 Sensitive	41	27.9 ± 5.0	PE
P	<i>Polystichum acrostichoides</i>	Christmas Fern				S3	4 Secure	107	30.4 ± 0.0	PE
P	<i>Botrychium virginianum</i>	Rattlesnake Fern				S3	4 Secure	24	1.6 ± 5.0	PE
P	<i>Osmunda regalis var. spectabilis</i>	Royal Fern				S3	4 Secure	24	17.0 ± 0.0	PE
P	<i>Antennaria howellii ssp. petaloidea</i>	Pussy-Toes				S3?	4 Secure	9	28.0 ± 5.0	PE
P	<i>Lactuca canadensis</i>	Canada Lettuce				S3?	3 Sensitive	57	18.2 ± 3.0	PE
P	<i>Amelanchier laevis</i>	Smooth Serviceberry				S3?	5 Undetermined	45	1.7 ± 5.0	PE

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)	Prov
P	<i>Rubus setosus</i>	Bristly Blackberry				S3?	3 Sensitive	12	26.2 ± 0.0	PE
P	<i>Juniperus communis</i> <i>var. depressa</i>	Common Juniper				S3?	5 Undetermined	25	2.2 ± 5.0	PE
P	<i>Carex bebbii</i>	Bebb's Sedge				S3?	3 Sensitive	22	16.7 ± 5.0	PE
P	<i>Eleocharis acicularis</i>	Needle Spikerush				S3?	3 Sensitive	20	16.4 ± 10.0	PE
P	<i>Agrostis perennans</i>	Upland Bent Grass				S3?	3 Sensitive	25	20.0 ± 5.0	PE
P	<i>Phragmites australis</i>	Common Reed				S3?	4 Secure	1	93.9 ± 0.0	NS
P	<i>Phragmites australis</i> <i>ssp. americanus</i>	Common Reed				S3?	4 Secure	6	27.3 ± 0.0	PE
P	<i>Lycopodium</i> <i>tristachyum</i>	Blue Groundcedar				S3?	3 Sensitive	24	3.2 ± 0.0	PE
P	<i>Solidago flexicaulis</i>	Zigzag Goldenrod				S3S4	3 Sensitive	200	34.0 ± 1.0	PE
P	<i>Geranium robertianum</i>	Herb Robert				S3S4	4 Secure	74	22.0 ± 0.0	PE
P	<i>Ribes triste</i>	Swamp Red Currant				S3S4	4 Secure	42	19.6 ± 0.0	PE
P	<i>Rhamnus alnifolia</i>	Alder-leaved Buckthorn				S3S4	4 Secure	53	3.9 ± 5.0	PE
P	<i>Crataegus succulenta</i>	Fleshy Hawthorn				S3S4	5 Undetermined	6	27.6 ± 5.0	PE
P	<i>Veronica scutellata</i>	Marsh Speedwell				S3S4	4 Secure	23	30.8 ± 0.0	PE
P	<i>Juniperus communis</i>	Common Juniper				S3S4	4 Secure	32	30.7 ± 1.0	PE
P	<i>Thuja occidentalis</i>	Eastern White Cedar				S3S4	3 Sensitive	24	48.6 ± 0.0	PE
P	<i>Tsuga canadensis</i>	Eastern Hemlock				S3S4	4 Secure	78	6.7 ± 3.0	PE
P	<i>Acorus americanus</i>	American Sweetflag				S3S4	4 Secure	48	21.1 ± 0.0	PE
P	<i>Carex lacustris</i>	Lake Sedge				S3S4	3 Sensitive	17	10.9 ± 0.0	PE
P	<i>Carex pallescens</i>	Pale Sedge				S3S4	4 Secure	40	8.2 ± 3.0	PE
P	<i>Carex viridula</i>	Greenish Sedge				S3S4	4 Secure	6	29.5 ± 1.0	PE
P	<i>Carex viridula</i> <i>ssp. viridula</i>	Greenish Sedge				S3S4	4 Secure	3	96.7 ± 0.0	NS
P	<i>Eleocharis obtusa</i>	Blunt Spikerush				S3S4	4 Secure	39	20.2 ± 1.0	PE
P	<i>Juncus nodosus</i>	Knotted Rush				S3S4	4 Secure	47	4.5 ± 0.0	PE
P	<i>Juncus pelocarpus</i>	Brown-Fruited Rush				S3S4	4 Secure	44	17.5 ± 0.0	PE
P	<i>Juncus</i> <i>alpinoarticulatus</i> <i>ssp.</i> <i>nodulosus</i>	Richardson's Rush				S3S4	4 Secure	12	31.6 ± 1.0	PE
P	<i>Spirodela polyrrhiza</i>	Great Duckweed				S3S4	4 Secure	52	12.2 ± 1.0	PE
P	<i>Potamogeton foliosus</i>	Leafy Pondweed				S3S4	3 Sensitive	9	14.2 ± 2.0	PE
P	<i>Potamogeton foliosus</i> <i>ssp. foliosus</i>	Leafy Pondweed				S3S4	3 Sensitive	3	22.7 ± 5.0	PE
P	<i>Lactuca hirsuta</i> <i>var.</i> <i>sanguinea</i>	Hairy Lettuce				SH	0.1 Extirpated	2	28.0 ± 5.0	PE
P	<i>Packera paupercula</i>	Balsam Groundsel				SH	0.1 Extirpated	50	70.8 ± 0.0	NS
P	<i>Stellaria crassifolia</i>	Fleshy Stitchwort				SH	2 May Be At Risk	3	28.4 ± 5.0	PE
P	<i>Pterospora</i> <i>andromedea</i>	Woodland Pinedrops				SH	0.1 Extirpated	1	54.4 ± 5.0	PE
P	<i>Montia fontana</i>	Water Blinks				SH	0.1 Extirpated	1	89.7 ± 5.0	PE
P	<i>Pyrola minor</i>	Lesser Pyrola				SH	0.1 Extirpated	2	58.2 ± 5.0	PE
P	<i>Ranunculus hispidus</i> <i>var. caricetorum</i>	Bristly Buttercup				SH	2 May Be At Risk	1	35.3 ± 5.0	PE
P	<i>Piptatherum</i> <i>canadense</i>	Canada Rice Grass				SH	2 May Be At Risk	1	28.4 ± 5.0	PE

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The recipient of these data shall acknowledge the ACCDC 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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15	Doucet, D.A. 2009. Census of Globally Rare, Endemic Butterflies of Nova Scotia Gulf of St Lawrence Salt Marshes. Nova Scotia Dept of Natural Resources, Species at Risk, 155 recs.
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15	Tims, J. & Craig, N. 1995. Environmentally Significant Areas in New Brunswick (NBESA). NB Dept of Environment & Nature Trust of New Brunswick Inc, 6042 recs.
14	Benjamin, L.K. 2012. NSDNR fieldwork & consultant reports 2008-2012. Nova Scotia Dept Natural Resources, 196 recs.
14	Clayden, S.R. 2007. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, download Mar. 2007, 6914 recs.
13	Belland, R.J. 2012. PEI moss records from New York Botanical Garden. NYBG Virtual Herbarium, Web site: http://sciweb.nybg.org/science2/vii2.asp 135 recs.
13	Cameron, R.P. 2013. 2013 rare species field data. Nova Scotia Department of Environment, 71 recs.
13	MacArthur, M.E.L. 1976. An Ecological Study of the Greenwich Sand Dune System, M.Sc. Thesis. Department of Biology, Acadia University, Wolfville NS, 98 recs.
13	Oldham, M.J. 2000. Oldham database records from Maritime provinces. Oldham, M.J.; ONHIC, 487 recs.
13	Zinck, M. & Roland, A.E. 1998. Roland's Flora of Nova Scotia. Nova Scotia Museum, 3rd ed., rev. M. Zinck; 2 Vol., 1297 pp.
12	Giberson, D. 2008. UPEI Insect Collection. University of Prince Edward Island, 157 recs.
11	Klymko, J.J.D. 2012. Insect fieldwork & submissions, 2011. Atlantic Canada Conservation Data Centre. Sackville NB, 760 recs.
11	Klymko, J.J.D.; Robinson, S.L. 2014. 2013 field data. Atlantic Canada Conservation Data Centre.
11	Prince Edward Island National Park. 2014. Prince Edward Island National Park Herbarium. Parks Canada Agency, PEINP, 39 recs.
10	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2003.
10	Doucet, D.A. 2007. Lepidopteran Records, 1988-2006. Doucet, 700 recs.
10	LaPaix, R.W.; Crowell, M.J.; MacDonald, M. 2011. Stantec rare plant records, 2010-11. Stantec Consulting, 334 recs.
9	Chaput, G. 2002. Atlantic Salmon: Maritime Provinces Overview for 2001. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-14. 39 recs.
9	Dibblee, R.L. 1999. PEI Cormorant Survey. Prince Edward Island Fisheries, Aquaculture & Environment, 1p. 21 recs.
9	Guignion, M; Ristau, C.; Lemon, D. 1995. The distribution & abundance of the Gulf of St. Lawrence Aster, <i>Aster laurentianus</i> in Prince Edward Island National Park. Can. Field-Nat, 109:462-464. 10 recs.
9	Kelly, G. 2005. <i>Fraxinus nigra</i> . Dept of Agriculture, Fisheries, Aquaculture & Forestry. Pers. comm. to C.S. Blaney, Mar. 2, 11 recs.
8	Amirault, D.L. 1997-2000. Unpublished files. Canadian Wildlife Service, Sackville, 470 recs.
8	Bryson, I. 2013. Nova Scotia rare plant records. CBCL Ltd., 180 records.
8	Munro, Marian K. Nova Scotia Provincial Museum of Natural History Herbarium Database. Nova Scotia Provincial Museum of Natural History, Halifax, Nova Scotia. 2014.
8	O'Neil, S. 1998. Atlantic Salmon: Northumberland Strait Nova Scotia part of SFA 18. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-08. 9 recs.
7	Gagnon, J. 2004. Specimen data from 2002 visit to Prince Edward Island. , 104 recs.
7	Smith, M.E.M. 2008. AgCan Collection. Agriculture Canada, Charlottetown PE, 44 recs.
6	Hinds, H.R. 1989. Greenwich, Blooming Point plant collections in Plant locations. Pers. Comm. to Robin Day (Ag. Can). 2pp, 8 recs, 8 recs.
6	Majka, C.G. 2008. Lepidoptera at St Patricks, 1993-2007. Pers. comm. to R. Curley, 8 Jan. 29 recs, 29 recs.
6	Sabine, D.L. 2013. Dwaine Sabine butterfly records, 2009 and earlier.
5	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.
5	Daury, R.W. & Bateman, M.C. 1996. The Barrow's Goldeneye (<i>Bucephala islandica</i>) in the Atlantic Provinces and Maine. Canadian Wildlife Service, Sackville, 47pp.
5	Downes, C. 1998-2000. Breeding Bird Survey Data. Canadian Wildlife Service, Ottawa, 111 recs.
5	Gagnon, J. 2003. Prince Edward Island plant records. Societe de la faune et des parcs Quebec, 13 recs.
5	MacQuarrie, K. and R. Sharkie. 2004. Plant lists for selected areas at Brackley and Dalvy, Prince Edward Island National Park. Island Nature Trust, 168 recs.
5	Mazerolle, D. 2003. Assessment and Rehabilitation of the Gulf of St Lawrence Aster (<i>Symphotrichum laurentianum</i>) in Southeastern New Brunswick. Irving Eco-centre, la Dune du Bouctouche, 13 recs.
5	Parks Canada. 2010. Specimens in or near National Parks in Atlantic Canada. Canadian National Museum, 3925 recs.
4	Benjamin, L.K. (compiler). 2001. Significant Habitat & Species Database. Nova Scotia Dept of Natural Resources, 15 spp, 224 recs.
4	Benjamin, L.K. 2009. Boreal Felt Lichen, Mountain Avens, Orchid and other recent records. Nova Scotia Dept Natural Resources, 105 recs.
4	Edsall, J. 2007. Personal Butterfly Collection: specimens collected in the Canadian Maritimes, 1961-2007. J. Edsall, unpubl. report, 137 recs.

# recs	CITATION
4	Harding, R.W. 2012. Pickerel Frog observations 2004-12. Pers. comm. to J. Klymko, Sep. 6, 4 recs, photos.
4	Mazerolle, D.M. 2005. Bouctouche Irving Eco-Centre rare coastal plant fieldwork results 2004-05. Irving Eco-centre, la Dune du Bouctouche, 174 recs.
4	Robinson, S.L. 2014. 2013 Field Data. Atlantic Canada Conservation Data Centre.
4	Webster, R.P. & Edsall, J. 2007. 2005 New Brunswick Rare Butterfly Survey. Environmental Trust Fund, unpublished report, 232 recs.
3	Basquill, S.P. 2012. 2012 Bryophyte specimen data. Nova Scotia Department of Natural Resources, 37 recs.
3	Bateman, M.C. & Prescott, W.H. 1984. The Mammals of Prince Edward Island National Park. Canadian Wildlife Service, vol 2:5. 3 recs.
3	Benedict, B. Connell Herbarium Specimen Database Download 2004. Connell Memorial Herbarium, University of New Brunswick. 2004.
3	Benedict, B. Connell Herbarium Specimens (Data) . University New Brunswick, Fredericton. 2003.
3	Blaney, C.S. Miscellaneous specimens received by ACCDC (botany). Various persons. 2001-08.
3	Boyne, A.W. & Grecian, V.D. 1999. Tern Surveys. Canadian Wildlife Service, Sackville, unpublished data. 23 recs.
3	Giroux, P. 2013. Personal communication concerning species at risk in and around PEI NP, PE. Winter 2013. Pers. comm.
3	Hinds, H.R. 1986. Notes on New Brunswick plant collections. Connell Memorial Herbarium, unpubl, 739 recs.
3	Klymko, J.J.D.; Robinson, S.L. 2012. 2012 field data. Atlantic Canada Conservation Data Centre, 447 recs.
3	Sollows, M.C. 2008. NBM Science Collections databases: herpetiles. New Brunswick Museum, Saint John NB, download Jan. 2008, 8636 recs.
3	Williams, M. Cape Breton University Digital Herbarium. Cape Breton University Digital Herbarium. 2013.
2	Belliveau, A.G. 2014. Plant Records from Southern and Central Nova Scotia. Atlantic Canada Conservation Data Centre, 919 recs.
2	Benjamin, L.K. 2009. D. Anderson Odonata Records for Cape Breton, 1997-2004. Nova Scotia Dept Natural Resources, 1316 recs.
2	Cameron, R.P. 2014. 2013-14 rare species field data. Nova Scotia Department of Environment, 35 recs.
2	Christie, D.S. 2000. Christmas Bird Count Data, 1997-2000. Nature NB, 54 recs.
2	Curley, F.R. 2003. Glen Kelly records for <i>Betula pumila</i> & <i>Asclepias syriaca</i> on PEI. , Pers. comm. to C.S. Blaney. 9 recs.
2	Curley, F.R. 2013. Bryoria observations in PE. PEI Dept Environment, Energy and Forestry, 27 records.
2	Erskine, A.J. 1999. Maritime Nest Records Scheme (MNRS) 1937-1999. Canadian Wildlife Service, Sackville, 313 recs.
2	Fernald, M.L. 1914. Some annual halophytic asters of the maritime provinces. <i>Rhodora</i> , 16:57-61. 2 recs.
2	Goltz, J.P. 2012. Field Notes, 1989-2005. , 1091 recs.
2	Houle, F. & Haber, E. 1990. Status of the Gulf of St. Lawrence Aster, <i>Aster laurentianus</i> (Asteraceae) in Canada. <i>Canadian Field-Naturalist</i> , 104:455-459. 2 recs.
2	Houle, F; Haber, E. 1990. Status of the Gulf of St. Lawrence Aster, <i>Aster laurentianus</i> (Asteraceae) in Canada. <i>Can. Field-Nat</i> , 104:455-459. 3 recs.
2	Macaulay, M. 2008. Email to Sean Blaney regarding rich hardwood floodplain site at Howards Pool, Wallace River, NS.
2	MacQuarrie, K. 2003. Field Observation Form. , 2pp.
2	Pepper, C. 2013. 2013 rare bird and plant observations in Nova Scotia. , 181 records.
2	Prince Edward Island National Park. 2010. Permanent sample plot ground vegetation data from 2007 & 2010. Parks Canada Agency, 3768 recs.
2	Sabine, D.L. 2012. Bronze Copper records, 2003-06. New Brunswick Dept of Natural Resources, 5 recs.
2	Thomas, H.H., Jones, G.S. & Diblee, R.L. 1980. <i>Sorex palustris</i> on Prince Edward Island. <i>Can. Field Nat.</i> , vol 94:329-331. 2 recs.
1	Amirault, D.L. 2003. 2003 Peregrine Falcon Survey. Canadian Wildlife Service, Sackville, unpublished data. 7 recs.
1	Basquill, S.P. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre, Sackville NB, 69 recs.
1	Basquill, S.P. 2012. 2012 rare vascular plant field data. Nova Scotia Department of Natural Resources, 37 recs.
1	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2000.
1	Benjamin, L.K. 2009. NSDNR Fieldwork & Consultants Reports. Nova Scotia Dept Natural Resources, 143 recs.
1	Cairns, D. 1998. Atlantic Salmon: Prince Edward Island SFA 17. Dept of Fisheries & Oceans, Atlantic Region, Science. Stock Status Report D3-07. 1 rec.
1	Cameron, A.W. 1958. Mammals in the Islands in the Gulf of St Lawrence. <i>Natl. Mus. Can. Bull.</i> , 154:1-165. 2 recs.
1	Cameron, R.P. 2011. Lichen observations, 2011. Nova Scotia Environment & Labour, 731 recs.
1	Cameron, R.P. 2012. Additional rare plant records, 2009. , 7 recs.
1	Cameron, R.P. 2012. Rob Cameron 2012 vascular plant data. NS Department of Environment, 30 recs.
1	Curley, F. R. Plant specimens given to AC CDC. PEI Dept Environment, Energy and Forestry . 2010.
1	Donell, R. 2008. Rare plant records from rare coastal plant project. Bouctouche Dune Irving Eco-centre. Pers. comm. to D.M. Mazerolle, 50 recs.
1	Doucet, D.A. 2007. PEI National Park Odonata Survey. Parks Canada, PEI National Park, 1 rec.
1	Doucet, D.A. 2008. PEI National Park Odonata Survey. Parks Canada, PEI National Park, 1 rec.
1	Doucet, D.A. ACCDC Reference Collection. Atlantic Canada Conservation Data Centre, Sackville NB. 2008.
1	Edsall, J. 2001. Lepidopteran records in New Brunswick, 1997-99. , Pers. comm. to K.A. Bredin. 91 recs.
1	Erskine, D.S. First <i>Myriophyllum tenellum</i> collection for PEI, specimen at DAO herbarium. Agriculture Canada, Research Branch. 1956.
1	Fraser, M. 2003. Fort Amherst Field Observations. Pers. comm., 2pp, 3 recs.
1	Frittation, C. 2012. NSNT 2012 Field Observations. Nova Scotia Nature Trust, Pers comm. to S. Blaney Feb. 7, 34 recs.
1	Goltz, J.P. & Bishop, G. 2005. Confidential supplement to Status Report on Prototype Quillwort (<i>Isoetes prototypus</i>). Committee on the Status of Endangered Wildlife in Canada, 111 recs.
1	Harling, L. & Silva, M. 2004. Abundance & species richness of shrews within forested habitats on PEI. <i>Am. Midl. Nat.</i> , 151:399-407. 2 recs.
1	Harris, P. & Blaney, C.S. 2003. SAR Inventory: Plants in Port-La-Joye NHS & Fort Amherst NHS. Parks Canada, Atlantic, SARINV03-23. 4 recs.
1	Lajeunesse, D. et al. 2002. PEINP Collection. Parks Canada, PEI National Park, 9 recs.
1	MacPhail, V. Bee and syrphid specimens from MSc research. Pers. comm., J. Klymko. 2006.
1	New York Botanical Garden. 2006. Virtual Plant Herbarium - Vascular Plant Types Catalog. <i>Sylva</i> , S.; Kallunki, J. (ed.) International Plant Science Centre, Web site: http://sciweb.nybg.org/science2/vii2.asp . 4 recs.

# recs	CITATION
1	New York Botanical Garden. 2010. American Bryophyte Catalog, Prince Edward Island specimens. C.V. Starr Virtual Herbarium. Online database. http://sciweb.nybg.org/science2/hcol/bryo/index.asp . Accessed February 2010., Web site: 135 recs.
1	Oakley, D. 2012. Pickerel Frog observation 2008. Pers. comm. to J. Klymko. email record, 1 photo.
1	Olsen, R. Herbarium Specimens. Nova Scotia Agricultural College, Truro. 2003.
1	Porter, C.J.M. 2014. Field work data 2007-2014. Nova Scotia Nature Trust, 96 recs.
1	Standley, L.A. 2002. <i>Carex haydenii</i> in Nova Scotia. , Pers. comm. to C.S. Blaney. 4 recs.
1	Stewart, J.I. 2010. Peregrine Falcon Surveys in New Brunswick, 2002-09. Canadian Wildlife Service, Sackville, 58 recs.

DATA DICTIONARY:

revised May 4, 2012

I. Observation Records

The following fields of data may be included (and may or may not be populated) in occurrence records. Text field lengths given as TXT+ are 255 char max. (and may truncate text).

TAXONOMY	type	definition
MCODE	TXT 8	8 character 'Museum Code' (1 to 4 = genus, 5 to 8 = sp+ssp)
ELCODE	TXT 10-12	Unique Identifier of taxon ¹
SCINAME	TXT+	Global Scientific Name of taxon ¹
COMNAME	TXT+	English Common Name of taxon ¹
NOMCOMMUN	TXT+	French Common Name

LOCATION

SURVEYSITE	TXT+	General locality of occurrence (not necessarily protected)
DIRECTIONS	TXT+	Specific locality: e.g. bearings and distance from enduring landmark
SUBNAT	TXT 2	Province/State: 2 character ISO code
COCODE	TXT 6	County Code (2 chars for province + 4 chars for county name)
MAPCODE	TXT 7	Map number: NTS identifier in Canada
UTME20	NUM 6	UTM ³ Easting reprojected as Zone 20
UTMN20	NUM 7	UTM ³ Northing reprojected as Zone 20
LONDEC	DEC 12,6	Decimal Longitude (6 decimal places, negative for west of Greenwich)
LATDEC	DEC 12,6	Decimal Latitude (6 decimal places)
LOCUNCM	NUM 5	Precision in meters, i.e. geospatial resolution or lack thereof
PREC	DEC 3,1	Precision in meters by power of 10 (e.g. 3 = 10 to the 3rd = 1000m = 1km)

	<i>prec</i>	<i>common speech</i>	<i>example</i>	<i>unit size</i>	<i>literal range (m)</i>
6.0		within province	province	1000.0km	562.3 - 1778.3
5.7		in part of province	'NW NB'	500.0km	281.2 - 889.1
5.0		within in county	county	100.0km	56.2 - 177.8
4.7		within 50s of kilometers		50.0km	28.1 - 88.9
4.0		within 10s of kilometers	BBA grid	10.0km	5.6 - 17.8
3.7		within 5s of kilometers		5.0km	2.8 - 8.9
3.0		within kilometers	topo grid	1.0km	0.6 - 1.8
2.7		within 500s of meters		500.0m	281.2 - 889.1
2.0		within 100s of meters	ball field	100.0m	56.2 - 177.8
1.7		within 50s of meters		50.0m	28.1 - 88.9
1.0		within 10s of meters	boxcar	10.0m	5.6 - 17.8
0.7		within 5s of meters		5.0m	2.8 - 8.9
0.0		within meters NOT USED	pace	1.0m	0.6 - 1.8
-1.0		within 10s of centimeters	fingernail	0.1m	0.1 - 0.2

RARITY STATUS

NRANK	TXT 5	National Rarity Rank of taxon (in Canada) ¹
NPROT	TXT+	National Protection Status of taxon (= COSEWIC in Canada)

code rank and short definition

X	Extinct in Canada and elsewhere
XT	Extirpated in Canada but surviving elsewhere
E	Endangered in Canada
T	Threatened in Canada
V	Vulnerable in Canada
SC	Special Concern in Canada
DD	Data Deficient: data inadequate for assessment
NAR	Not At Risk in Canada

SRANK**	TXT 5	Subnational (Provincial) Rarity Rank of taxon ¹
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code rank and short definition

SX	Extinct or extirpated in province
SH	Historically occurring but currently undetected in province
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
SE	Exotic in province
SA	Accidental, infrequent and outside of range within province
SNA	Ranking not applicable in province
SNR	Not yet assessed in province

SPROT**	TXT+	Provincial rank/status of taxon; cf provincial websites
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DATASENS TXT 5 Data sensitivity index; indicates blurred² export coordinates
 IUCN TXT+ International Union of Conservation Naturalists rarity rank; cf IUCN website
code rank and short definition

EX	Extinct: no individuals remaining
EW	Extinct in the Wild: only captive or naturalised survivors
CR	Critically Endangered: extreme risk of extinction in wild
EN	Endangered: high risk of extinction in wild
VU	Vulnerable: high risk of endangerment in wild
NT	Near Threatened: likely to become endangered soon
LC	Least Concern: lowest risk, widespread and abundant
DD	Data Deficient: data inadequate for assessment
NE	Not Evaluated, not yet assessed against criteria

OBSERVATION

OBSERVER TXT+ Person or persons collecting specimen, in bibliographic form
 OBDATE TXT 10 Date of specimen collection as YYYY MM DD
OBDATA TXT+ Concatenation of fields below, relating to specimen (EODATAEVID, EODATACNT etc)
 OBEVID TXT+ Type of evidence (specimen, photo etc)
 OBCOUNT TXT+ Number of individuals at location
 OBABUN TXT+ Relative rarity of taxon at location, e.g. ‘common’, ‘scattered’
 OBSIZE TXT+ Size of specimen
 SIZE TXT+ Size of occurrence ‘patch’ (in m2, ha or acres)
 OBDESC TXT+ Details of specimen appearance
 OBPHEN TXT+ Lifestage of specimen (bud, flowering etc)
 OBSEX TXT+ Male/female if relevant
 OBACTIV TXT+ Activity of taxon when observed (nesting, crossing road etc)
 OBASSP TXT+ Other taxa associated with specimen
 NOTETAX TXT+ Identifier’s note on taxonomic issues
GENDESC TXT+ Concatenation of fields below, relating to site (HABITAT, ECOL etc)
 HABITAT TXT+ Habitat characterisation of location
 ECODIST NUM 4 National Ecological Framework EcoDistrict identifier
 WSCODE TXT 10 Quaternary Watershed identifier
GCOM TXT+ General Comments: concatenation of Notes (NOTE1, NOTE2, NOTE3)

COLLECTION

OWNER TXT+ Landowner or owner type (Federal, Provincial, Private, etc)
 ACCNUM TXT+ Museum/Herbarium Accession number
 COLLNUM TXT+ Collectors’ number
 COLLECTION TXT+ Herbarium acronym(s) with specimen
 CITATION TXT+ Primary source of data

DATA MANAGEMENT

IDNUM TXT+ Field Office Number: Internal ACCDC record reference (not the EONUM)
 EDITION TXT 14 Last editor’s initials and date as YYYY MM DD
 OB TXT 2 Mapping shape: PN=polygon, BF=buffer, LN=line, PT=point
 DB TXT 2 Database, e.g. Ob=observations, Ff=freshwater fish, Bp=birds, pelagic
 IN TXT 2 GIS search flag for observation within buffer
 IX TXT 2 GIS search flag for observation intersects buffer
 EONUMLAST NUM 3 Map labeling flag for most recent taxon observation in area
 RARENS NUM 1 Inclusion flag for extraprovincial records in NS 100km GIS scans

Notes:

¹ Methodology of NatureServe, Arlington, VA
² Easting and Northing rounded to 5, 10 or 50km grid location.
³ Universal Transverse Mercator.
 ** Field name followed by 2-character ISO provincial abbreviation.

II. Managed or Special Areas

The following fields of data may be included (and may or may not be populated) for Protected Areas and Ecologically Significant Areas.

IDENTITY

MACODE	TXT 14	Unique identifier for Managed Area ¹ with some level of protection
SACODE	TXT 14	Unique identifier for Ecologically Special Area ¹ with or without protection
MANAME	TXT+	Name of Protected Area containing occurrence
SANAME	TXT+	Name of Ecologically Special Area containing occurrence
SITECODE	TXT+	External agency site identity code

JURISDICTION / OWNERSHIP

LOCALJURIS	TXT+	Abbreviation for mandated agency
OWNER	TXT+	Short name or category of title holder
OWNERCOM	TXT+	Short detail of multiparty arrangements
OWNERCODE	TXT+	Canadian Conservation Area DB ownercodes (modified)

<i>group</i>	<i>code</i>	<i>designation</i>
Owner	GN	government, national (federal)
	GS	government, subnational (prov., state)
	GM	government, municipal
	IN	international
	NG	non-governmental organisation
	OR	organisational
	CO	corporate
	PR	private

CLASSIFICATION

PROTSTAT	TXT+	Activities permitted or restricted (when known)
LEGALACT	TXT+	Short title of enabling legislation
LEGALDATE	TXT+	Year of enabling legislation
ESTABDATE	TXT+	Year of site designation
IBP	TXT+	International Biological Program identity number (Y=unknown)
IBPSTATUS	TXT+	International Biological Program status: proposed or declared
IUCN	TXT+	IUCN protection level, e.g. I very restricted, VI few restrictions
LEVEL1	TXT 3	Canadian Conservation Area DB type
LEVEL2	TXT+	Canadian Conservation Area DB subtype(s)

<i>group</i>	<i>code</i>	<i>designation</i>
Conservation	CEP	Conservation Easement Property
	ESA	Environmentally Sensitive Area
	NAC	Nature Conservancy
	NAT	Natural Area
	NCA	NCC Conservation Land
	PCA	Private Conservation Area
	PRA	Protected Area
	PRB	Protected Beach
	RER	Representative Area Ecological Reserve
	TRA	Nature Trail
Heritage	ARS	Archaeological Site
	HEA	Heritage Area or Park
	HEC	Heritage Canal
	HEP	Heritage Park
	HER	Heritage River
	HIA	Historic Area or Park
	NHP	National Historic Park
	NHS	National Historic Site
	PEP	Provincial Heritage Property
	PHP	Provincial Historic/Heritage Park
	PHS	Provincial Heritage Site
WHS	World Heritage Site	
Parks	CMG	Campground
	CMP	Community Park
	DUP	Day Use Park
	MUP	Municipal Park
	NAP	National Park
	NEP	Natural Environment Park
	NTP	Nature Park
	PKW	Parkway
	PNS	Picnic Site
	PVP	Provincial Park
WAP	Wayside Park	

<i>group</i>	<i>code</i>	<i>designation</i>
Wilderness	ECR	Ecological Reserve
	NTA	Nature Trust Area
	NTR	Nature Reserve
	SES	Significant Ecological Area
	WDA	Wilderness Area
	WDR	Wilderness Reserve
Wildlife	BSR	Bird Sanctuary
	EHJ	Eastern Habitat Joint Venture
	GAS	Game Sanctuary
	MBS	Migratory Bird Sanctuary
	NWA	National Wildlife Area
	PWA	Provincial Wildlife Area
	SBS	Sea Bird Sanctuary
	WHR	Western Hemispheric Shorebird Reserve
	WLP	Wildlife Park
	WLR	Wildlife Reserve
	WLS	Wildlife Sanctuary
	WMA	Wildlife Management Area
	WPA	Wildlife Protection Area
	WRF	Wildlife Refuge
Other	AGF	Agreement Forest
	ASI	Area of Scientific Interest
	DUN	Ducks Unlimited Canada
	EDA	Education Area
	FCP	Federal Community Pasture
	IBP	International Biological Program
	NCC	National Capital Commission
	NSA	Natural Scenic Area
	PLS	Palaeontological Site
	PSL	Public Safety Lands: watershed protection
	RAM	Ramsar Wetland Site
	RTA	Research and Teaching Area
NS SigHab	380	wetland habitat
	381	saltmarsh habitat
	382	deer/moose wintering
	383	other significant habitats

APPENDIX C

Monitoring Plan

Monitoring Plan

A monitoring plan has been developed to include sampling locations, parameters to be monitored, and frequency of sampling. The parameters of interest for monitoring are:

- Wastewater Volume;
- Biochemical oxygen demand (BOD);
- Total suspended solids (TSS);
- Total nitrogen (TN);
- Total phosphorus (TP); and
- Faecal Coliforms.

Water use will be recorded daily at the well head however, much of this water will be utilized as cooling water and crab wash water, both of which will be discharged directly. The wastewater volumes will be recorded by monitoring the level in the holding tank. The holding tank water level will be recorded each day before and after processing. This will allow the calculation of the volumes utilized during processing and clean-up shifts. Wastewater samples will be collected and transported to the PEI Analytical Laboratory in Charlottetown, PEI for analytical testing. The proposed frequency of sampling is provided in the Table below.

Table 1: Monitoring Plan

Location	Parameters					
	BOD	TSS	TN	TP	Faecal	Flow
Process Wastewater (Screening Inlet)	W	W	M	M	M	NA
Process Wastewater Holding Tank	W	W	M	M	M	D2
Cooling Water Discharge Manhole	M	M	M	M	M	DE
Storm Sewer (Crab rinse water)	W	W	M	M	M	DE

D – Daily

D2 – Twice per day

DE- Daily Estimate

W – Weekly

M – Monthly

NA – Not Applicable