Environmental Impact Assessment (EIA) Registration:

Caribou Mine Copper Circuit

Prepared for:
Trevali Mining Corporation
9361 Highway 180
Bathurst, NB E2A 3Z1

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Project No. 121616495
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1.0 INTRODUCTION

This document is intended to fulfill the requirements for registration of an Undertaking under New Brunswick's *Environmental Impact Assessment Regulation* of the *Clean Environment Act* for upgrades to the Caribou concentrator (the "Project"), at the Caribou Mine in northern New Brunswick. The Project is proposed by Trevali Mining Corporation (the "Proponent") and consists of adding a copper separation circuit, a copper concentrate building as well as a transformer station, to the existing processing mill at Caribou.

1.1 NAME OF THE UNDERTAKING

Caribou Mine Copper Circuit Addition.

1.2 PROJECT OVERVIEW

The Project consists of adding a copper separation circuit within the concentrator building located on the Caribou Mines property located 45 kilometres (km) west of Bathurst, in Restigouche County, New Brunswick (Figure 1).

The Project consists of adding a copper separation circuit within the pre-existing Caribou concentrator as well as adding a copper storage/loading building to the already existing concentrate building. A new transformer station will also be added as part of the Project. This circuit will be installed between the existing lead and zinc circuits. The copper will be recovered from the lead tailings. The addition of the copper circuit will be completed within the current concentrator footprint. No external modification to the concentrator will be required, except that an extension of the concentrate building will be required to accommodate the new copper storage and a new transformer pad adjacent to the concentrator. The existing mining and milling processes as well as the 3,000 tonne/day milling capacity at the Caribou Mine will be unaffected by these new additions.

1.3 PURPOSE/RATIONALE/NEED FOR THE UNDERTAKING

A new copper separation circuit will be added between the lead and zinc circuits in the existing concentrator building in order to maximize the revenue from the plant feed through enhanced copper recovery in the process as well as enhance tailings quality. The copper storage/loading building will be added to store copper concentrate awaiting shipping and a transformer will be installed to accommodate the extra power requirements of the proposed copper separation circuit.

Figure 1 Caribou Mine General Location

1.4 PROPONENT CONTACT INFORMATION

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Principal Environmental Contact :
Aziz Essalhi
Environmental Coordinator
Tel: 506-545-6097
E-mail : essalhi@trevali.com

1.5 PROPERTY OWNERSHIP

The Caribou property consists of a single Mining Lease, ML-246, covering 3,105.7 hectares (ha). The lease has a 20 year term and is set to expire on October 27, 2028. It is owned 100% by Trevali Mining Corporation.

The Caribou property also carries an Industrial Surface Lease, SIML2271, covering approximately 90 hectares (ha) which includes the existing tailings facility. The lease has a 20 year term and is set to expire on May 31, 2026. It is owned 100% by Trevali Mining Corporation.

1.6 PROJECT LOCATION

The Caribou property is located in Restigouche County, approximately 45 km west of the city of Bathurst in the province of New Brunswick. The property lies within National Topographical System (NTS) map sheet 21O/09. The Caribou deposit is located on an existing mine site with extensive pre-existing infrastructure. The property is approximately 7 km long in the east-west direction, and 5 km wide in the north-south direction. The north-eastern and northern limits of the property are intersected by Highway 180 (Figure 2).

The Caribou concentrator is situated within the Caribou mine site located at civic address: 9361 Highway 180, Bathurst, NB, in Restigouche County and is identified by Service New Brunswick (SNB) as parcel identifier (PID)#50072032. More specifically, the Project will be located within and/or near the existing Caribou mine concentrator, at coordinates 47°33'49''N and 66°17'24''W (Figure 3).

1.7 FUNDING

The Project will be financed entirely by the Proponent or its parent company.

1.8 PROJECT-RELATED DOCUMENTS

Other than this document, no publicly available Project related documents have been developed in support of this EIA registration document to date. Appendices contained at the end of this report contain pertinent information related to this Project.

1.9 REGULATORY FRAMEWORK

1.9.1 New Brunswick Environmental Impact Assessment

The Project is an "undertaking" under Schedule "A" of the New Brunswick *Clean Environment Act*, *Environmental Impact Assessment Regulation*, as it will modify, rehabilitate and extend an undertaking specified in Schedule A of the regulation (i.e., Item (a), "all commercial extraction or processing of a mineral as defined in the *Mining Act*"). As such, the Project must be registered under the Regulation, and a review of the Project will be carried out to determine if and under what conditions the Project may proceed (Determination Review), or whether a Comprehensive EIA review is required.

It is important to note that the major Project component (copper circuit) is situated within an existing and permitted covered concentrator facility and that the concentrator footprint will not significantly change (except for the extension of the concentrate building) and minimal environmental interaction is anticipated.

1.9.2 Canadian Environmental Assessment Act, 2012

The Project is not believed to trigger the requirement for a federal environmental assessment (EA) under the *Canadian Environmental Assessment Act, 2012* ("*CEAA 2012*"). Though metal mines and mills are "designated projects" under the *Regulations Designating Physical Activities* under *CEAA 2012,* the nature of the Project is such that there is no change to the mining operation compared to the existing and historical operation, and there is no measurable increase in capacity of the mill as a result of the Project.

Section 17 of the regulations states the following as being a designated project:

> "17. The expansion of an existing
>
> (a) metal mine, other than a rare earth element mine or a gold mine, that would result in an increase in the area of mine operations of 50% or more and a total ore production capacity of 3,000 t/day or more;
>
> (b) metal mill that would result in an increase in the area of mine operations of 50% or more and a total ore input capacity of 4,000 t/day or more;".

Since the Project does not cause these thresholds to be exceeded, an EA under *CEAA 2012* is not believed to be required.

LEGEND

- SURFACE WATER FISH SAMPLING BENTHIC SAMPLING
- SURFACE WATER BENTHIC SAMPLING

GRID NORTH

ROUTE 180

COLD STORAGE
REFUGE STATION
PORTAL
FIRE POND
FIRE POND DAM
G-POND
WASTE DUMP
WEST PIT WASTE DUMP
OFFICE
ANACONDA TAILINGS PONDS
WAREHOUSE/GARAGE
CONCENTRATOR
CORE SHED
'F'
'E'
'A'
'D'
'C'
'B'
M2
M1
FORTY MILE BROOK
HEADFRAME
HOISTHOUSE
OPEN PIT
SOUTH TRIBUTARY TO FORTY MILE BROOK
ASSAY LAB.
CONCENTRATE STORAGE
REAGENT STORAGE
ELECTRICAL SUBSTATION
POINT OF FINAL DISCHARGE
STATION B
POLISHING POND DAM
MINE WATER TREATMENT PLANT
SEDIMENT POND
HYDROXIDE POND
POWER LINE
TAILINGS LINE ROAD
STATION PPD
STTP TAILINGS DAM
TAILINGS LINE
SPILLWAY
RECLAIM PUMP HOUSE
RECLAIM LINE
STTP TAILINGS POND
DIVERSION CHANNEL
STTP SLUDGE CELL
DIVERSION DAM
CARIBOU LAKE
CARIBOU LAKE DAM

0 500m
SCALE

THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:
AERIAL IMAGERY: GOOGLE EARTH 2013

GENERAL LAYOUT

CARIBOU MINE, NEW BRUNSWICK

Client: TREVALI MINING (NEW BRUNSWICK) LTD.

Job No.:	121616495
Scale:	1 : 20,000
Date:	2015 01 16
Dwn. By:	JL
App'd By:	EA

Dwg. No.: 2

Stantec

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THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC CONSULTING LTD. REPORT AND MUST NOT BE USED FOR OTHER PURPOSES.

Reference:
AERIAL IMAGERY: GOOGLE EARTH 2013

PROJECT OVERVIEW

CARIBOU MINE CONCENTRATOR & ASSOCIATED INFRASTRUCTURE
CARIBOU MINE, NEW BRUNSWICK

Client: TREVALI MINING (NEW BRUNSWICK) LTD.

Job No.:	121616495
Scale:	N.T.S.
Date:	2015 02 04
Dwn. By:	JL
App'd By:	EA

Dwg. No.: 3

Stantec

2.0 PROJECT DESCRIPTION

The proposed copper circuit will be located within the existing Caribou concentrator at the Caribou property. The Caribou mine and mill was previously subject to an EIA registration process back in 1996 under East West Caribou Mining Limited, through which its proposed construction and operation (including location and process) were deemed acceptable by the New Brunswick Department of Environment, leading to EIA approval of the current operations. The mine is located on Crown Land, although the land of the concentrator area is owned by Trevali. The mine site is located in a remote setting and is bordered by forested areas. The fully permitted enclosed concentrator which was historically used to process ore is located on what is considered a "Brown Field Location (BFL)", makes it an obvious location choice for ongoing mining and milling operations.

The current concentrator location being situated on a BFL, as well as it containing the lead and zinc separation circuits, make it an obvious location choice to add the proposed copper circuit. In addition, the existing concentrator infrastructure such as piping, pumping, electrical, mechanical components and concentrate storage/loading building will only require minor modifications to accommodate the copper circuit. Furthermore, the current concentrator is set up to meet all the process water requirements as well as reagent mixing/addition needs that the new copper circuit will require. As is the case for lead and zinc, copper will be shipped to the Port of Belledune using the same method of transportation as the previous operation.

Aside from the obvious economic benefits of extracting copper from the mill feed, this process will further enhance the tailings quality by removing copper from the tailings stream which would otherwise report to the tailings basin. In addition, by extracting copper from the tailings stream, this will further enhance the existing water treatment process, thus diminishing the copper load to the receiving environment.

The Project includes the addition of a copper separation circuit within the existing Caribou concentrator, extending the existing concentrate storage building and installation of a new transformer adjacent to the concentrator, shown on Figure 3.

This section describes the key aspects of the Project, as currently conceived, including:

- a description of the Project components, including the likely infrastructure and components associated with the Project, and proposed mitigation for potential environmental effects;
- a discussion of the activities that will be carried out during Construction, Operation, and eventual Decommissioning and Abandonment of the Project;
- consideration of alternative means of carrying out the Project; and
- a brief overview of potential accidents, malfunctions, and unplanned events.

2.1 PROJECT COMPONENTS

2.1.1 Project Components

The Project involves the following:

- construction of a new copper separation circuit within the Caribou concentrator;
- extending the current concentrate building to accommodate a copper concentrate storage/loading area; and
- the installation of a new transformer unit.

2.1.1.1 Physical Components and Dimensions of the Project

The concentrator is a multi-level structure occupying an area of approximately 4,000 square metres. The building is steel construction on concrete foundations. The building is a combination of an older structure, and newer (1996) construction. Both sections of the concentrator building are clad with steel siding. Two, 2,000 tonne concrete and steel coarse mill feed bins are located adjacent to the concentrator building.

Adjacent to the concentrator building are two concentrate storage buildings. The zinc storage building has a storage capacity of 6,500 tonnes. The lead concentrate storage building has a storage capacity of 3,000 tonnes. Both buildings are connected by a breezeway where concentrate transport trucks are loaded. All the concentrate storage and load out buildings are of steel construction with metal cladding. The concentrate storage buildings have 3 metre high concrete side walls and concrete floors.

An overview of the concentrator and supporting infrastructure is presented in Figure 3.

The new Cu separation circuit will fit entirely within the current permitted concentrator footprint. The general arrangement drawing (seen in Appendix A) highlights the process equipment that is proposed inside the current concentrator footprint. The few exceptions where equipment needs to be built/stored outside the current concentrator footprint are listed below:

- **Concentrate Storage Extension –** Currently there is a Concentrate storage building (annexed to the concentrator facility) on the property that was used to store lead (Pb) and zinc (Zn) concentrates from the previous operations. By adding a Cu separation process, it will be necessary to extend the current concentrate storage outside the existing building footprint. Currently two options are being considered but both will necessitate extending the current concentrate building.
    - Option 1 involves annexing an approximate 25 m x 6 m extension to the lead storage building. Within the new storage building, a hopper would store approximately 150 tonnes of Cu concentrate. The hopper would be used to fill the transport trucks in a fully enclosed environment while minimizing handling and spillage (Appendix A – Drawing 172-14-GA6).

  - Option 2 consists of adding an approximate 9 m x 6 m) extension to the lead storage building where the Cu concentrate would be housed and loaded on trucks by a loader via the current breezeway (Appendix A – Drawing 172-14-GA5).

- **Transformer Pad –** A new transformer needs to be installed outside of the north wall of the concentrator to help power the new Cu circuit. The transformer will be a dry type with no oil and sitting on a concrete pad with dimensions of 4 m x 2.9 m, which is also illustrated in Appendix A.

2.1.2 Components Description

2.1.2.1 Float Cells

The process is based on the installation of six (6) rougher/scavenger flotation cells and nine (9) cleaner cells. The rougher/scavengers will consist of two (2) banks, each containing three (3) cells installed in series. The rougher/scavenger cells arrangement is approximately 15.7 m long and 2.3 m wide, not including the launders. It is expected that each cell's impeller will be driven by a 22 kW (30 HP) motor and will require approximately 4.5 Am³/min (160 Acfm) of air at 18 kPag (2.6 psig).

To optimize the available space, it is proposed to install two cleaner cell banks in series with the remaining banks installed parallel to the other two. The two bank units will be 6.7 m long and 1.3 m wide, including the launders. The three cell unit is expected to be 3.5 m long and 1.253 m wide. The cell's impellers will be driven by 4 kW (5 HP) motors and necessitate approximately 0.7 Am³/ min (25 Acfm) of air at 9 kPag (1.3 psig).

2.1.2.2 Conditioning Tanks

Two conditioning tanks will be used to allow the injection of reagent in the slurry before being supplied to the rougher/scavenger banks. The first conditioning tank will be used to introduce SO_2 (from the existing tank stored outside the concentrator), while the second tank will be used for lime injection. The 1.6 m x 1.9 m x 2.8 m high tanks are dimensioned to allow a residence time of five (5) minutes and will be equipped with top mounted agitators. The SO_2 tank will also be equipped with an exhaust fan to maintain a negative pressure environment.

The proposed supports for the conditioning tanks will include installation of structural members between gridlines 11 and 12 on line A. These structural members will use the existing main columns as their connection points. This installation will also require some modifications to the existing cat walk arrangement.

2.1.2.3 Thickener

Following the cleaning stages, the concentrate will be gravity fed to the thickener to reduce the water content of the slurry. The proposed concentrate thickener will be installed next to the existing Pb Concentrate Storage Tank EQ # 32-ST002 between gridlines 10 and 11 and between gridlines Z and Zx. A portion of the existing steel frame parallel and near gridline 11 will need to be removed and modified to allow this installation. It is proposed to cut the existing steel frame on each side of the new thickener and add two new columns to support the frame ends. This will allow the removal of a portion of the existing frame. The demolition of the floor slab and one existing foundation will be required in this area

to permit the construction of the new thickener foundation. The thickener foundation will also serve as a foundation for the new frame columns.

The installation of the new Cu Concentrate Thickener will be challenging due to the size, weight and maneuverability of the equipment. The limited space and the 5-tonne gantry crane inside the concentrator building create restrictions, which may require an opening through the roof. The installation method will be better defined upon the completion of the detailed engineering.

2.1.2.4 Piping

The slurry process piping will be constructed from carbon steel piping and fittings, high density polyethylene (HDPE) piping and fittings and flexible rubber hoses, depending on the design flow rates and pressures. Carbon steel pipes will be specified on high pressure lines, HDPE pipes will be specified on gravity lines and low pressure lines 50 mm in diameter and above. Flexible hoses will be specified on gravity lines and low pressure lines below 50 mm in diameter.

2.1.2.5 Slurry Pumps and Pump Boxes

The concept developed during the preliminary engineering phase is based on the installation of six (6) slurry pumping systems. The systems will include the following:

a) Copper Conditioning Tank Feed Pumps (34-PU024 A&B);

b) #1 Copper Cleaner Feed Pumps (34-PU025 A&B);

c) #1 Copper Cleaner (or Scavenger) Feed Pumps (34-PU017 A&B);

d) #1 Copper Cleaner (or Scavenger) Tailing Pumps (34-PU026 A&B);

e) Copper Concentrate Holding Tank Feed Pumps (34-PU055 A&B); and

f) Copper Filter Feed Pumps (34-PU056 A&B).

Pumps a) to d) will include a pump box of circular shape, dimensioned to provide a retention time of one minute to allow the escape of any entrained air from the slurry. Pump boxes will be designed with sloped bottom, overflow, drain connection and abrasive resistant material in the feed area. All pumping systems, except the Copper Filter Feed Pump, will include one operating pump and one standby pump. The operating pump will be equipped with a Variable Frequency Drive (VFD), while the standby pump will include across-the-line type starter for motors under 30 kW (40 HP).

2.1.2.6 SO_2 Tank

The existing SO_2 system includes a 2.59 m outer diameter, 14.68 m long storage tank and associated supply piping to the concentrator. Four lines have been terminated inside the concentrator. The system has been recertified with the Province of New Brunswick as a pressure vessel and is ready to use. The scope will consist of extending one 15 mm diameter line to the SO_2 conditioning tank located ahead of the rougher/scavenger cells, install an exhaust fan and provide a pH level sensor to control the injection rates. The SO_2 consumption is expected to be 78 3g/tonne of mill feed. This equates to a volume of

1.62 m³ at a specific gravity of 1.45. The existing storage tank would have an autonomy of approximately 38 days.

2.1.2.7 Lime Injection

Lime is currently consumed in the lead and zinc recovery circuits at a rate of 2,520 grams per tonne (g/t) of mill feed. The addition of a copper recovery circuit will increase the lime consumption by 1,887 g/t for a total of 4,407 g/t. Lime will predominantly be injected in the second conditioning tank. Other lime injection points will be required at each cleaning stage to maintain a pH of 8.7 to compensate for pH reduction in the launder. The lime slurry is mixed to a ratio of 10% by mass with water. This will represent a consumption of 5,949.45 L/h (26.2 US gpm) of the mixture, a 75% lime consumption increase based on historical data.

2.1.2.8 MIBC Tank and Metering Pumps

This reagent is currently stored in a 1.0 m diameter by 1.5 m high tank. Eleven metering pumps are presently connected to piping headers from the storage tank. To service the copper circuit, it is proposed to install four additional pumps to the existing system. Based on the information provided, an additional 4 g/t will need to be injected to the copper circuit.

2.1.2.9 Aero 5100 Metering Pumps

As the Aero 5100 reagent was not used in prior concentrator operations, a new system will need to be installed. It is proposed to install five metering pumps mounted on a skid and store the reagent in either totes or 45 gallon drums. The installation will conform to the requirements of National Fire Code (NFC) 2010. Refer to section 2.4.3.2 for additional information on 5100.

2.1.2.10 Copper Storage Building Conveying System

Option 1 would see a takeoff from the existing lead conveyor system via a screw feed mechanism which would deliver the concentrate within an enclosed Cu storage hopper. The hopper would have an approximate 150 tonne capacity and would minimize handling requirements while loading the concentrate to trucks.

Option 2 would consist of installing an additional conveyor to allow the transfer of copper concentrate from the existing lead conveyor. The copper concentrate would be conveyed to a distinct storage area located outside the current building, presumably the proposed Cu concentrate storage building.

2.2 PROJECT ACTIVITIES

The Project consists of eight main activities, as follows:

Copper (Cu) Separation Circuit:

- preparing the concentrator area to accommodate the new copper separation circuit;
- installation of the new float cells, thickeners, pump tanks, piping and electrical components;

- tie in with the existing lead and zinc circuits;

Concentrate Building Extension:

- site preparation (geotechnical investigation, grading and leveling);
- pouring of new cement slab and foundations;
- erection of the new building structure and tie in with the existing concentrate building;

Transformer:

- pouring of a new cement slab for the new transformer; and
- the installation of the new transformer and tie in with the concentrator's electrical system.

2.3 CONSTRUCTION DETAILS

The large majority of the construction for the Cu separation circuit will be done offsite at the equipment manufacture or within the current concentrator footprint. This work is referring to the construction/installation of the float cells, thickeners, pump tanks, piping, electrical connections, etc.

During construction, it is anticipated that the following equipment will be required: an excavator; backhoe; roller; bulldozer; crane; boom truck; concrete trucks; flat beds; dump trucks; and small equipment.

With respect to the origin of the fill material, a minor component of the construction, it is anticipated that the material would be obtained from existing borrow pits in the area; however, a contractor has not been selected yet.

Contractor mobilization is scheduled for mid-May 2015. Some concrete work and steel erection will take place prior to the concentrator start up scheduled in April 2015. To be noted that the concentrator can start-up prior to the copper circuit being installed.

2.3.1 Work Schedule

It is anticipated that the Project will extend over a 3 month period starting in May 2015. The estimated working schedule would be 5-6 days per week, between 7 am – 6 pm, for the duration of the Project.

2.3.2 Structural

The installation of the proposed copper circuit into the existing concentrator building will necessitate modifications to the surrounding structures and the addition of supporting members. Modifications to the existing structures will be based on the installation of the new copper circuit's proposed primary components, including the flotation cells, the copper concentrate thickener, the conditioning tanks, and various smaller equipment associated with the process.

Additional concrete pads will be required throughout the area to allow the installation of various equipment such as pumps and motors. The lateral stability of the new supporting frames and modified supporting frames will be provided by cross-bracing and/or moment frames. Foundations will be designed based on structural and equipment load calculations.

In terms of the Cu storage building, at the time of writing a final decision was not yet taken on either proceeding with Option 1 or Option 2 (Refer to Section 2.6). Once the preliminary engineering and costing completed, an addendum to this report will be forwarded to NBDELG for review.

2.3.3 Electrical

As the Caribou mine concentrator is located on a BFL, any new power requirements for the Cu circuit will draw from the existing infrastructure.

The new copper circuit equipment requires approximately 900 HP of connected loads, which would be distributed between the existing available space in MCC #8, 11, 14 and CDPB panel and one (1) new three (3)-section 600 Amps MCC.

Based on a review of the facilities' connected loads, it was found that the existing 1.5 MVA transformer T5 was loaded to its maximum capacity. Therefore, from the main substation's cell #9, a new 3c #350MCM teck cable will be added which will be used to supply power to a proposed 1.5 MVA dry-type pad mounted transformer (T6) located outdoors, west of the existing SO_2 tank. Consequently, electrical room B will be extended to house a new switchgear (SG16), MCC and (8) VFDs which will be fed from transformer T6. In conclusion, the changes will require the following:

- Installation of new 3c #350MCM 5 kV cable from cell #9 in main substation to a new medium voltage switch SW06 located next to new transformer T6;
- Installation of a new 1.5 MVA transformer, mounted on a concrete slab west of the existing SO_2 tank;
- Extension of electrical room B (located within the concentrator) to accommodate the new electrical equipment;
- Installation of a new switchgear SG16 in the electrical room B extension;
- installation of one (1) new three (3)-section MCC rated at 600A for the installation of new copper rougher 30 HP motors;
- Installation of new cable trays, as required, to power the new copper line motors; and
- Installation of new starters in the existing free MCC buckets.

2.4 OPERATION AND MAINTENANCE DETAILS

Trevali plan's on extracting Cu from the Caribou deposit for the life of mine (LOM), which is currently estimated at 7 years, with the possibility of extension.

The Pb and Zn circuits in the Caribou concentrator will remain unchanged from the former Blue Note flow sheet (Appendix A). Blue Note Mining Corporation was the previous mine operator. The only change will be removing the Cu from the mill feed in-between the Pb separation stage and the Zn separation stage. The Cu circuit will be operated on a continuous basis, allowing for monthly planned shutdowns for maintenance (approximately 1 day per month).

The Cu concentrate will be stored short term in the Cu concentrate building (expansion of current lead building) and be trucked to the Port of Belledune by enclosed live bottom trucks or enclosed back dump trucks. Previously under Blue Note, back dump trucks were utilized. The storage capacity of the new Cu storage building/storage would accommodate approximately 5 days of production (Option 1) and 9-12 days of production (Option 2).

2.4.1 Process Description

As shown in Figure 4, tailings from the existing #1 Lead Cleaner will be conveyed by gravity to the proposed conditioning tank feed pump box at a rate of 81.09 m^3/h. The slurry will then be pumped into a SO_2 conditioning tank, which will overflow into the lime conditioning tank. Overflow from the lime tank will constitute the feed to the rougher/scavenger flotation cells. Tailings from the rougher/scavenger will be gravity fed to the zinc feed pump box, while concentrate will be pumped to the feed box of the subsequent cleaning stage consisting of three banks of three flotation cells. Concentrate from the last cleaning stage will also be gravity fed to the thickener, while the tailings will be diverted to the zinc feed box or recirculated to the rougher/scavenger cells if copper grading is unsatisfactory. The thickener underflow will be pumped to the two copper concentrate holding tanks until the press filter is available to process a batch of copper concentrate (Figure 4). From the press filter, the concentrate will be released onto an existing conveyor belt discharging in the lead storage building. It is proposed to install a second conveyor equipped with a diverting discharge chute and/or a screw feeder. This system will allow the lead and copper concentrate to be stored in two distinct piles (Option 2), or in the case of the copper, stored into a storage hopper (Option 1).

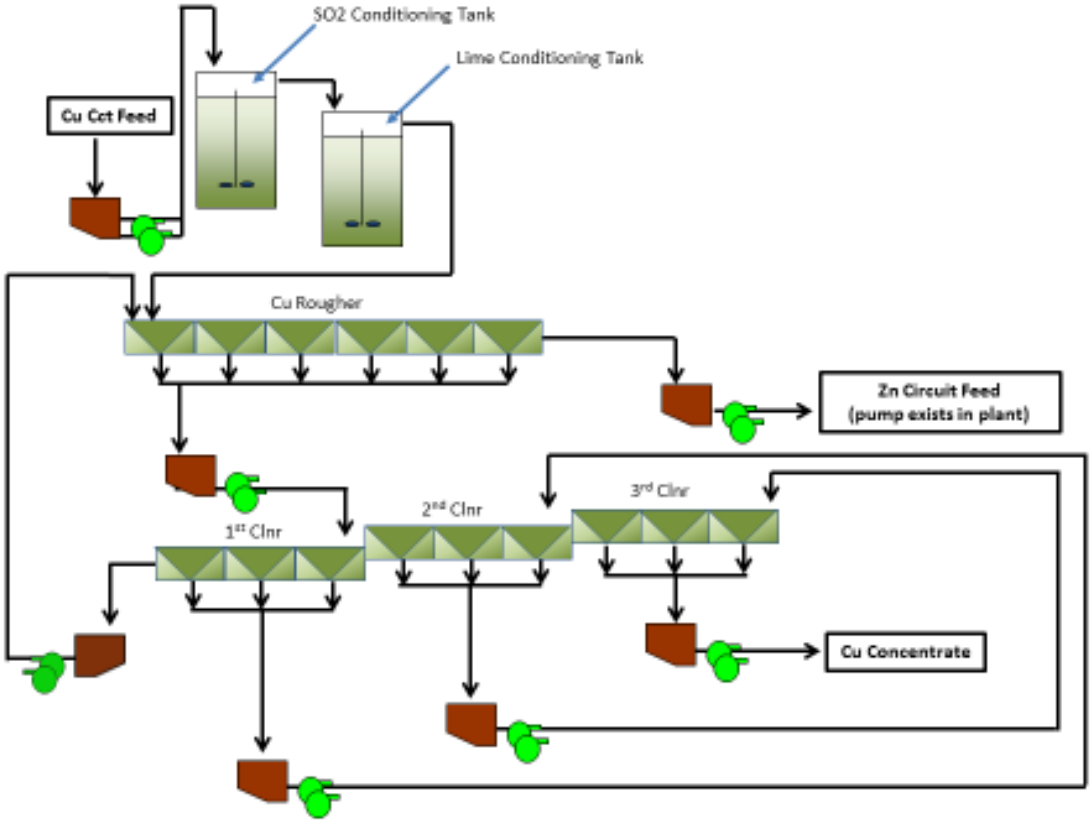

Figure 4 Copper Separation Circuit

2.4.2 Metallurgy

The Project will allow the recovery of Cu metal from the mill feed that previously reported to tailings and Zn concentrate. Approximately 1% of the concentrator feed from a tonnage perspective is expected to report to the new Cu concentrate.

- The Cu circuit flow sheet will follow the process outlined in Figure 4.
- The material balance of the Cu circuit can be seen in Appendix B.
- Table 1 illustrates the anticipated metallurgy for the Cu circuit, which shows the assay and recoveries of metals to the Cu circuit.

The size distribution and overall tonnage of the tailings will also change with the removal of a Cu concentrate from the mill feed. Trevali expects to produce approximately 27 tonnes of Cu concentrate per operating day (3,000 tonnes of mill feed). This material will have a P80 (particles passing of 80%) between 8-12 microns. Therefore, expected tailings size distribution should be very similar to historical tailings (Blue Note operation) with the exception that 27 tonnes of 8-12 micron material for every 3,000 tonnes of processed feed will be removed from the concentrator discharge (Table 1).

In regard to the tailings characteristics the estimated quantity of the initial concentrator feed reporting to tailings is 85.41%, compared to 85.08 % in 2008 and 89.17% in 2007 during the former Blue Note operation. The current estimated quantity is lower than the Blue Note average of 86.17%. The overall tailings characteristics will be further enhanced with the reduction of approximately 30% of Cu, Pb, Zn and 20% of Ag going out to tailings (Table 2). As previously done by Blue Note, tailings will be stored subaqueously within the South Tributary Tailings Pond (STTP) as per Trevali's tailings management plan in order to comply with environmental monitoring guidelines.

Table 1 Designed Metallurgy at 30 Micron Primary Grind, at Reduced Tonnage to Primary Circuit (Recoveries and Grades)

		Grades					Recoveries				
Product	Wt %	Pb	Cu	Zn	Ag	Au	Pb	Cu	Zn	Ag	Au
Feed	100	2.44	0.4	6.05	71	0.93	100	100	100	100	100
Pb Conc	3.52	45	0.4	6.05	655	2.00	65	3.52	3.52	32.5	7.58
Cu Conc	0.9	8	20	5.5	394	3.10	2.62	45	0.73	5	3.00
Zn Conc	10.16	1.22	0.7	50	126	0.91	5.08	17.79	84	18	10
Tailing	85.41	0.78	0.16	0.83	36.99	0.86	27.30	33.69	11.75	44.50	79.42

Table 2 Comparison of Expected Tailings to Historical Tailings (Blue Note)

	Pb%	Zn%	Cu%	Ag (g/t)
2008 YTD Avg Tailings (Blue Note)	1.13	1.22	0.22	46
Designed Tailings (Trevali)	0.78	0.83	0.16	37

2.4.3 Reagents

The copper process will require the injection of four different reagents including sulfur dioxide (SO_2), lime, a frother (MIBC), Aero 5100, and a flocculent. Previous operations included the use of all of these reagents except for 5100. A list and description of the required new reagents for the operation of the Cu circuit is listed in the Table 3.

Table 3 List of Additional Reagents Required for the Cu Circuit

	Historical Caribou (g/t)	New Cu Circuit (g/t)	Total Reagent Consumption (g/t)\	Increased Daily Reagent (kg/day)
Lime	2520	1887	4407	5661
Frother (MIBC)	21	4	25	12
Flocculant	30	15	45	45
SO_2	N/A	783	783	2349
5100 (Collector)	N/A	6	6	18

2.4.3.1 SO_2

SO_2 (sulfur dioxide) in compressed liquid form will be delivered to the process and introduced to a ventilated conditioning tank as a gas in the plant. The purpose of the SO_2 is to reduce the pH prior to the Cu circuit to depress Fe/Zn. The SO_2 liquid will be stored in a pressurized tank which already exists on the exterior wall of the concentrator. SO_2 is commonly used in other copper extraction processes in Canada.

2.4.3.2 Aero 5100 (Promoter)

Aero 5100 promoter, a Cytec reagent which is used to selectively float copper will also be used and stored in 45 gallon drums or totes and pumped to the process in liquid form directly from the drum. This reagent is commonly used in copper extraction processes throughout Canada and was used at the Brunswick No. 12 mine for several years without any issues.

2.4.3.3 Lime

Lime is used in the process to bring the pH back up where Cu minerals can be selectively floated after the SO_2 addition.

2.4.3.4 MIBC

MIBC is a frother that promotes bubble stability in the metals extraction process. It helps to prevent bubble collapse and increases the recovery of valuable metals. MIBC is also commonly used in other extraction processes in Canada.

2.4.3.5 Flocculent

Flocculent is currently consumed in the lead and zinc recovery stages at a rate of 30g/t of mill feed. The flocculent is mixed to a ratio of 0.8% by mass with water. This represents a total consumption of 506.25 L/h. The addition of a copper recovery circuit will increase this consumption by 15 g/t for a total of 45 g/t, increasing the mixture consumption to 759.38 L/h.

Prior to the Cu circuit installation, the vast majority of this material would be rejected to the tailings pond. By introducing the Cu circuit, the deposition rate at the tailings pond is actually reduced by a rate of 0.9% of the feed tonnage (approx. 30 tonne/day). This material that will no longer report to the tailings pond will have a P80 of 8-12 µm (Table 1).

2.4.3.6 Concentrate Shipping

The new Cu concentrate will be shipped to the Port of Belledune using the same method of transportation as the previously produced Pb and Zn concentrates. The initial trucking plan is to use enclosed live bottom dump trucks or back dump trucks to haul Cu concentrate from the existing concentrate storage building to the Port of Belledune where Zn concentrate is also shipped. The haulage trucks will transit via Route 180, Highway 11, Turgeon Road, and Route 134 to transport Cu concentrate from the Caribou Mine site to the Port of Belledune or Glencore's lead smelter.

2.5 FUTURE MODIFICATION, EXTENSIONS, OR ABANDONMENT

At current estimates, the LOM is approximately 7 years with the possibility of extension. A "Reclamation Plan" was filed for Caribou mine in June of 2012 which meets the current mine reclamation requirements as outlined in Part VI of New Brunswick Regulation 86-98, Sections 29(1)(bb), 30(2) and 30(3), under the *Mining Act* (O.C. 86-515). The overall objectives of the reclamation plan include:

- restoration of the health and fertility of the land to a self-sustaining, natural state;
- provision of an agreeable habitat for wildlife in a balanced and maintenance free ecosystem;
- provision of restored natural stream habitat in the proximity of the mine site capable of supporting fish and aquatic species;
- creation of a landscape which is visually acceptable and compatible with surrounding terrain;
- elimination, mitigation, and control of potential sources of pollution, fire risk, and public liability to within acceptable levels; and
- provide a safe environment for long term public access.

Near the end of the LOM, a detailed reclamation plan will be registered under the New Brunswick EIA process for approval. Following subsequent approval, all buildings, milling and mining infrastructure will be decommissioned as per the reclamation plan on file. As such the concentrator area will be graded, contoured and capped with till and re-vegetated. Milling equipment will either be sold, recycled or disposed of in an approved matter.

Therefore, decommissioning and abandonment will not be considered further in the assessment.

2.6 ALTERNATIVE MEANS OF CARRYING OUT THE PROJECT

While evaluating the copper circuit Project, the only alternative that was considered was the storage location of the new copper concentrate, whereas to; 1- build an extension to the existing lead storage building to store the copper concentrate in an enclosed hopper; 2- build an extension to the existing lead storage building to store the new Cu concentrate. Either option will require a similar type expansion in the same area (north wall of existing lead storage building).

2.7 APPROVALS, PERMITS AND AUTHORIZATIONS

The following list of authorizations and permits is typical for a Project of this type, however additional approvals may be required while existing approvals may be amended.

- Provincial EIA review and approval;
- Approval to Operate under the *Air Quality Regulation* and/or the *Water Quality Regulation*; and
- Building permits.

Other permits, approvals, or other forms of authorizations may be required from federal, provincial, and local authorities throughout the Construction and Operation phases of the Project.

2.8 ACCIDENTS, MALFUNCTIONS AND UNPLANNED EVENTS

Accidents, Malfunctions and Unplanned Events will be prevented and mitigated through a systematic approach to environmental protection.

The key Accidents, Malfunctions and Unplanned Events that could potentially occur during Construction of the Project are described below. Mitigation measures to prevent the occurrence of such events, and response procedures to be implemented in the event they do occur, will be developed prior to the commencement of each Project phase, as applicable.

2.8.1 Hazardous Materials Spill

A spill of petroleum, oil and lubricants (POLs) or other liquid hazardous materials may occur during any phase of the Project during refueling of machinery or through breaks or leaks in hydraulic lines of equipment. Such spills are usually highly localized and easily cleaned up by on-site crews using standard equipment and spill response materials. In the unlikely event of a large spill, soil, groundwater and surface water contamination may occur. This contamination can adversely affect the quality of groundwater, fish and fish habitat, and wetland habitat, and result in the ingestion/uptake of contaminants by wildlife.

Trevali will take necessary precautions, including the designation of fuel storage and fuelling areas according to provincial policy such that Construction activities will not result in the release of harmful material or substances and take necessary measures for containing and cleaning up spills which may occur, in a safe and efficient manner, and in accordance with federal and provincial reporting requirements.

2.8.2 Erosion and Sediment Control Failure

Failure of erosion and sediment control measures may occur during the construction of the concentrate building and the transformer pad due to precipitation events. Such an event would potentially result in the release of sediment-laden run-off to receiving watercourses with potential adverse environmental effects to fish and fish habitat. The scenario is highly unlikely since the closest water source is approximately 500 metres away, with various levels of runoff control on the property that would prevent sediment-laden water from entering a watercourse.

Standard erosion and sediment control measures, including the use of sediment/silt fencing and check dams, will be utilized if deemed necessary. Inspection and monitoring of erosion and sediment control measures will be conducted regularly during the construction phase of the Project, particularly during and after extreme precipitation events that result in visible overland flow of water. Erosion and sediment control structures found to be damaged will be repaired immediately and any other remedial action will be taken as necessary.

2.8.3 Fire

A fire may occur during any phase of the Project due to an equipment accident, human carelessness, or natural causes such as a forest fire under dry conditions. The immediate concern for a fire would be for human health and safety; additional concerns include habitat loss, direct mortality to wildlife, and loss or damage of property. The emissions from a fire would likely consist mainly of smoke (particulate matter) and CO_2, but could also include CO, NOx, SO_2, and other products of incomplete combustion. A large fire could create air contaminant levels greater than the ambient air quality standard over distances of several kilometres, but such cases would be of short duration and are not expected to occur.

Proper materials management (i.e., of fuel and other hazardous materials) and operational procedures (i.e., storage, handling and transfer) will reduce the potential for, and extent of, accidental Project-related fires. In the unlikely event of a large fire, local emergency response and firefighting capability will be called to respond to reduce the severity and extent of damage and to protect the safety of workers.

2.8.4 SO_2 Leak

SO_2 will be used in the new copper circuit. During past operations (i.e. Breakwater – mine operator previous to Blue Note), SO_2 was used with no issues. The SO_2 will be in the form of a compressed liquid and stored in an approved pressure vessel already installed on-site. The SO_2 will be delivered in liquid form to the process and introduced to a ventilated conditioning tank as a gas within the concentrator. An SO_2 leak would be covered by Trevali's Emergency Response Plan (ERP) for all active employees in the area. SO_2 gas monitors will be installed inside and outside the concentrator at critical points along the delivery system.

2.8.5 Discovery of a Heritage Resource

There is a low probability that a previously undiscovered artifact may be uncovered as a result of the Project since the construction area is located in excess of 500 metres from a watercourse (Fire Pond). Such a discovery would be most likely to occur from earth moving and excavation activities during Construction, e.g., construction of the copper concentrate storage building and the transformer pad. No other intrusive ground-disturbing activities are planned for the Project.

In the event that Project personnel encounter any potential heritage resources, work in the immediate area of the find (10 m radius) will be halted immediately, and the Archaeological Services Unit of the New Brunswick Department of Tourism, Heritage and Culture will be contacted (506-453-3115). The heritage resources will not be removed by anyone other than a licensed archaeologist.

2.8.6 Vehicle Accident

A vehicle accident could potentially occur during Construction when an anticipated increase in heavy truck traffic around the concentrator is likely to occur. Worker and truck traffic to and from the site, and the operation of heavy equipment on-site during Construction, have the potential to result in vehicle accidents during Construction.

Project-related vehicles will observe all traffic rules and provincial and federal highway regulations. Trucking activity for Construction will take place on designated routes, and traffic control will be implemented if needed, but is not anticipated.

2.8.7 Wildlife Encounter

There is the potential for workers to come into contact with wildlife during the Construction and Operation of the Project. This could have adverse environmental effects on both worker (e.g., disruption of work activity, or bodily harm) and wildlife (e.g., disturbance of critical life cycles). Frequent human activity in the area of the Project reduces the potential for wildlife encounters (i.e., posing a risk to public or worker health and safety or to the survival of the wildlife). In case of persistent or dangerous wildlife encounters, Trevali personnel shall notify NBDNR of the situation.

3.0 SUMMARY OF EXISTING CONDITIONS

3.1 GEOGRAPHIC LOCATION

The Caribou Mine is located in northern New Brunswick in Restigouche County at latitude 47°33' N and longitude 66°17' W. Specifically, the site is located 45 km west of the City of Bathurst. From Bathurst, the mine is accessed via Provincial Route 180 and the site is located approximately 4 km south off Route 180 via a gravel road. The mine is located on Crown Land, although the concentrator area is owned by Trevali. The mine site is located in a remote setting and is bordered by forested areas. Forestry activities are on-going around the mine site as well as recreational trail systems for ATV and snowmobiles (Figures 1 and 2).

Within the mine's footprint are a concentrator, office buildings, a water treatment plant, a shop/warehouse, a hoist room, a shaft, a compressor room, an electrical sub-station and several pump stations. The site also includes several historical tailings storage areas known as the Anaconda tailings (Ponds A, B, C, D, E, F and G-Pond). The current tailings area is located 1.5 km south east of the concentrator. The site is also characterized by a fire water retention pond called the "Fire Pond" which supplements the concentrator with process water (Figure 2).

Caribou Mine is a historical mine site with development activities dating back to 1966. Since that period, the mine has operated sporadically due to poor metal recoveries and fluctuating metal prices with the last mining campaign dating back to 2008, after which the mine entered into care and maintenance. Trevali acquired the mine in 2012 and are currently in the process of rehabilitating the concentrator and the underground mine. It is expected that the mine will be in production by the second quarter of 2015.

For the purpose of this document, the spatial boundaries for the Project include the Project Development Area (PDA) and the Local Assessment Area (LAA), defined as follows. The PDA includes the area of physical ground disturbance associated with the development of the Project facilities (Figure 3), as represented by the physical Project activities described in the Project Description. The LAA includes the PDA and other adjacent areas with a radius of 500 m around the existing concentrator (Figure 2), representing the outer limits where Project environmental effects might reasonably be expected to occur.

3.2 NOISE AND AIR QUALITY

The mine site is located in an environment close to a highway, and is situated in a remote area with no other industrial and/or private activities. Existing anthropogenic noise sources in the area include start-up activities associated with mine development and concentrator upgrades/refurbishment, road traffic and recreational activities from the nearby ATV and snowmobile trails.

There is no heavy industry in the direct vicinity of the mine site and background concentrations of air contaminants are expected to be minimal. Site specific background air quality data was carried out in 2007-2008 when the mine was in production and it was determined that air quality was not an issue. During very dry periods, fugitive dust was handled using a water truck to moisten the haul roads.

3.3 TERRESTRIAL ENVIRONMENT

Caribou Mine is situated in the Atlantic Maritime Ecozone. More specifically, the site is situated within the Tetagouche Ecodistrict and is a transitional area between the highlands of Ganong and Upsalquitch Ecodistricts to the west and the lower terrain of the Tjigog Ecodistrict to the east. The Tetagouche Ecodistrict is intermediate in elevation (200-400 metres) between the highlands of Ganong and Upsalquitch Ecodistricts to its west, and the lowlands of Tjigog Ecodistrict to the east (NBDNR, 2007).

No formal wildlife and/or terrestrial surveys have been conducted at Caribou Mine during the past few years. As such, the descriptions provided below are generally applicable for New Brunswick as a whole and are referenced from the Canadian Biodiversity Website for the Atlantic Maritime Region. Some of the species described below, may or may not be present in the immediate area of the Caribou property.

The forested area surrounding the LAA consists of typical Acadian Forests with a mix of conifers and deciduous trees. Typical conifers found are red spruce, black spruce, white spruce, balsam fir, red pine, jack pine, eastern white pine, tamarack, eastern white cedar and eastern hemlock. Deciduous trees include yellow birch, white birch, paper birch, sugar maple, red maple, striped maple, balsam poplar, pin cherry, speckled alder, beech, black ash, white ash, ironwood, basswood, white elm and red oak.

Plants in the area include blueberry, sphagnum moss, kalmia heath, smooth serviceberry, violets, wild lupins, starflower, trailing arbutus, lady slipper, pitcher plant, ostrich fern and purple loosestrife (introduced/invasive species).

Animals found within the area include large carnivores such as black bear, lynx and bobcat. The most common large herbivores are the moose, and whitetail deer. Small carnivores such as the red fox, muskrat, raccoon, striped skunk, marten, fisher, coyote, mink and river otter. Small herbivores include the eastern chipmunk, beaver, porcupine, snowshoe hare, northern flying squirrel, and woodchuck.

Birds of prey found in the area include, osprey, Cooper's hawk, broad-winged hawk, red tail hawk, common nighthawk, northern goshawk, northern saw-whet owl, short-eared owl and long-eared owl. Typical song birds include, red-winged blackbird, ruby-throated hummingbird, cedar waxwing, purple finch, and blue jay but to name a few. Other forest birds include the ruffed grouse, spruce grouse, northern flicker, downy woodpecker, pileated woodpecker. Waterfowl include the great blue heron, Canada goose, common loon, American bittern, common snipe, ring-necked duck, wood duck, American black duck, northern pintail and blue-winged teal.

Reptiles and amphibians found in the region are the American toad, northern leopard frog, mink frog, green frog, pickerel frog, wood frog and the spring peeper. Five species of salamanders and newt are found in the region: yellow-spotted salamander, blue-spotted salamander, dusky salamander, eastern redback salamander, and the eastern newt. Fresh water turtles may be found in the area (Canadian Biodiversity Website, February 2014), although none have been observed in the LAA while conducting routine sampling and aquatics work.

3.4 AQUATIC ENVIRONMENT

The nearest watercourses to the Caribou property include Forty Mile Brook, the Nepisiguit River, and Caribou Lake (Figure 2). Numerous fish and fish habitat studies have been conducted within the North and South Branches of Forty Mile Brook and the Nepisiguit River. Due to the historical nature of the mine site and the lack of environmental knowledge on the effects of Acid Rock Drainage (ARD) back in the 1960's, several locations along the North and South Branches of Forty Mile Brook are impacted. Most notably, the North Branch of Forty Mile Brook near the current location of G-Pond is seeing continued seepage from ARD due to the historical storage of waste rock along its banks. Furthermore, at the confluence of the North and South Branches of Forty Mile Brook is characterized by copper and zinc seepage coming from the historic Anaconda Tailings Area. This habitat is characterized by the absence of aquatic vegetation, fish species and benthic communities. Typically, the bottom at this location is covered with a "red and grey sludge precipitate" and has been deemed unproductive (R.A. Currie, 1988).

Sections of North Branch Forty Mile Brook above the current location of G-Pond and tributaries leading to the Fire Pond as well as Caribou Lake and its tributaries, the Diversion Channel and the South Branch of Forty Mile Brook between the Polishing Pond Discharge (PPD) and Station B are still intact and provide suitable habitat for fish, aquatic vegetation and benthic communities. During a recent electrofishing campaign as part of the Caribou Mines Environmental Effects Monitoring (EEM) required under the *Metal Mining Effluent Regulations* (MMER), fish species such as brook trout (*Salvelinus fontinalis*), and blacknose dace (*Rhinichthys astratulus*) were caught, although it is likely that other species such as minnows, sticklebacks and suckers are present (Caribou EEM Study Report, 2015 (pending release)).

3.5 ABORIGINAL LAND AND RESOURCE USE

Due to the industrial nature of the LAA and the restricted access that Trevali permits in and around the mine site for security reasons, it is very unlikely that land and resources at the Caribou property are used by Aboriginal persons. This assumption will be confirmed via discussions with Trevali's Mi'Kmaq Benefits Manager. In the event that land and resources within the area of the Mining Lease are identified as being used by the Aboriginal community, discussions will be held with the Mi'Kmaq Benefits Manager on how to best manage these uses within the current context.

3.6 HERITAGE RESOURCES

The PDA and LAA are both located within an existing industrial site (i.e. mine site). The site has been disturbed on numerous occasions during the construction, operation and maintenance of the mine site, as far back as the 1960s. Due to the limited footprint of the Project and its current location (i.e. concentrator), it is highly unlikely that heritage resources will be impacted. In the event that heritage resources are discovered, procedures as outlined in Section 2.8.5 will be implemented.

4.0 ENVIRONMENTAL EFFECTS ASSESSMENT

4.1 METHODOLOGY

To determine the potential for interactions between the Project and the environment, a qualitative rating system is employed. Each Valued Environmental Component (VEC) is rated based on the following rating system, rated according to the professional judgment and experience of the study team.

0 = No interaction. The environmental effects are not significant and are not considered further in this report.

1 = Interaction occurs, however, based on past experience and professional judgment the interaction would not result in a significant environmental effect, even without mitigation; or interaction would not be significant due to application of codified environmental protection practices that are known to effectively mitigate the predicted environmental effects. The environmental effects are not significant and are not considered further in this report.

2 = Interaction could result in an environmental effect of concern even with mitigation; the potential environmental effects are considered further in this report.

Where a potential Project-VEC interaction (*i.e.,* a rating of 2) is identified through the qualitative rating system, further discussion of the potential interaction is provided in the subsequent section. However, where no interaction is identified (*i.e.,* a rating of 0 or 1), the rationale of why no interaction exists, or why a limited interaction can be adequately mitigated without resulting in significant environmental effects, is provided, but the environmental effects are considered not significant and are not discussed further in this report.

The evaluation is provided in tabular form for ease in evaluation and communication.

4.2 POTENTIAL INTERACTIONS OF THE PROJECT AND THE ENVIRONMENT

4.2.1 Project-Environment Interactions Matrix

Based on the Project Description and the methodology described briefly above, the potential interactions between the Project and the environment are summarized in Table 4.

Table 4 Potential Interactions of the Project with the Environment

Project Phase, or Activities/Physical Works Associated with the Project	Atmospheric Environment	Water Resources	Aquatic Environment	Terrestrial Environment	Wetland Environment	Land Use and Economy	Archaeological and Heritage Resources	Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons	Road Transportation	Effects of Environment on the Project
Construction	1	0	0	1	0	1	1	0	1	1
Operation	0	1	1	1	0	1	0	0	1	1

KEY:
0 = No interaction. The environmental effects are not significant and are not considered further in this report.
1 = Interaction occurs; however, based on past experience and professional judgment the interaction would not result in a significant environmental effect, even without mitigation; or interaction would not be significant due to application of codified environmental protection practices that are known to effectively mitigate the predicted environmental effects. The environmental effects are not significant and are not considered further in this report.
2 = Interaction could result in an environmental effect of concern even with mitigation; the potential environmental effects are considered further in this report.

4.2.2 VECS with No Interactions, or No Significant Interactions with the Project

The VECs below have been identified as having either no interaction, or no significant interaction with the Project:

- Atmospheric Environment;
- Water Resources;
- Aquatic Environment;
- Terrestrial Environment;
- Wetland Environment;
- Land Use and Economy;
- Archaeological and Heritage Resources;
- Road Transportation;
- Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons; and
- Effects of Environment on the Project.

Further information on the justification for the 0 or 1 rankings is provided for each VEC below.

4.2.2.1 Atmospheric Environment

The Atmospheric Environment is characterized by Air Quality (ambient air quality and air contaminant emissions) and Sound Quality.

4.2.2.1.1 Air Quality

An extensive air quality monitoring network for various air contaminants has been operated by government and industry in New Brunswick for a number of years. The monitoring network was designed primarily to monitor compliance with ambient air quality standards; the monitors also serve as an early warning system for industry to initiate actions to reduce contributions to the airshed during periods of reduced atmospheric dispersion or poor air quality. According to the NBDELG report entitled "New Brunswick Air Quality Monitoring Results Report for 2010" (NBDELG 2012) and previous annual reports, the existing and historical ambient air quality in Bathurst, the closest air quality monitoring locations to the PDA, is generally considered good (NBDELG 2012). Furthermore, monitoring completed during the last mining campaign (2007-2008) at Caribou Mine determined that air quality was not an issue.

4.2.2.1.2 Sound Quality

Existing sound levels at the PDA and LAA have not been documented. Most of the LAA is surrounded by forested area dominated by natural sound. Within the LAA, noise associated with the existing mining and milling operations and additional sound from forest resources harvesting and recreational activity (all-terrain vehicle and snowmobile use, hunting) are expected. The nearest business/residence is located approximately 3.6 km (straight line) from the PDA. From the forested and hilly nature of the area, distance from the mine and the relatively low level of human activity, it can be implied that sound quality in the LAA is generally good.

4.2.2.1.3 Potential Environmental Effects and Mitigation (Atmospheric Environment)

4.2.2.1.3.1 Air Quality

During Construction and Operation, emissions of air contaminants to the environment may occur primarily from the operation of construction equipment associated with the Project (e.g., emissions from the combustion of fuel and dust). Particulate matter emissions may be associated with earth moving activities.

Emissions generated during Construction are expected to be relatively low given the very limited nature of the Project, at times intermittent, and of short duration. Overall emissions from heavy equipment during construction activities of the Project are not expected to exceed ambient air quality standards for New Brunswick. Equipment will be maintained in good working order to ensure that emissions are within manufacturer's performance specifications.

The emission of particulate matter (i.e., dust) during Construction would be primarily restricted to activities associated with earth moving and construction of the Cu concentrate building and transformer pad. Dust will be managed effectively in dry periods using standard dust suppression best management practices (e.g., water) on the exposed ground surface and stockpiles.

Construction related emissions from the Project will be short term, intermittent over the 3-month construction period, and will not have any substantive interactions with Air Quality.

4.2.2.1.3.2 Sound

Construction will involve the use of some heavy equipment. No blasting or pile driving is required for this Project. Noise generated from the Project is likely to be localized to the LAA, where possible mufflers and other mitigation measures will be undertaken to further reduce noise. Increased sound quality from the Project is anticipated to be non-consequential compared to the current sound levels related to mining and milling activities. As such, substantive interactions with Sound Quality are not expected to occur.

Overall, the Project is not expected to result in substantive interactions with the Atmospheric Environment.

4.2.2.2 Water Resources

Water resources include surface and groundwater in the LAA.

Since ground disturbance will be limited to a very small area of the mine site within which the PDA will be located and only for a short period during the Construction phase, surface and groundwater resources will not be significantly altered.

The operation of the new copper circuit will require additional water usage in the order of 144 m^3/day on top of the existing concentrator water requirements. The additional water will be taken from the Fire Pond. Water extraction from the Fire Pond is currently covered under Certificate of Approval to Operate I-8310, where Trevali is permitted to pump an average of 1,750 m^3/day (maximum of 2,000 m^3/day) of process water from the pond, providing that they meet base flow requirements. It is anticipated that the concentrators fresh process water needs will be well within these limits.

No groundwater is used for potable or domestic use within the PDA and/or the LAA. Potable water for the site is pumped from the nearby Caribou Lake which also falls under Trevali's Certificate of Approval to Operate in terms of maximum daily pumping rates.

In terms of water quality, with the addition of the new copper circuit, tailings will be reduced in the order of 30 tonnes/day, thus reducing the overall metal loadings for copper, lead and zinc (Table 2). By reducing the metal loading, the water quality of the tailings pond should improve or remain near the status quo. Furthermore, under its Certificate of Approval to Operate, Trevali is obligated to collect mine water and any contaminated surface run-off from the facility that does not comply with provincial limits set in their Approval. In addition, the Caribou mine facility is also in the obligation to comply with the *Metal Mining Effluent Regulations* (MMER) which prohibits the discharge of deleterious substances to the receiving environment beyond certain thresholds. As such, the mine and process water used at Caribou are treated with lime and flocculent to extract the metals and adjust the pH to federal and provincial standards prior to discharge in the receiving environment. This will not change with the addition of the new copper circuit, and water quality is not expected to be adversely affected.

As stated previously, one new reagent will be used for the new copper circuit (i.e., Aero 5100 Promoter). This reagent has been successfully used in other copper extraction processes (i.e., Brunswick Mine No. 12 concentrator) and did not cause any adverse environmental effects (S. Wood, per. comm. Feb. 2015). It is not anticipated that this reagent will cause adverse effects at Caribou.

4.2.2.2.1 Potential Environmental Effects and Mitigation (Water Resources)

The Project is being undertaken at an existing facility and Project activities will not result in any substantive changes to the groundwater or surface waters from existing conditions. There are no substantive users of surface water or groundwater for use as potable water or other uses in the immediate vicinity of where Project-related construction activities will take place.

Additional "fresh" water usage requirements in the order of 144 m³/day will be needed for the operation the copper circuit. As the copper floatation process is refined, the need for "fresh" water may be replaced with Reclaimed water from the tailings impoundment and would eliminate the additional fresh water need, although this will be based on process requirements and performance.

With the reduction in tailings provided by the copper circuit, metal loadings will be reduced. A reduction in loading will be beneficial to the existing water treatment process. As is currently the case, mine water, process water and surface run-off will continue to be treated by Trevali to provincial and federal standards.

During construction of the Cu concentrate building and the transformer pad, surface water run-off will be managed through typical construction mitigation measures (e.g., sediment or silt fence, use of geotextile materials).

As such, the Project is not expected to result in substantive interactions with Water Resources.

4.2.2.3 Aquatic Environment

The aquatic environment around the Caribou mine has been historically affected by Acid Rock Drainage (ARD) arising from the storage of acid generating waste rock on surface and from the historic Anaconda tailings. As such, portions of the North and South Branches of Forty Mile Brook are considered as having poor aquatic habitat. The Fire Pond is not considered to be fish habitat by the Department of Fisheries and Oceans (DFO) since it does not support aquatic life and does not provide fish passage (F. Plante letter dated 4 February, 2015 (DFO)). As its name states, the pond was created as a water retention basin to be used in case of fire. Although it does not support a fish community, water extraction from the pond is still regulated by Trevali's Certificate of Approval to Operate and is subject to minimum flow requirements based on low flow requirements provided by DFO. The additional water uptake from the concentrator to supply the new copper circuit will not adversely affect the pond's discharge rate or overall aquatic environment compared to existing conditions.

A portion of the South Branch of Forty Mile Brook between the PPD (i.e. final discharge location) and Station B (approx. 200 metres downstream) currently supports aquatic life. Habitat assessments and electrofishing surveys conducted at these locations in the fall of 2014, showed the presence of good fish habitat supporting brook trout and blacknose dace. The current provincial and federal water quality requirements which are applied at the PPD provide adequate protection to the receiving environment.

Based on reduced tailings volume and metal loadings, it is not anticipated that the copper circuit will have adverse environmental effects on the receiving aquatic habitat.

4.2.2.3.1 Potential Environmental Effects and Mitigation (Aquatic Environment)

The Project is being undertaken at an existing facility and Project activities will not result in any changes to the existing aquatic environment. All surface run-off on the mine site will continue to be collected and treated as currently.

With the reduction in tailings provided by the copper circuit, metal loadings in the liquid discharge to the aquatic environment may be further reduced. Water quality and quantity discharged at PPD are not expected to change with the addition of the copper circuit, thus leaving the aquatic environment unchanged from its current condition. With the reduction of copper in the tailings, water quality is expected to remain as currently or improve, thus helping with the water treatment process.

During construction of the Cu concentrate building and the transformer pad, surface water run-off will be managed through typical construction mitigation measures (e.g., sediment or silt fence, use of geotextile materials) and will not negatively affect the aquatic environment.

As such, the Project is not expected to result in substantive interactions with the Aquatic Environment.

4.2.2.4 Terrestrial Environment

The context of the Terrestrial Environment includes Wildlife (*i.e.*, birds and animals) and Wildlife Habitat.

The Project is located on the Caribou Mine property, where a mine, concentrator and other infrastructure have been located for more than half a century. The wildlife in the area is not expected to be of an unusual abundance or diversity (NBDNR 2007). The PDA and LAA do not contain any important or specialized habitat and the areas surrounding the LAA are typical of forested areas found in northern New Brunswick.

According to the Atlantic Canada Conservation Data Center (AC CDC), there have been three wildlife (3 birds) species of conservation concern observed within a 5 km radius of the PDA, all of which are ranked S3 (i.e. vulnerable) or lower. No "location sensitive" species were identified (AC CDC 2014; Appendix C).

The AC CDC report identified the following species as being observed within a 5 km radius of the PDA:

- Common Nighthawk (*Chordeiles minor*);
- Barn Swallow (*Hirundo rustica*);
- Evening Grosbeak (*Coccothraustes vespertinus*).

The Common nighthawk is considered "threatened" by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the *Species at Risk Act* (SARA). The Common nighthawk traditionally nests on the ground in open areas such as burns and clearcuts. While only considered "threatened" under COSEWIC and not protected under SARA, the Barn swallow typically nests on man-made

structures or cliffs and their nests are made of mud. They forage in open areas such as fields and open bodies of water (i.e. lakes and ponds). The Evening grosbeak is not ranked under COSEWIC and/or SARA, but is provincially ranked as being "Sensitive". Typically found in flocks, they forage in tree tops for insect larvae and eat seeds, buds, berries and small fruits. The Common nighthawk, Barn swallow and Evening Grosbeak are not expected to be directly affected by the Project.

Typical assemblages of wildlife (moose, white tail deer, bears, etc.) are anticipated to be present proximate to the LAA. Refer to Section 3.3 for a complete description.

No Important Bird Areas (IBAs) are located within the LAA of the Project. The closest IBA to the PDA is the Nepisiguit Highlands (NB024) located approximately 50 km west of the Project.

No Environmentally Sensitive Areas are noted to be within the LAA of the Project. No other locations of critical or sensitive habitat for wildlife are known within the 5 km of the LAA.

4.2.2.4.1 Potential Environmental Effects and Mitigation (Terrestrial Environment)

The Project will be constructed within the existing general concentrator footprint and the construction and operational features of the Project is not expected to substantively interact with the Terrestrial Environment, including any Species at Risk or Species of Conservation Concern. No clearing of vegetation and grubbing on land outside of the PDA during Construction of the Project is anticipated. Although sound generated by Construction may deter some species e.g., birds, from inhabiting the LAA during Construction, the disturbance will be short-term and intermittent, and there is an abundance of similar suitable habitat within and outside of the LAA. As such, the Project is not expected to substantively interact with the Terrestrial Environment.

4.2.2.5 Wetland Environment

4.2.2.5.1 Wetlands

There were no wetlands identified within 30 m of the PDA (Google Earth 2013). The PDA is not within any important or specialized habitat that is not found widespread throughout the northern part of New Brunswick.

4.2.2.5.1.1 Plant Species of Conservation Concern

The AC CDC report included one rare or uncommon vascular plant species that was observed within a 5 km radius of the PDA. The Small yellow pond-lily (*Nuphar lutea ssp. pumila* – S3) was recorded approximately 1.8 km +/-1 km south of the PDA presumably in the vicinity of Caribou Lake. The Small yellow pond-lily is provincially ranked as being "Secure" and is not listed under SARA, NB SARA, or COSEWIC. This water lily occurs in open, slow moving water such as lakes, streams and ponds generally less than 0.5 m in depth. The Small yellow pond-lily is not expected to be directly affected by the Project.

4.2.2.5.2 Potential Environmental Effects and Mitigation (Wetland Environment)

4.2.2.5.2.1 Wetland Habitat

There is no known wetland within the PDA, as such substantive interactions with wetlands or the Wetland Environment are not expected.

4.2.2.5.2.2 Plant Species of Conservation Concern

One rare or uncommon vascular plant species, Small yellow pond-lily, was identified in the AC CDC database but lies outside of the LAA. Since the PDA is located several kilometres to the north from its potential location (i.e. Caribou Lake area) and that construction/operational activities will not affect that location, the Project is not expected to substantively interact with plant species of conservation concern or the Wetland Environment.

4.2.2.6 Land Use and Economy

The Caribou Mine is located in an area with a long history of mining. With the recent closure of the Brunswick No. 12 Mine (B-12 Mine), the area is in need of employment opportunities in mining, and has a large pool of experienced mining personnel, contractors, and service providers available to service the Project.

The Caribou Mine has operated intermittently since the 1960's. Since the Project will be within the existing concentrator area, it is not anticipated that land use will be an issue since the mine site has had an industrial vocation for years. Natural resource extraction (forestry) and recreation (snowmobile, ATV and hunting) activities have co-existed for years outside the LAA with no major issues.

The re-opening of the Caribou Mine will make use of the existing infrastructure on an already disturbed site and the addition of a copper circuit will enhance the mines profitability and make better use of a non-renewable resource.

4.2.2.6.1 Potential Environmental Effects and Mitigation (Land Use and Economy)

Construction-related employment and direct and indirect expenditures within the local area will result in a short-term increase in employment and GDP as a result of increased spending by the labor force in the area, no substantive positive or negative interactions with Land Use and Economy as a result of the Project are anticipated. While local business and industry will be positively affected during Construction, no long-term effect of the Project in terms of substantial increased employment or expenditures during Operation is foreseen (excluding the normal staffing requirements needed to operate the concentrator and the mine when it re-opens).

The principal environmental effects on land use will be ground disturbance during construction, within an existing and establish industrial property. As stated previously, the concentrator lies within the Caribou Mine site which is already considered a Brown Field Location.

After Construction, the land will revert to normal operating conditions. Notification of the Project, its timelines and anticipated environmental effects will be provided through the public, stakeholder and

Aboriginal engagement process. No mitigation proposed beyond that described elsewhere in this EIA Registration is planned in respect to Land Use and Economy.

As such, substantive interactions with Land Use and Economy are not expected to occur as a result of the Project.

4.2.2.7 Road Transportation

The Road Transportation network is typically characterized by the Level of Service, Road Network Infrastructure, and Traffic Safety.

No new roads will be constructed that would interfere with the existing Road Network Infrastructure near Caribou Mine. The single road leading in to the PDA will be used by more heavy equipment traffic once the mine becomes operational in April 2015, thus the additional heavy equipment requirements linked to the construction phase of the Project will be negligible. Once the copper circuit is operational, it is anticipated that 1 additional concentrate truck load per day will be required on top of the regular concentrate shipping. A change to the level of service of the road is not anticipated from being substantively different from previous mining operations.

4.2.2.7.1 Potential Environmental Effects and Mitigation (Road Transportation)

As the Project is relatively small, and will not require large numbers of heavy equipment, it is not anticipated that any damage to the road network infrastructure will occur as a result the movement of equipment and personnel to the site. Project-related vehicles will observe all traffic rules and provincial and federal highway regulations, trucking activity for Construction will take place on designated routes, and traffic control will be implemented if needed; therefore, changes to current traffic safety levels are not anticipated.

Overall, no substantive interactions are expected between the Project and Road Transportation.

4.2.2.8 Archaeological and Heritage Resources

Past excavation of the area, the long-standing industrial nature of the site, and the site location make this area unsuitable for archaeological finds.

A significant archaeological resource is defined as a site that contains features (non-removable indications of past human use and activity, such as a fire hearth, a living floor, or a burial site) in addition to artifacts determined by the provincial regulatory agency to be significant. The disturbance of an individual artifact is not normally considered significant.

4.2.2.8.1 Potential Environmental Effects and Mitigation (Archaeological and Heritage Resources)

The Project will be carried out entirely on existing developed land, adjacent and within an existing concentrator facility that has been in place since the 1980's. Furthermore, the PDA is located several hundred metres away from any watercourse, making archaeological finds very unlikely. Construction activities (including some excavation) will take place to construct the Cu concentrate building and the transformer pad. Both these areas have previously been excavated during the initial construction of the

concentrator and associated infrastructure. Furthermore, underground pipes are also strewn within those areas, indicating previous excavation.

While all earth-moving activities have the potential to uncover previously undiscovered artifacts, the earth moving activities required to complete the Construction of the Project are relatively limited in scope, and are very limited in geographic extent to a very small footprint that is within the existing fence line of the mine site in an area that has been used for industrial and mining purposes for several decades. There is no planned disturbance of previously undisturbed soils as a result of the Project—all activity will either be within existing buildings, or result in the construction of new buildings and infrastructure in areas adjacent to existing buildings within the developed mine site. Due to the pre-disturbed/industrial nature of the site and its location away from a watercourse, the discovery potential of an archaeological or heritage resource during any phase of the Project is very low because of the relatively limited extent of disturbance associated with the Project and the fact that previous development has taken place in and adjacent to the PDA. However, if cultural materials were to be discovered during the construction, the work would be interrupted and consultation would be made with Archaeological Services of the New Brunswick Department of Tourism, Heritage and Culture.

A potential environmental effect of the Project on Archaeological and Heritage Resources would be the permanent loss or destruction of a heritage resource material. Based on the pre-existing industrial nature of the site, the Project is not expected to interact with an area considered to hold a high potential for undocumented archaeological resources. In the unlikely event that archaeological artifacts are uncovered, procedures set out in Section 2.8.5 will be applied.

As such, substantive interactions with Archaeological and Heritage Resources are not expected to occur as a result of the Project.

4.2.2.9 Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons

The LAA does not include any First Nation reserve land although it is within Mi'kmaq traditional territory. The nearest First Nation reserve is the Pabineau First Nation, located along the Nepisiguit River near Bathurst. Despite the long-standing industrial nature of the site, it is likely that the Aboriginal community will have an interest in the Project. At this time, it is unknown whether traditional resources in the LAA are collected by First Nations, although based on the nature of the site (a mine site), and imposed site access restriction by Trevali for security purposes, would lessen the probability that resources in or adjacent to the LAA would be used for traditional purposes.

4.2.2.9.1 Potential Environmental Effects and Mitigation (Land and Resources for Traditional Purposes by Aboriginal Persons)

The EIA registration must determine how the Project may affect the current use of land and resources by Aboriginal persons for traditional purposes ("traditional use"). This is normally achieved after engagement with the Aboriginal leadership (i.e., Chiefs and in some cases, umbrella organizations, where the Chiefs desire that level of consultation). Trevali employs a Mi'Kmaq Benefits Manager that regularly communicates and consults with the Aboriginal communities on various issues/projects that are on-going at Caribou Mine. Via the Mi'kmaq Benefits Manager, Trevali will continue to engage the Aboriginal community to understand whether there is any current use of land and resources for traditional purposes by Aboriginal persons.

As such, with accommodation for any documented current use of land and resources for traditional purposes that is ultimately determined to adversely affected by the Project, it is not expected that the Project will cause any substantive interactions with the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons.

4.2.2.10 Effects of Environment on the Project

A number of planning, design and construction strategies have been considered as part of the Project to minimize the potential effects of the environment on the Project so that the risk of serious damage to the Project can be reduced to acceptable levels.

Compliance with these and other design codes and construction practices will ensure that the Project is developed, conceived, constructed and operated in such a manner that it inherently accounts for environmental forces that, if not accounted for, could cause a significant adverse effect on the Project. Environmental factors such as, severe weather, seismicity, and other environmental forces will be addressed as part of the Project design.

Extreme rain events during Construction can create difficult working conditions. Rain is an expected work difficulty and the construction schedule considers delays due to potential rain events. In the event of extreme rain, standard construction practices for erosion and sediment control will mitigate that erosion and sedimentation are addressed appropriately to minimize the potential environmental effects.

The data from the Geological Survey of Canada's National Earthquake Database (NEDB) (http://www.seismo.nrcan.gc.ca) show very few seismic events in the vicinity of the Project. Epicentres cluster in three regions: Passamaquoddy Bay region; Central Highlands (Miramichi) region; and Moncton region. The Project, and all related facilities, have been designed to the applicable standards for earthquakes, although this is an unlikely scenario for the area.

4.2.2.10.1 Potential Environmental Effects and Mitigation (Effects of Environment)

The Project has been conceived and will be constructed and operated in such a manner that substantive interactions from the effects of the environment on the Project are not likely to occur. These effects have been considered through design standards and building codes.

5.0 PUBLIC, STAKEHOLDER, AND ABORIGINAL ENGAGEMENT

5.1 PUBLIC AND STAKEHOLDER ENGAGEMENT

Public consultation will be undertaken on a number of levels including: direct engagement with individuals and stakeholders; direct notification about the Project to elected officials and neighbors of the Project; and follow-up meetings if required. If deemed necessary, an open house session may be held depending on stakeholder response.

Key stakeholders will be contacted, and those who express an interest in the Project will be provided with a project information sheet, including a map showing the location of the Project, and a written description of key features of the Project. A preliminary list of potential stakeholders to be notified of the EIA Registration is provided in Table 5.

Table 5 Preliminary List of Stakeholders

Government	
Provincial MLA Restigouche-Chaleur	Daniel Guitard
Provincial MLA Bathurst West-Beresford	Brian Kenny
Provincial MLA Bathurst East-Nepisiguit-Saint-Isidore	Denis Landry
Federal MP Acadie-Bathurst	Yvon Godin
City of Bathurst	Stephen Brunet (Mayor)
Recreation and Natural Resource Groups	
Nepisiguit Snowmobile Club	TBD
Chaleur Snowmobile Club	TBD
Nepisiguit River Management Committee	Bob Baker
Nepisiguit Salmon Association	Bob Baker
New Brunswick All Terrain Vehicle Federation	Roger Daigle
New Brunswick Federation of Snowmobile Clubs	Sandy Young

In the event that the Proponent deems necessary to conduct an open house, the purpose of the session will be to inform and update stakeholders on the Project, answer any questions, solicit input, and to collect and communicate any concerns back to appropriate Trevali personnel and, therefore as relevant, into the environmental assessment and regulatory process.

An open house may also be organized for the First Nations community if so desired by the Aboriginal leadership. If deemed necessary by Trevali, the open house will be scheduled following the filing of the Project Description/EIA Registration.

Comments from the public and stakeholders on the Project will be considered in the EIA during the review process.

Trevali may choose to hold one or more special meetings with directly affected stakeholders, e.g., First Nations, local enterprise or elected officials to discuss their interests and concerns in a more focused and structured setting, depending on the outcomes of early consultation and the open house.

Copies of the Project Description/EIA Registration document will be made available at the following locations for public viewing:

- online on Trevali's website;
- the Project Assessment Branch of NBDELG in Fredericton;
- the Regional Office of NBDELG in Bathurst; and
- the Smurfit-Stone Public Library in Bathurst.

5.2 ABORIGINAL ENGAGEMENT

First Nations will be engaged through early communication with Trevali's Mi'kmaq Benefits Manager. First Nations input will be sought on the overall engagement process for their communities and others that they may identify as being potentially affected by the Project. First Nations communities are constructed communities, and members who live outside of the community may have an equal interest in the Project to those currently residing at Pabineau First Nation. For this reason, Trevali will remain open to engaging with more First Nations communities or organizations, particularly if specifically requested to do so by any First Nation organization.

Aboriginal engagement will be initiated early and continue throughout the course of the EIA review. As described above, Trevali will initiate discussions about the Project with its Benefits Manager after registration of the Project. The Proponent will follow the direction and interest of the Benefits Manager and undertake engagement with the Aboriginal community in consideration of the wishes of the aboriginal communities of how they wish to be engaged, if at all. The Proponent will work with the Province of New Brunswick officials who will be conducting engagement with First Nations regarding the Project.

5.3 REPORTING

A summary report on public engagement activities will be filed with NBDELG within 60 days of registration.

6.0 CLOSURE

This document was prepared in conjunction by Trevali Mining Corporation (Trevali), Stantec Consulting Ltd. (Stantec) and Roy Consultants (Roy) personnel. The Construction and Operation related sections were prepared by Roy and Trevali, while the Environmental sections were prepared by Stantec. The report may not be relied upon by any other person or entity, other than for its intended purposes, without the express written consent of Stantec.

This report was undertaken exclusively for the purpose outlined herein and was limited to the scope and purpose specifically expressed in this report. This report cannot be used or applied under any circumstances to another location or situation or for any other purpose without further evaluation of the data and related limitations. Any use of this report by a third party, or any reliance on decisions made based upon it, are the responsibility of such third parties. Stantec accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

Stantec makes no representation or warranty with respect to this report, other than the work was undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. Any information or facts provided by others and referred to or used in the preparation of this report were assumed by Stantec to be accurate. Conclusions presented in this report should not be construed as legal advice.

The information provided in this report was compiled from existing documents and data provided by Trevali and Roy and by applying currently accepted industry standard mitigation and prevention principles. This report represents the best professional judgment of Stantec personnel available at the time of its preparation. Stantec reserves the right to modify the contents of this report, in whole or in part, to reflect any new information that becomes available. If any conditions become apparent that differ significantly from our understanding of conditions as presented in this report, we request that we be notified immediately to reassess the conclusions provided herein.

STANTEC CONSULTING LTD.

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7.0 SIGNATURE

February 12, 2015

Anna Ladd, Chief Financial Officer
for
Dr. Mark Cruise, Chief Executive Officer
Trevali Mining Corporation

Date

8.0 REFERENCES

8.1 LITERATURE CITED

AC CDC. 2014. Atlantic Canada Conservation Data Centre data response, AC CDC Report 5303: Caribou Mine, NB. November 7, 2014.

Culture and Sport Secretariat. 2004. Guide to Heritage Resource Impact Assessment in New Brunswick – New Brunswick manuscripts in Archaeology 35.

NBDNR (New Brunswick Department of Natural Resources). 2007. Our Landscape Heritage: The Story of Ecological Land Classification. Prepared by New Brunswick Department of Natural Resources, The Ecosystem Classification Working Group. Vincent F. Zelazny, General Editor. 2nd Edition. Originally issued 2003. ISBN 978-1-55396-203-8 in New Brunswick.

Scott, W.B. and E.J. Crossman. 1993. Freshwater Fishes of Canada. Fisheries Research Board of Canada, Ottawa, ON.

Stantec Consulting Ltd. (publication pending). Caribou Mine Environmental Effects Monitoring Interpretive Report (Cycle 1). Trevali Mining Corporation.

R.A. Currie Ltd., 1988. Caribou Mines 1987 Biological Monitoring Report. Caribou New Brunswick Mining Ltd. 18 pp plus appendix (in Jacques Whitford 1996. ''1995 Caribou Mine Pre-Opening Baseline Aquatic Survey''.

8.2 INTERNET SOURCES

http://canadianbiodiversity.mcgill.ca/english/ecozones/atlanticmaritime/atlanticmaritime.htm (Consulted February 2014).

http://www2.gnb.ca/content/dam/gnb/Departments/nr-rn/pdf/en/ForestsCrownLands/ProtectedNaturalAreas/OurLandscapeHeritage/ForewordIntroduction-e.pdf (Consulted February 2014).

http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/GuideEnvironmentalImpactAssessment.pdf (Consulted December 2014).

http://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/AirLair/AirQualityMonitoringResults2010.pdf (Consulted January 2015).

http://www.ibacanada.ca/index.jsp?lang=en (Consulted January 2015).

http://www.naturenb.ca/programs/bsp/important-bird-areas/ (Consulted January 2015).

8.3 PERSONAL COMMUNICATIONS

Plant, François. Fire Pond Habitat Determination Letter. Department of Fisheries and Oceans. February 2015.

Woods, Shawn. Brunswick 12 Mine Concentrator Metallurgy and Environmental Effects. January 2015.

Appendix A

Engineering Drawings (Copper Circuit)

Trevali Mining Corporation

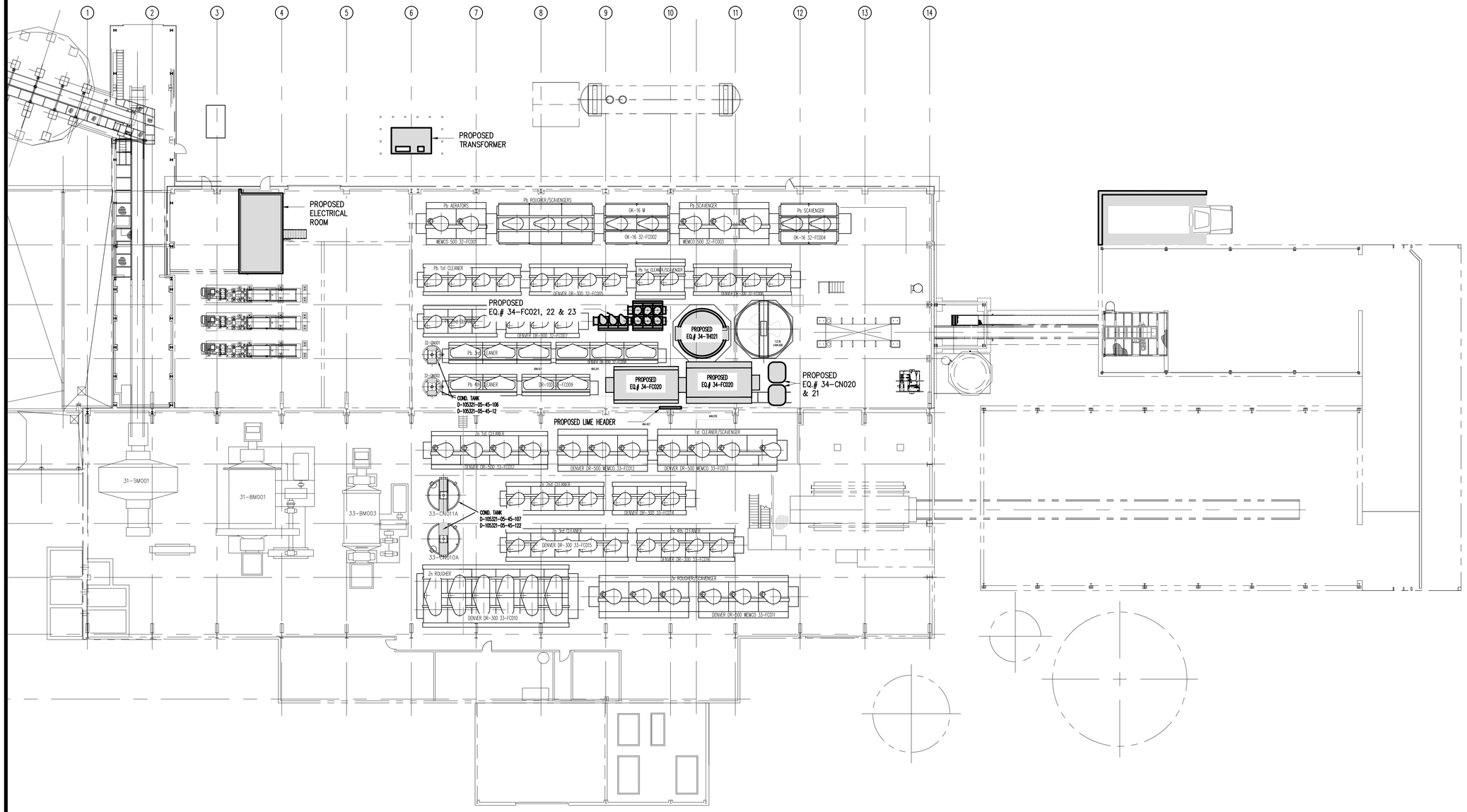
Bathurst, New Brunswick

Caribou Mine Cu Circuit

List of Drawings

1	172-14-GA6-revA-A1	General arrangement for proposed Cu Circuit (Flotation level)
2	172-14-GA5-revB-A1	General arrangement for proposed Cu Circuit (Pump level)
3	172-14-GA5-revA	General arrangement for proposed Cu Circuit with Option #2 for Cu Concentrate storage

Drawing Number 172-14-GA5 Numero du Plan
Plot date_____ Date du tracage



FLOTATION CELL FLOOR
PLAN VIEW

NOTES

- PROPOSED EQUIPMENT IS SHOWN DARK / SHADDED.

FOR INFO. ONLY
NOT FOR CONSTRUCTION

NO.	DATE	REVISIONS	BY: PAR:
A	2015/01/19	ISSUED FOR INFORMATION ONLY	CJA

A DETAIL No
No DU DETAIL
B LOCATION DRAWING No
SUR DESSIN No
C DRAWING No
DESSIN No

Client / Client
Trevali MINING CORPORATION

Project / Projet
CARIBOU MINING
COPPER CIRCUIT

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Drawing Title / Titre du Plan
PROPOSED
Cu. CIRCUIT
EQUIPMENT LAYOUT
FLOTATION CELL FLOOR

Design by: Design par:	Drawn by: Dessine par:
	C.J. Albert
Checked by: Verifie par:	Date: January 2015
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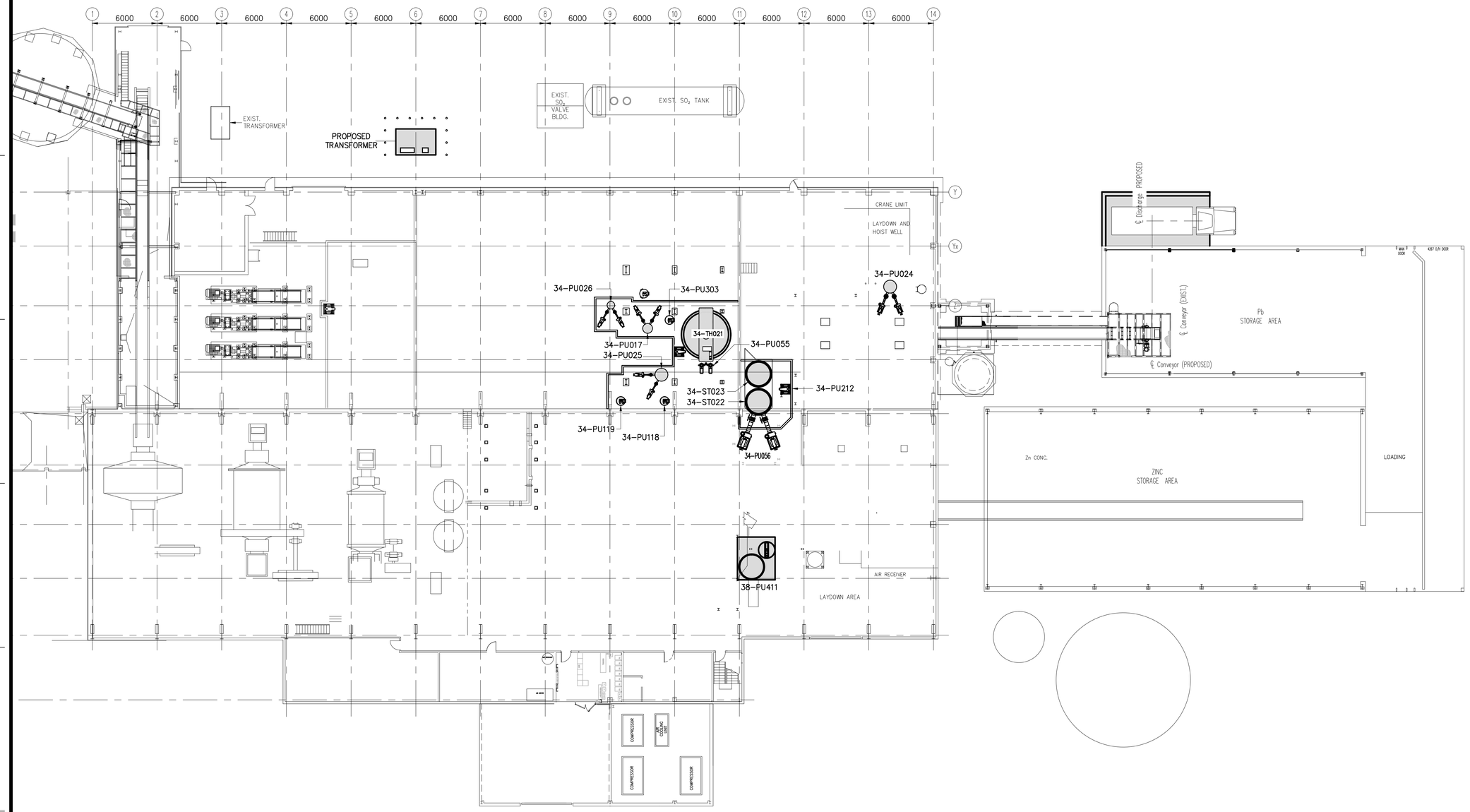

PUMP FLOOR PLAN VIEW

NOTES

- PROPOSED EQUIPMENT IS SHOWN DARK / SHADDED.

FOR INFO. ONLY
NOT FOR CONSTRUCTION

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B	2015/01/19	ISSUED FOR INFORMATION ONLY	CJA
A	2014/12/24	ISSUED FOR INFORMATION ONLY	CJA

A DETAIL No
No DU DETAIL
B LOCATION DRAWING No
SUR DESSIN No
C DRAWING No
DESSIN No

Client / Client

Trevali MINING CORPORATION

Project / Projet

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Job# 172-14-2

Drawing Title / Titre du Plan

PROPOSED
Cu. CIRCUIT
EQUIPMENT LAYOUT
PUMP FLOOR

Design by: Design par:	Drawn by: Dessine par: C.J. Albert
Checked by: Verifie par:	Date: December 2014
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Drawing Number: Numero du Plan: 172-14-GA5 | Rev. B

Drawing Number 172-14-GA5 Numero du Plan

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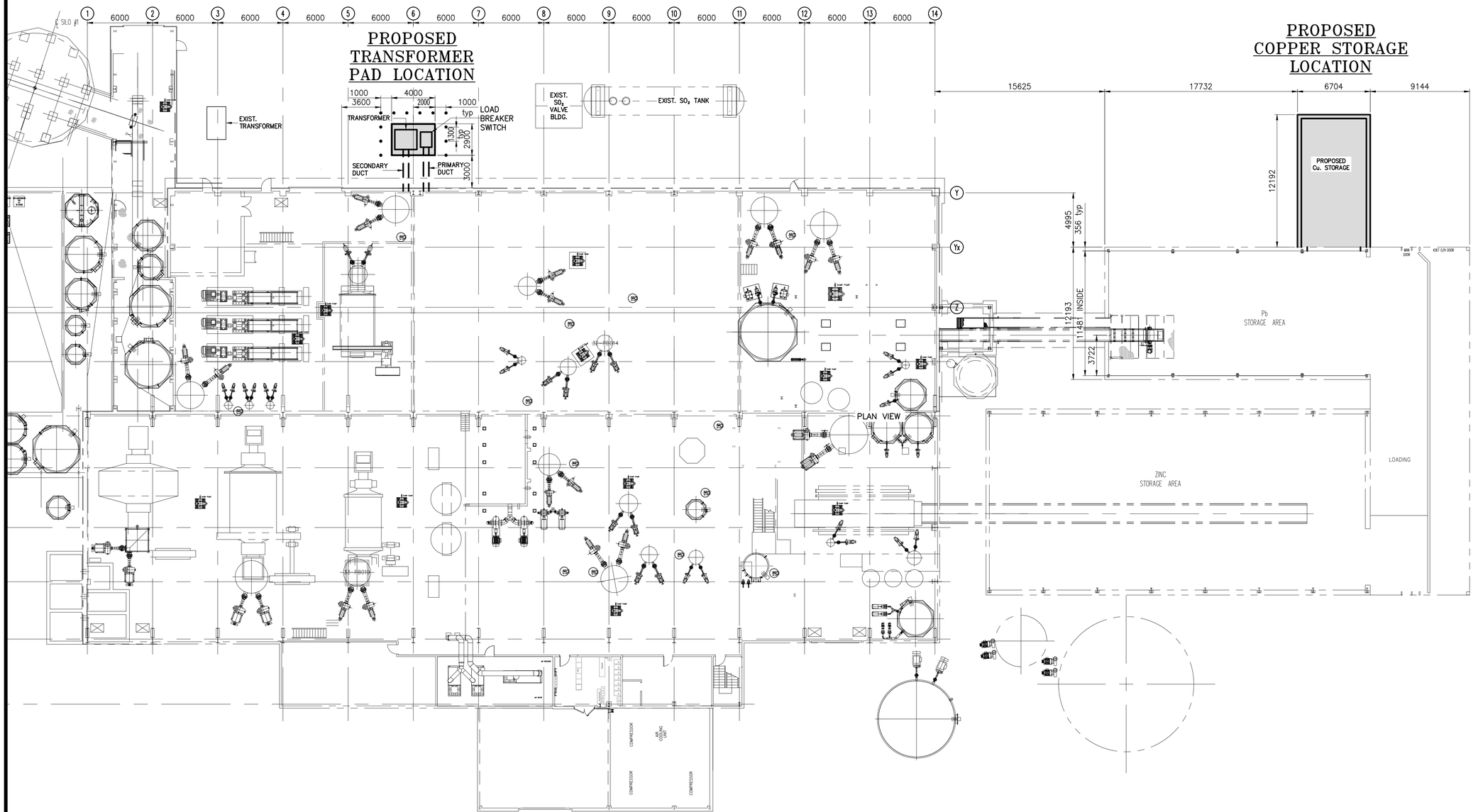

MILL PLAN VIEW

NOTES

FOR INFO. ONLY
NOT FOR CONSTRUCTION

NO.	DATE	REVISIONS	BY: PAR:
A	2014/12/24	ISSUED FOR INFORMATION ONLY	CJA

A DETAIL No
No DU DETAIL
B LOCATION DRAWING No
SUR DESSIN No
C DRAWING No
DESSIN No

Client Client

Trevali MINING CORPORATION

Project Projet

CARIBOU MINING
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Job# 172-14-2

Drawing Title Titre du Plan

PROPOSED
TRANSFORMER PAD
& Cu. CIRCUIT STORAGE
LOCATION

Design by: Design par:	Drawn by: Dessine par: C.J. Albert
Checked by: Verifie par:	Date: December 2014
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Drawing Number: Numero du Plan: 172-14-GA5	Rev. A

Appendix B

Caribou Concentrator Mass Balance

CARIBOU MASS BALANCE Rev 1 6-2-14
3000.00 Tonnes per DAY.

	Wt %
Pb Conc	**3.750**
Cu Conc	**0.800**
Zn Conc	**10.300**
Tail	**85.150**

Crushing Circuit

		SOLIDS				WATER			PULP	
Stream No	Description	D.M.T.P.H.	%	S.G.	C.M.P.H.	T.P.H.	C.M.P.H.	T.P.H.	S.G.	C.M.P.H.
1	Plant feed ex mine	208.33	97.00	4.300	48.45	6.44	6.44	214.78	3.913	54.89
Grinding Circuit										
2	PLANT FEED	135.14	97.00	4.30	31.43	4.18	4.18	139.31	3.91	35.61
3	SAG Mill feed	162.16	96.66	4.30	37.71	5.60	5.60	167.76	3.87	43.31
4	Derrick overflow	27.03	95.00	4.30	6.29	1.42	1.42	28.45	3.69	7.71
5	Derrick underflow	135.14	65.00	4.30	31.43	72.77	72.77	207.90	2.00	104.19
6	SAG Discharge	162.16	68.61	4.30	37.71	74.19	74.19	236.35	2.11	111.90
7	SAG water addition	0.00	0.00	1.00	0.00	68.59	68.59	68.59	1.00	68.59
8	Ball Mill feed	337.84	75.00	4.30	78.57	112.61	112.61	450.45	2.36	191.18
9	Mill discharge	337.84	75.00	4.30	78.57	112.61	112.61	450.45	2.36	191.18
10	Mill discharge water	0.00	0.00	1.00	0.00	129.94	129.94	129.94	1.00	129.94
11	Primary cyclone feed	472.97	60.00	4.30	109.99	315.32	315.32	788.29	1.85	425.31
12	Primary cyclone overflow	135.14	40.00	4.30	31.43	202.70	202.70	337.84	1.44	234.13
13	Primary cyclone underflow	337.84	75.00	4.30	78.57	112.61	112.61	450.45	2.36	191.18
Lead rougher scavenger circuit										
14	Rougher feed	135.14	40.00	4.30	31.43	202.70	202.70	337.84	1.44	234.13
15	Rougher conc water	0.00	0.00	1.00	0.00	2.97	2.97	2.97	1.00	2.97
16	Rougher Concentrate	29.68	35.00	5.25	5.65	55.11	55.11	84.79	1.40	60.76
17	Rougher tailing	105.46	41.68	4.09	25.77	147.59	147.59	253.05	1.46	173.36
18	Scav Feed	105.46	41.68	4.09	25.77	147.59	147.59	253.05	1.46	173.36
19	Scavenger conc water	0.00	0.00	1.00	0.00	0.68	0.68	0.68	1.00	0.68
20	Scavenger concentrate	6.76	30.00	4.30	1.57	15.77	15.77	22.52	1.30	17.34
21	Copper scavenger tailing	98.70	42.82	4.08	24.20	131.82	131.82	230.53	1.48	156.03
Lead Regrind Circuit										
22	Regrind circuit feed	36.43	32.84	5.04	7.22	74.52	74.52	110.95	1.36	81.74

23	Regrind cyclone overflow	36.43	32.84	5.04	7.22	74.52	74.52	110.95	1.36	81.74
24	Regrind cyclone underflow	72.86	65.00	5.04	14.45	39.23	39.23	112.10	2.09	53.68
25	Regrind cyclone feed	109.30	49.00	5.04	21.67	113.76	113.76	223.05	1.65	135.43
Lead cleaner circuit										
26	Prim clnr feed	48.38	28.92	5.06	9.57	118.93	118.93	167.31	1.30	128.50
27	Prim clnr conc water	0.00	0.00	1.00	0.00	5.41	5.41	5.41	1.00	5.41
28	Prim clnr conc	13.51	28.00	5.42	2.49	34.75	34.75	48.26	1.30	37.24
29	Clnr Ro tailing	34.86	29.29	4.93	7.08	84.18	84.18	119.05	1.30	91.26
30	Scav conc	3.50	27.00	5.00	0.70	9.46	9.46	12.96	1.28	10.16
31	Scav water add n	0.00	0.00	1.00	0.00	0.35	0.35	0.35	1.00	0.35
32	Scav tailing	31.36	29.57	4.92	6.38	74.72	74.72	106.08	1.31	81.09
Regrind Cleaner conc										
33	Regrind Circuit feed	13.51	25.18	5.42	2.49	40.15	40.15	53.67	1.26	42.65
34	Regrind Cyclone overflow	4.05	15.00	5.42	0.75	22.97	22.97	27.03	1.14	23.72
35	Regrind cyclone underflow	9.46	35.51	5.42	1.75	17.18	17.18	26.64	1.41	18.93
36	Feed to cyclone	13.51	25.18	5.42	2.49	40.15	40.15	53.67	1.26	42.65
Lead secondary cleaner										
37	Sec Cleaner feed	15.51	23.29	5.40	2.87	51.09	51.09	66.60	1.23	53.96
38	Sec Clnr conc water	0.00	0.00	1.00	0.00	2.83	2.83	2.83	1.00	2.83
39	Sec Clnr conc	7.07	30.00	5.77	1.22	16.49	16.49	23.56	1.33	17.72
40	Sec Clnr tail	8.45	19.62	5.13	1.65	34.60	34.60	43.04	1.19	36.24
Lead tertiary cleaner										
41	Ter Cleaner feed	8.52	22.11	5.69	1.50	30.02	30.02	38.54	1.22	31.52
42	Ter Clnr conc water	0.00	0.00	1.00	0.00	2.31	2.31	2.31	1.00	2.31
43	Ter Clnr conc	5.77	28.00	5.89	0.98	14.84	14.84	20.61	1.30	15.82
44	Ro tail	2.75	15.34	5.31	0.52	15.18	15.18	17.93	1.14	15.70
45	Scav Conc	0.75	15.00	5.350	0.14	4.25	4.25	5.00	1.139	4.39
46	Scav conc water	0.00	0.00	1.00	0.00	0.08	0.08	0.08	1.00	0.08
47	Scav tail	2.00	0.34	-0.04	0.38	10.93	10.93	12.93	1.14	11.31
Lead quaternary cleaner										
48	Quat Cleaner feed	6.52	23.29	5.82	1.12	21.47	21.47	27.99	1.24	22.59
49	Quat Clnr conc water	0.00	0.00	1.00	0.00	2.03	2.03	2.03	1.00	2.03
50	Quat Clnr conc	5.07	32.00	5.98	0.85	10.77	10.77	15.84	1.36	11.62

51	Quat Clnr tail	1.45	11.95	5.33	0.27	10.70	10.70	12.16	1.11	10.97
COPPER CIRCUIT										
52	Copper circuit feed	31.36	29.57	4.92	6.38	74.72	74.72	106.08	1.31	81.09
53	Lamella omitted	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
54	Lamellae omitted	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Copper rougher-scavenger										
55	Feed	43.80	28.76	4.90	8.94	108.50	108.50	152.29	1.30	117.44
56	Ro+Sc conc water	0.00	0.00	1.00	0.00	3.38	3.38	3.38	1.00	3.38
57	Ro+Sc copper conc	13.51	30.00	4.80	2.82	31.53	31.53	45.05	1.31	34.35
58	Copper rougher tail	30.28	28.24	4.94	6.13	76.96	76.96	107.25	1.29	83.09
Primary copper cleaner										
59	Feed	19.19	27.28	4.79	4.00	51.15	51.15	70.34	1.28	55.16
60	Prim Clnr conc water	0.00	0.00	1.00	0.00	1.69	1.69	1.69	1.00	1.69
61	Prim copper conc	6.76	28.00	4.70	1.44	17.37	17.37	24.13	1.28	18.81
62	Prim clnr tail	12.43	26.90	4.85	2.57	33.78	33.78	46.21	1.27	36.34
Secondary copper cleaner										
63	Feed	7.36	26.35	4.71	1.56	20.59	20.59	27.95	1.26	22.15
64	Sec Clnr conc water	0.00	0.00	1.00	0.00	0.42	0.42	0.42	1.00	0.42
65	Sec copper conc	1.69	28.00	4.50	0.38	4.34	4.34	6.03	1.28	4.72
66	Sec clnr tail	5.68	25.89	4.78	1.19	16.24	16.24	21.92	1.26	17.43
Tertiary copper cleaner										
67	Feed	1.69	26.17	4.50	0.38	4.77	4.77	6.46	1.26	5.14
68	Ter Clnr conc water	0.00	0.00	1.00	0.00	0.27	0.27	0.27	1.00	0.27
69	Ter copper conc	1.08	25.00	4.33	0.25	3.24	3.24	4.32	1.24	3.49
70	Ter clnr tail	0.61	28.54	4.84	0.13	1.52	1.52	2.13	1.29	1.65
Zinc rougher scavenger circui										
71	Zn Rougher feed	128.99	38.19	4.25	30.33	208.79	208.79	337.78	1.41	239.12
72	Rougher conc water	0.00	0.00	1.000	0.00	5.12	5.12	5.12	1.000	5.12
73	Rougher Concentrate	51.22	40.00	3.250	15.76	76.82	76.82	128.04	1.383	92.58
74	Rougher tailing	77.77	37.08	5.337	14.57	131.97	131.97	209.74	1.431	146.54
75	Scav Feed	77.77	37.08	5.34	14.57	131.97	131.97	209.74	1.43	146.54
76	Scavenger conc water	0.00	0.00	1.000	0.00	0.32	0.32	0.32	1.000	0.32

77	Scavenger concentrate	3.24	35.00	3.090	1.05	6.02	6.02	9.27	1.310	7.07
78	Final scavenger tailing	74.53	37.18	5.512	13.52	125.94	125.94	200.47	1.437	139.46
Zinc Regrind Circuit										
79	Regrind circuit feed	70.62	30.55	3.257	21.68	154.82	154.82	231.18	1.269	182.25
80	Regrind cyclone overflow	70.62	30.55	3.257	21.68	154.82	154.82	231.18	1.269	182.25
81	Regrind cyclone underflow	141.24	65.00	3.257	43.37	76.05	76.05	217.30	1.820	119.42
82	Regrind cyclone feed	211.86	47.85	3.257	65.05	230.87	230.87	448.48	1.487	301.67
Zinc cleaner 1 circuit										
83	Cleaner feed	80.76	30.92	3.274	24.67	174.65	174.65	261.16	1.274	205.06
84	Cleaner 1 concentrate	30.08	25.00	3.600	8.36	90.24	90.24	120.32	1.220	98.60
85	Rougher conc water	0.00	0.00	1.000	0.00	3.01	3.01	3.01	1.000	3.01
86	Rougher tailing	50.68	37.51	3.107	16.31	84.41	84.41	140.83	1.323	106.47
87	Primary Scav clnr conc	10.14	35.00	3.400	2.98	18.82	18.82	28.96	1.328	21.80
88	Primary clnr conc water	0.00	0.00	1.000	0.00	1.01	1.01	1.01	1.000	1.01
89	Primary clnr tailing	40.54	38.20	3.042	13.33	65.59	65.59	111.87	1.321	84.66
Zinc cleaner 2 circuit										
90	Cleaner feed	30.08	24.39	3.60	8.36	93.25	93.25	123.33	1.214	101.61
91	Cleaner 2 concentrate	18.39	25.00	3.800	4.84	55.18	55.18	73.57	1.226	60.02
92	Rougher conc water	0.00	0.00	1.000	0.00	1.84	1.84	1.84	1.000	1.84
93	Cleaner 2 tailing,	11.69	23.49	3.325	3.52	38.08	38.08	51.60	1.188	43.43
Zinc cleaner 3 circuit										
94	Cleaner feed	18.39	24.39	3.800	4.84	57.01	57.01	75.41	1.219	61.85
95	Cleaner 3 concentrate	15.64	25.00	3.900	4.01	46.91	46.91	62.54	1.228	50.91
96	Rougher conc water	0.00	0.00	1.000	0.00	3.91	3.91	3.91	1.000	3.91
97	Cleaner 3 Tailing	2.76	21.43	3.318	0.83	10.11	10.11	16.78	1.130	14.85
Zinc cleaner 4 circuit										
98	Cleaner feed	15.64	23.53	3.90	4.01	50.81	50.81	66.45	1.21	54.82
99	Cleaner 4 concentrate	13.92	30.00	4.000	3.48	32.48	32.48	46.40	1.290	35.96
100	Rougher conc water	0.00	0.00	1.000	0.00	2.09	2.09	2.09	1.000	2.09
101	Cleaner 4 Tailing	1.72	8.56	3.243	0.53	18.34	18.34	20.05	1.063	18.87
Lead Dewatering										
102	Lead concentrate	5.07	28.37	5.98	0.85	12.80	12.80	17.86	1.309	13.64

103	Filtrate water	0.00	0.00	1.000	0.00	2.94	2.94	2.94	1.000	2.94
104	Combined thickener feed	5.07	24.36	5.980	0.85	15.73	15.73	20.80	1.255	16.58
105	Thickener underflow	5.07	60.00	5.980	0.85	3.38	3.38	8.45	1.999	4.23
106	Lead Filter cake	5.07	92.00	5.980	0.85	0.44	0.44	5.51	9.592	1.29
107	Thickener overflow	0.00	0.00	1.000	0.00	12.35	12.35	12.35	1.000	12.35
Copper Dewatering										
108	Copper concentrate	1.08	23.53	4.33	0.25	3.51	3.51	4.59	1.221	3.76
109	Filtrate water	0.00	0.00	1.000	0.00	0.63	0.63	0.63	1.000	0.63
110	Combined thickener feed	1.08	20.71	4.330	0.25	4.14	4.14	5.22	1.189	4.39
111	Thickener underflow	1.08	60.00	4.330	0.25	0.72	0.72	1.80	1.857	0.97
112	Copper Filter cake	1.08	92.00	4.330	0.25	0.09	0.09	1.18	9.950	0.34
113	Thickener overflow	0.00	0.00	1.000	0.00	3.42	3.42	3.42	1.000	3.42
Zinc dewatering circuit			**SOLIDS**			**WATER**			**PULP**	
		D.M.T.P.H.	%	S.G.	C.M.P.H.	T.P.H.	C.M.P.H.	T.P.H.	S.G.	C.M.P.H.
114	Zinc concentrate	13.92	25.00	3.90	3.48	34.57	34.57	48.48	1.228	38.05
115	Thickener underflow	13.92	60.00	3.900	3.57	9.28	9.28	23.20	1.806	12.85
116	Zinc concentrate cake	13.92	92.00	3.900	3.57	1.21	1.21	15.13	3.166	4.78
117	Filtrate	0.00	0.00	1.000	0.00	8.07	8.07	8.07	1.000	8.07
118	Thickener overflow	0.00	0.00	1.000	0.00	33.35	33.35	33.35	1.000	33.35
Tailing dewatering circuit										
119	Tailing thickener feed	115.07	75.38	4.29	26.85	191.53	191.53	312.34	1.39	224.13
120	Tailing thickener underflow	115.07	50.00	4.286	26.85	115.07	115.07	230.14	1.622	141.92
121	Tailing thickener overflow	0.00	0.00	1.00	0.00	76.46	76.46	82.21	1.00	82.21

SOLIDS AND WATER BALANCE

121	**Solids In**	135.14
122	**Solids Out**	135.14
123	**Water In**	242.40
124	**Water Out**	242.40

Appendix C

AC CDC Report (Caribou Mine)

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

DATA REPORT 5303: Caribou Mine, NB

Prepared 7 November 2014
by J. Churchill, Data Manager

CONTENTS OF REPORT

Map 1. A 100 km buffer around the study area

1.0 PREFACE

The Atlantic Canada Conservation Data Centre (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
CaribouMineNB_5303ob.xls	All Rare and legally protected *Flora and Fauna* within 5 km of your study area
CaribouMineNB_5303ob100km.xls	A list of Rare and legally protected *Flora and Fauna* within 100 km of your study area

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) 364-2659
jrbreau@mta.ca

Questions on the biology of Federal Species at Risk can be directed to ACCDC: (506) 364-2657, 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
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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 Rosemary Curley, PEI Dept. of Agriculture and Forestry: (902) 368-4807.

2.0 RARE AND ENDANGERED SPECIES

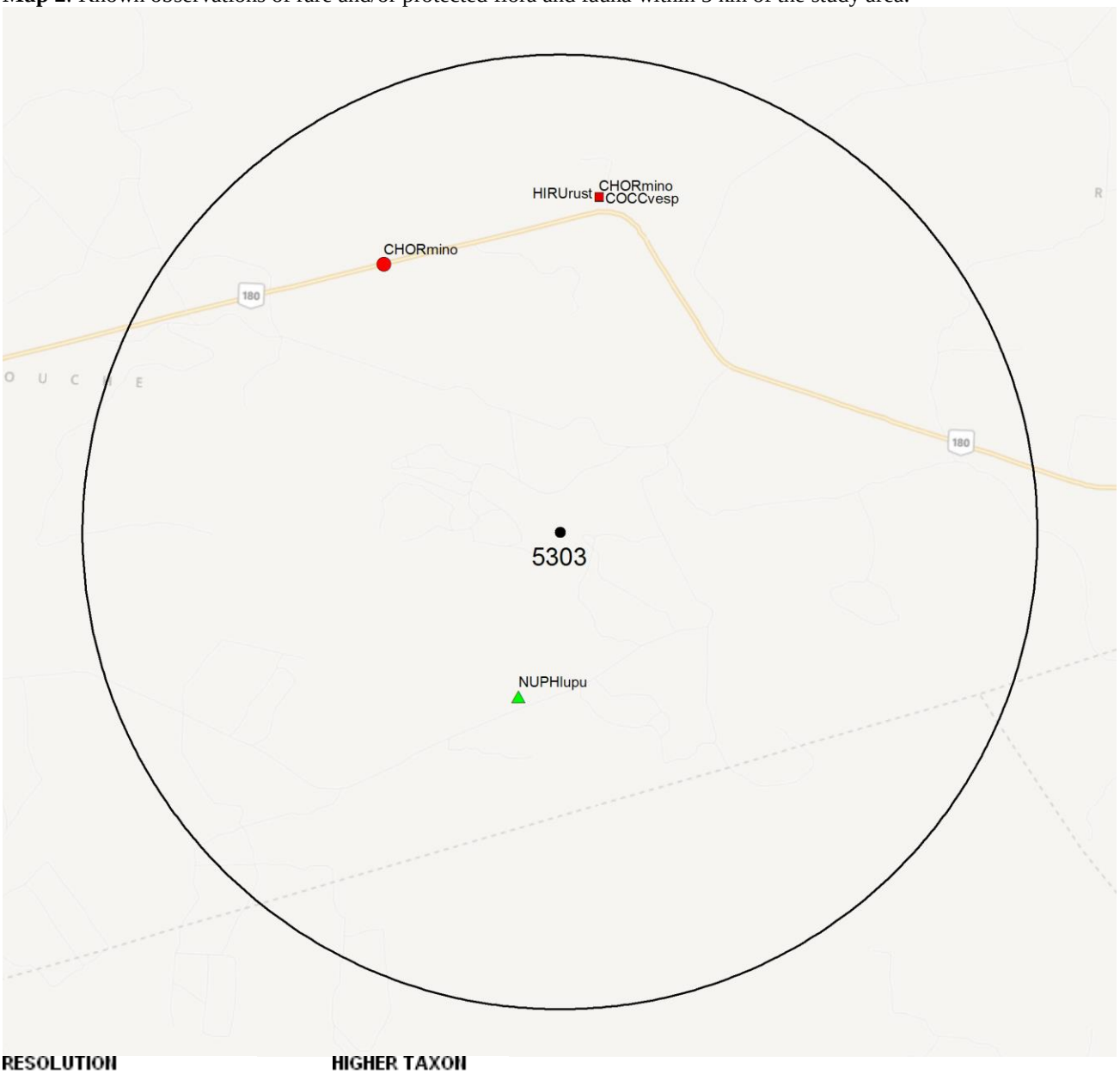
2.1 FLORA

A 5 km buffer around the study area contains 1 record of 1 vascular, no records of nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

A 5 km buffer around the study area contains 4 records of 3 vertebrate, no records of invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if 'location-sensitive' species occur near your study site.

Map 2: Known observations of rare and/or protected flora and fauna within 5 km of the study area.

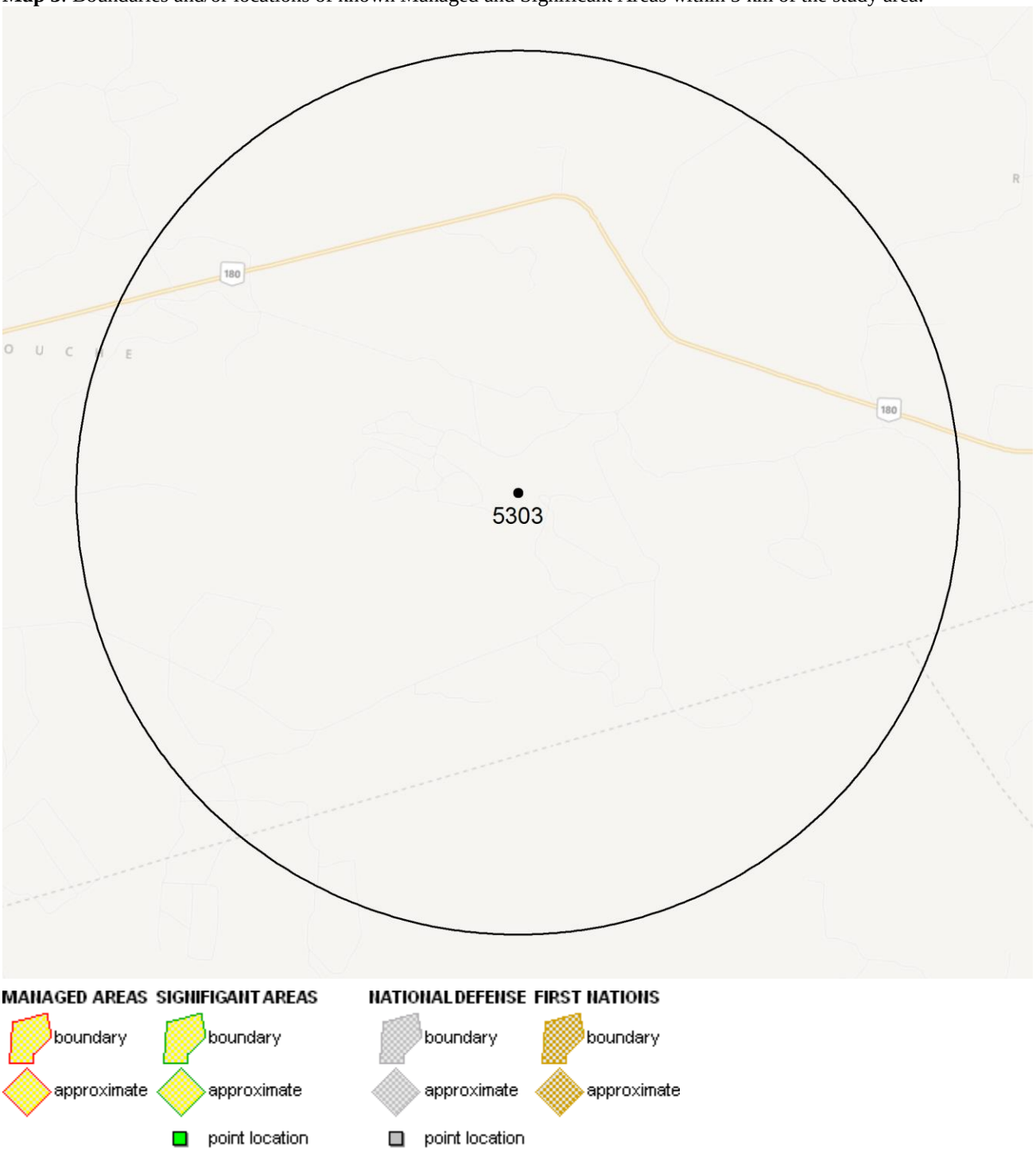


3.0 SPECIAL AREAS

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

3.2 SIGNIFICANT AREAS
The GIS scan identified no biologically significant sites in the vicinity of the study area (Map 3 and attached file: *sa*.xls)

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



4.0 RARE SPECIES LISTS

Rare and/or endangered taxa 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. [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community.

4.1 FLORA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	*Nuphar lutea ssp. pumila*	Small Yellow Pond-lily				S3	4 Secure	1	1.8 ± 1.0

4.2 FAUNA

	Scientific *Name*	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	*Chordeiles minor*	Common Nighthawk	Threatened	Threatened		S3B	1 At Risk	2	3.5 ± 7.07
A	*Hirundo rustica*	Barn Swallow	Threatened			S3B	3 Sensitive	1	3.5 ± 7.07
A	*Coccothraustes vespertinus*	Evening Grosbeak				S3S4B,S4S5N	3 Sensitive	1	3.5 ± 7.07

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”.

New Brunswick

Scientific *Name*	Common Name	SARA	Prov Legal Prot	Known within 5 km of Study Site?
Glyptemys insculpta	Wood Turtle	Threatened		No
Chelydra serpentina	Snapping Turtle	Special Concern		No
Falco peregrinus pop. 1	Peregrine Falcon - anatum/tundrius pop.	Special Concern	Endangered	No
Chrysemys picta picta	Eastern Painted Turtle			No

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
2	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
2	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs.
1	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.

5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 7673 records of 94 vertebrate and 475 records of 40 invertebrate fauna; 4045 records of 286 vascular, 91 records of 54 nonvascular flora (attached: *ob100km.xls).

Rare and/or endangered taxa within the 100 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.

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	*Myotis lucifugus*	Little Brown Myotis	Endangered		Endangered	S1	1 At Risk	1	50.0 ± 1.0
A	*Myotis septentrionalis*	Northern Long-eared Myotis	Endangered		Endangered	S1	1 At Risk	2	75.5 ± 1.0
A	*Dermochelys coriacea (Atlantic pop.)*	Leatherback Sea Turtle - Atlantic pop.	Endangered	Endangered	Endangered	S1S2N	1 At Risk	1	97.0 ± 1.0
A	*Morone saxatilis*	Striped Bass	Endangered			S2	2 May Be At Risk	7	79.5 ± 10.0
A	*Salmo salar pop. 1*	Atlantic Salmon - Inner Bay of Fundy pop.	Endangered	Endangered	Endangered	S2	2 May Be At Risk	153	93.7 ± 0.1
A	*Charadrius melodus melodus*	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S2B	1 At Risk	26	46.9 ± 0.5
A	*Calidris canutus rufa*	Red Knot rufa ssp	Endangered		Endangered	S3M	1 At Risk	8	45.8 ± 0.5
A	*Rangifer tarandus pop. 2*	Woodland Caribou (Atlantic-Gasp ├⌐sie pop.)	Endangered	Endangered	Extirpated	SX	0.1 Extirpated	5	11.1 ± 5.0
A	*Emydoidea blandingii*	Blanding's Turtle - Nova Scotia pop.	Endangered	Endangered				1	63.1 ± 1.0
A	*Hylocichla mustelina*	Wood Thrush	Threatened		Threatened	S1S2B	2 May Be At Risk	55	24.0 ± 7.07
A	*Sturnella magna*	Eastern Meadowlark	Threatened		Threatened	S1S2B	2 May Be At Risk	4	82.2 ± 7.07
A	*Caprimulgus vociferus*	Whip-Poor-Will	Threatened	Threatened	Threatened	S2B	1 At Risk	26	70.4 ± 7.07
A	*Chaetura pelagica*	Chimney Swift	Threatened	Threatened	Threatened	S2S3B	1 At Risk	171	18.8 ± 0.15
A	*Catharus bicknelli*	Bicknell's Thrush	Threatened	Special Concern	Threatened	S2S3B	1 At Risk	239	11.8 ± 7.07
A	*Glyptemys insculpta*	Wood Turtle	Threatened	Threatened	Threatened	S3	1 At Risk	41	44.4 ± 0.1
A	*Chordeiles minor*	Common Nighthawk	Threatened	Threatened	Threatened	S3B	1 At Risk	306	3.4 ± 0.15
A	*Hirundo rustica*	Barn Swallow	Threatened		Threatened	S3B	3 Sensitive	341	3.5 ± 7.07
A	*Riparia riparia*	Bank Swallow	Threatened			S3B	3 Sensitive	157	20.9 ± 7.07
A	*Contopus cooperi*	Olive-sided Flycatcher	Threatened	Threatened	Threatened	S3S4B	1 At Risk	447	11.8 ± 7.07
A	*Wilsonia canadensis*	Canada Warbler	Threatened	Threatened	Threatened	S3S4B	1 At Risk	397	5.8 ± 0.15
A	*Dolichonyx oryzivorus*	Bobolink	Threatened		Threatened	S3S4B	3 Sensitive	218	18.5 ± 7.07
A	*Anguilla rostrata*	American Eel	Threatened		Threatened	S5	4 Secure	10	10.0 ± 0.03
A	*Coturnicops noveboracensis*	Yellow Rail	Special Concern	Special Concern	Special Concern	S1?B	2 May Be At Risk	2	52.1 ± 0.15
A	*Histrionicus histrionicus pop. 1*	Harlequin Duck - Eastern pop.	Special Concern	Special Concern	Endangered	S1B,S1N	1 At Risk	6	19.3 ± 7.07
A	*Bucephala islandica (Eastern pop.)*	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern	Special Concern	S2N	3 Sensitive	2	51.7 ± 1.0
A	*Chelydra serpentina*	Snapping Turtle	Special Concern	Special Concern	Special Concern	S3	3 Sensitive	1	84.4 ± 0.5
A	*Asio flammeus*	Short-eared Owl	Special Concern	Special Concern	Special Concern	S3B	3 Sensitive	2	82.3 ± 7.07
A	*Euphagus carolinus*	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S3B	2 May Be At Risk	181	10.7 ± 7.07
A	*Phocoena phocoena (NW Atlantic pop.)*	Harbour Porpoise - Northwest Atlantic pop.	Special Concern	Threatened		S4		1	59.4 ± 1.0
A	*Contopus virens*	Eastern Wood-Pewee	Special Concern		Special Concern	S4B	4 Secure	233	10.7 ± 7.07
A	*Tryngites subruficollis*	Buff-breasted Sandpiper	Special Concern			SNA	8 Accidental	1	97.3 ± 0.5
A	*Odobenus rosmarus rosmarus*	Atlantic Walrus	Special Concern					1	86.2 ± 1.0
A	*Lynx canadensis*	Canadian Lynx	Not At Risk		Endangered	S1	1 At Risk	50	12.4 ± 0.01
A	*Sorex dispar*	Long-tailed Shrew	Not At Risk	Special Concern		S1	3 Sensitive	22	48.4 ± 0.1
A	*Falco rusticolus*	Gyrfalcon	Not At Risk			S1N	5 Undetermined	1	54.9 ± 0.1
A	*Accipiter cooperii*	Cooper's Hawk	Not At Risk			S1S2B	2 May Be At Risk	3	53.3 ± 0.15
A	*Aegolius funereus*	Boreal Owl	Not At Risk			S1S2B	2 May Be At Risk	10	26.5 ± 7.07
A	*Buteo lineatus*	Red-shouldered Hawk	Not At Risk	Special Concern		S2B	2 May Be At Risk	5	60.1 ± 7.07
A	*Globicephala melas*	Long-finned Pilot Whale	Not At Risk			S2S3		1	94.2 ± 1.0
A	*Haliaeetus leucocephalus*	Bald Eagle	Not At Risk		Endangered	S3B	1 At Risk	174	16.5 ± 7.07

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
A	*Sterna hirundo*	Common Tern	Not At Risk			S3B	3 Sensitive	90	43.2 ± 1.0
A	*Puma concolor pop. 1*	Cougar - Eastern pop.	Data Deficient		Endangered	SU,SH	5 Undetermined	33	13.5 ± 1.0
A	*Salvelinus alpinus*	Arctic Char				S1	3 Sensitive	10	18.0 ± 1.0
A	*Microtus chrotorrhinus*	Rock Vole				S1	5 Undetermined	30	50.0 ± 1.0
A	*Synaptomys borealis*	Northern Bog Lemming				S1	5 Undetermined	5	25.6 ± 1.0
A	*Bartramia longicauda*	Upland Sandpiper				S1B	3 Sensitive	4	91.8 ± 7.07
A	*Phalaropus tricolor*	Wilson's Phalarope				S1B	3 Sensitive	1	88.6 ± 1.0
A	*Sterna paradisaea*	Arctic Tern				S1B	2 May Be At Risk	4	49.8 ± 0.5
A	*Troglodytes aedon*	House Wren				S1B	5 Undetermined	6	44.3 ± 0.15
A	*Aythya marila*	Greater Scaup				S1B,S2N	4 Secure	1	97.4 ± 1.0
A	*Alca torda*	Razorbill				S1B,S3N	4 Secure	7	44.7 ± 7.07
A	*Rissa tridactyla*	Black-legged Kittiwake				S1B,S4N	4 Secure	17	72.2 ± 0.5
A	*Nycticorax nycticorax*	Black-crowned Night-heron				S1S2B	3 Sensitive	37	31.0 ± 1.0
A	*Empidonax traillii*	Willow Flycatcher				S1S2B	3 Sensitive	9	23.5 ± 7.07
A	*Progne subis*	Purple Martin				S1S2B	2 May Be At Risk	3	20.9 ± 7.07
A	*Prosopium cylindraceum*	Round Whitefish				S2	4 Secure	4	64.6 ± 0.15
A	*Salmo salar*	Atlantic Salmon				S2	2 May Be At Risk	2100	20.7 ± 50.0
A	*Lasiurus cinereus*	Hoary Bat				S2?	5 Undetermined	2	69.7 ± 1.0
A	*Anas clypeata*	Northern Shoveler				S2B	4 Secure	18	44.6 ± 7.07
A	*Anas strepera*	Gadwall				S2B	4 Secure	3	53.6 ± 0.15
A	*Eremophila alpestris*	Horned Lark				S2B	2 May Be At Risk	25	25.8 ± 7.07
A	*Toxostoma rufum*	Brown Thrasher				S2B	3 Sensitive	24	39.7 ± 0.15
A	*Pooecetes gramineus*	Vesper Sparrow				S2B	2 May Be At Risk	38	44.6 ± 7.07
A	*Tringa solitaria*	Solitary Sandpiper				S2B,S5M	4 Secure	40	32.3 ± 6.08
A	*Asio otus*	Long-eared Owl				S2S3	5 Undetermined	14	50.5 ± 0.15
A	*Tringa semipalmata*	Willet				S2S3B	3 Sensitive	21	46.1 ± 0.5
A	*Pinicola enucleator*	Pine Grosbeak				S2S3B,S4S5N	3 Sensitive	92	7.8 ± 7.07
A	*Branta bernicla*	Brant				S2S3M,S2S3N	4 Secure	8	47.4 ± 10.0
A	*Cepphus grylle*	Black Guillemot				S3	4 Secure	48	44.7 ± 7.07
A	*Loxia curvirostra*	Red Crossbill				S3	4 Secure	51	10.7 ± 7.07
A	*Coregonus clupeaformis*	Lake Whitefish				S3	4 Secure	5	65.3 ± 0.1
A	*Salvelinus namaycush*	Lake Trout				S3	3 Sensitive	5	65.3 ± 0.1
A	*Picoides dorsalis*	American Three-toed Woodpecker				S3?	3 Sensitive	71	21.5 ± 7.07
A	*Anas acuta*	Northern Pintail				S3B	3 Sensitive	30	47.7 ± 1.0
A	*Anas americana*	American Wigeon				S3B	4 Secure	104	43.5 ± 7.07
A	*Cathartes aura*	Turkey Vulture				S3B	4 Secure	13	25.8 ± 7.07
A	*Rallus limicola*	Virginia Rail				S3B	3 Sensitive	10	52.8 ± 7.07
A	*Charadrius vociferus*	Killdeer				S3B	3 Sensitive	286	6.5 ± 7.07
A	*Larus delawarensis*	Ring-billed Gull				S3B	4 Secure	85	43.5 ± 7.07
A	*Myiarchus crinitus*	Great Crested Flycatcher				S3B	3 Sensitive	21	20.2 ± 7.07
A	*Mimus polyglottos*	Northern Mockingbird				S3B	3 Sensitive	33	41.5 ± 7.07
A	*Passerina cyanea*	Indigo Bunting				S3B	4 Secure	12	74.5 ± 7.07
A	*Molothrus ater*	Brown-headed Cowbird				S3B	2 May Be At Risk	79	31.5 ± 7.07
A	*Mergus serrator*	Red-breasted Merganser				S3B,S4S5N	4 Secure	66	32.8 ± 7.07
A	*Pluvialis dominica*	American Golden-Plover				S3M	3 Sensitive	5	47.8 ± 0.5
A	*Phalaropus fulicarius*	Red Phalarope				S3M	3 Sensitive	2	90.9 ± 0.5
A	*Melanitta nigra*	Black Scoter				S3M,S2S3N	3 Sensitive	15	47.4 ± 12.5
A	*Calidris maritima*	Purple Sandpiper				S3M,S3N	4 Secure	4	47.8 ± 0.5
A	*Bucephala albeola*	Bufflehead				S3N	3 Sensitive	2	49.9 ± 8.0
A	*Tyrannus tyrannus*	Eastern Kingbird				S3S4B	3 Sensitive	146	6.5 ± 7.07
A	*Petrochelidon pyrrhonota*	Cliff Swallow				S3S4B	3 Sensitive	184	20.9 ± 7.07
A	*Piranga olivacea*	Scarlet Tanager				S3S4B	4 Secure	84	10.3 ± 0.15
A	*Coccothraustes vespertinus*	Evening Grosbeak				S3S4B,S4S5N	3 Sensitive	347	3.5 ± 7.07
A	*Morus bassanus*	Northern Gannet				SHB,S5M,S5N	4 Secure	7	47.4 ± 12.5
I	*Coenonympha nipisiquit*	Maritime Ringlet	Endangered	Endangered	Endangered	S1	1 At Risk	62	45.9 ± 1.0
I	*Ophiogomphus howei*	Pygmy Snaketail	Special Concern	Special Concern	Special Concern	S1	2 May Be At Risk	13	97.4 ± 0.5

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I	*Danaus plexippus*	Monarch	Special Concern	Special Concern	Special Concern	S3B	3 Sensitive	7	82.0 ± 0.01
I	*Somatochlora septentrionalis*	Muskeg Emerald				S1	2 May Be At Risk	3	78.5 ± 0.1
I	*Leucorrhinia patricia*	Canada Whiteface				S1	2 May Be At Risk	8	75.7 ± 1.0
I	*Coccinella transversoguttata richardsoni*	Transverse Lady Beetle				S1S2	2 May Be At Risk	2	47.4 ± 1.0
I	*Boloria eunomia*	Bog Fritillary				S1S2	5 Undetermined	10	26.3 ± 10.0
I	*Callophrys henrici*	Henry's Elfin				S2	4 Secure	4	64.4 ± 0.01
I	*Strymon melinus*	Grey Hairstreak				S2	4 Secure	6	50.0 ± 0.1
I	*Aeshna juncea*	Rush Darner				S2	3 Sensitive	13	29.1 ± 1.0
I	*Somatochlora brevicincta*	Quebec Emerald				S2	5 Undetermined	6	86.0 ± 0.1
I	*Somatochlora tenebrosa*	Clamp-Tipped Emerald				S2	5 Undetermined	3	50.1 ± 0.1
I	*Coenagrion interrogatum*	Subarctic Bluet				S2	3 Sensitive	15	29.8 ± 1.0
I	*Gomphus abbreviatus*	Spine-crowned Clubtail				S2S3	4 Secure	5	63.3 ± 0.01
I	*Euphyes bimacula*	Two-spotted Skipper				S3	4 Secure	4	54.9 ± 0.5
I	*Papilio brevicauda*	Short-tailed Swallowtail				S3	4 Secure	24	49.0 ± 1.0
I	*Papilio brevicauda bretonensis*	Short-tailed Swallowtail				S3	4 Secure	8	47.4 ± 1.0
I	*Lycaena hyllus*	Bronze Copper				S3	3 Sensitive	2	87.0 ± 0.01
I	*Lycaena dospassosi*	Salt Marsh Copper				S3	4 Secure	66	46.1 ± 0.01
I	*Satyrium acadica*	Acadian Hairstreak				S3	4 Secure	2	50.0 ± 0.1
I	*Callophrys polios*	Hoary Elfin				S3	4 Secure	2	59.2 ± 0.1
I	*Callophrys eryphon*	Western Pine Elfin				S3	4 Secure	6	26.0 ± 0.01
I	*Plebejus idas*	Northern Blue				S3	4 Secure	9	87.4 ± 1.0
I	*Plebejus saepiolus*	Greenish Blue				S3	4 Secure	19	44.4 ± 1.0
I	*Speyeria aphrodite*	Aphrodite Fritillary				S3	4 Secure	3	60.8 ± 1.0
I	*Boloria chariclea*	Arctic Fritillary				S3	4 Secure	11	33.9 ± 0.01
I	*Boloria chariclea grandis*	Purple Lesser Fritillary				S3	4 Secure	4	58.3 ± 10.0
I	*Chlosyne nycteis*	Silvery Checkerspot				S3	4 Secure	15	21.1 ± 0.01
I	*Polygonia satyrus*	Satyr Comma				S3	4 Secure	13	25.8 ± 0.01
I	*Polygonia gracilis*	Hoary Comma				S3	4 Secure	21	38.5 ± 0.01
I	*Nymphalis l-album*	Compton Tortoiseshell				S3	4 Secure	6	36.2 ± 0.01
I	*Oeneis jutta*	Jutta Arctic				S3	4 Secure	13	50.0 ± 0.1
I	*Somatochlora albicincta*	Ringed Emerald				S3	4 Secure	34	16.8 ± 1.0
I	*Somatochlora cingulata*	Lake Emerald				S3	4 Secure	27	12.8 ± 1.0
I	*Somatochlora forcipata*	Forcipate Emerald				S3	4 Secure	14	35.6 ± 0.05
I	*Lestes eurinus*	Amber-Winged Spreadwing				S3	4 Secure	6	60.4 ± 1.0
I	*Stylurus scudderi*	Zebra Clubtail				S3	4 Secure	1	85.1 ± 0.03
I	*Pantala hymenaea*	Spot-Winged Glider				S3B	4 Secure	1	62.3 ± 1.0
I	*Satyrium liparops*	Striped Hairstreak				S3S4	4 Secure	5	60.8 ± 1.0
I	*Satyrium liparops strigosum*	Striped Hairstreak				S3S4	4 Secure	2	51.0 ± 0.1
N	*Erioderma pedicellatum (Atlantic pop.)*	Boreal Felt Lichen - Atlantic pop.	Endangered	Endangered	Endangered	SH	1 At Risk	1	59.7 ± 50.0
N	*Arctoa fulvella*	a Moss				S1	2 May Be At Risk	2	50.0 ± 1.0
N	*Bryum blindii*	a Moss				S1	2 May Be At Risk	2	44.4 ± 10.0
N	*Bryum pallens*	a Moss				S1	2 May Be At Risk	1	84.9 ± 0.1
N	*Calliergon richardsonii*	Richardson's Spear Moss				S1	2 May Be At Risk	3	52.1 ± 1.0
N	*Cinclidium stygium*	Sooty Cupola Moss				S1	2 May Be At Risk	1	46.5 ± 0.1
N	*Tortula cernua*	Narrow-Leafed Chain-Teeth Moss				S1	2 May Be At Risk	2	44.4 ± 1.0
N	*Dicranum bonjeanii*	Bonjean's Broom Moss				S1	2 May Be At Risk	1	51.9 ± 0.1
N	*Distichium inclinatum*	Inclined Iris Moss				S1	2 May Be At Risk	2	39.6 ± 1.0
N	*Grimmia donniana*	Donn's Grimmia Moss				S1	2 May Be At Risk	2	50.0 ± 1.0
N	*Grimmia incurva*	Black Grimmia				S1	2 May Be At Risk	3	50.0 ± 1.0
N	*Kiaeria starkei*	Starke's Fork Moss				S1	2 May Be At Risk	1	50.0 ± 1.0
N	*Meesia triquetra*	Three-ranked Cold Moss				S1	2 May Be At Risk	2	69.7 ± 10.0
N	*Oncophorus virens*	Green Spur Moss				S1	2 May Be At Risk	1	83.2 ± 0.1
N	*Paludella squarrosa*	Tufted Fen Moss				S1	2 May Be At Risk	1	46.5 ± 0.1
N	*Pseudoleskeella tectorum*	Rooftop Leskea Moss				S1	2 May Be At Risk	1	55.0 ± 1.0
N	*Seligeria brevifolia*	a Moss				S1	3 Sensitive	1	74.1 ± 1.0

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N	*Sphagnum subfulvum*	a Peatmoss				S1	2 May Be At Risk	1	51.9 ± 0.1
N	*Timmia austriaca*	Austrian Timmia Moss				S1	2 May Be At Risk	1	74.1 ± 10.0
N	*Timmia norvegica var. excurrens*	a moss				S1	2 May Be At Risk	2	39.1 ± 0.1
N	*Tomentypnum falcifolium*	Sickle-leaved Golden Moss				S1	2 May Be At Risk	1	79.9 ± 0.1
N	*Rhizomnium pseudopunctatum*	Felted Leafy Moss				S1	2 May Be At Risk	1	51.6 ± 1.0
N	*Anomobryum filiforme*	a moss				S1?	5 Undetermined	1	44.4 ± 1.0
N	*Anacamptodon splachnoides*	a Moss				S1S2	3 Sensitive	1	52.8 ± 0.1
N	*Campylium radicale*	Long-stalked Fine Wet Moss				S1S2	5 Undetermined	2	56.6 ± 10.0
N	*Hygrohypnum montanum*	a Moss				S1S2	3 Sensitive	2	50.9 ± 0.5
N	*Platydictya confervoides*	a Moss				S1S2	3 Sensitive	2	67.1 ± 100.0
N	*Seligeria campylopoda*	a Moss				S1S2	3 Sensitive	1	74.1 ± 1.0
N	*Seligeria diversifolia*	a Moss				S1S2	3 Sensitive	2	81.3 ± 1.0
N	*Splachnum sphaericum*	Round-fruited Dung Moss				S1S2	3 Sensitive	1	89.0 ± 1.0
N	*Tortula mucronifolia*	Mucronate Screw Moss				S1S2	3 Sensitive	3	39.1 ± 0.1
N	*Trichodon cylindricus*	Cylindric Hairy-teeth Moss				S1S2	3 Sensitive	3	50.5 ± 0.1
N	*Plagiomnium rostratum*	Long-beaked Leafy Moss				S1S2	3 Sensitive	3	50.5 ± 0.1
N	*Anastrophyllum saxicola*	Curled Notchwort				S1S3	6 Not Assessed	1	56.4 ± 0.1
N	*Calypogeia neesiana*	Nees' Pouchwort				S1S3	6 Not Assessed	1	96.8 ± 1.0
N	*Lophozia badensis*	Dwarf Notchwort				S1S3	6 Not Assessed	1	44.4 ± 1.0
N	*Lophozia heterocolpos*	Whip Notchwort				S1S3	6 Not Assessed	2	39.1 ± 0.1
N	*Lophozia obtusa*	Obtuse Notchwort				S1S3	6 Not Assessed	2	52.8 ± 1.0
N	*Metacalypogeia schusterana*	Schuster's Pouchwort				S1S3	6 Not Assessed	3	43.0 ± 0.1
N	*Campylium polygamum*	a Moss				S2	3 Sensitive	2	51.9 ± 0.1
N	*Hypnum pratense*	Meadow Plait Moss				S2	3 Sensitive	2	52.7 ± 0.1
N	*Pohlia sphagnicola*	a moss				S2	3 Sensitive	1	43.5 ± 1.0
N	*Scorpidium scorpioides*	Hooked Scorpion Moss				S2	3 Sensitive	3	15.3 ± 1.0
N	*Sphagnum lindbergii*	Lindberg's Peat Moss				S2	3 Sensitive	1	58.8 ± 0.01
N	*Sphagnum flexuosum*	Flexuous Peatmoss				S2	3 Sensitive	1	55.0 ± 1.0
N	*Tayloria serrata*	Serrate Trumpet Moss				S2	3 Sensitive	1	52.7 ± 0.1
N	*Barbilophozia lycopodioides*	Greater Pawwort				S2S4	6 Not Assessed	3	51.6 ± 1.0
N	*Bazzania tricrenata*	Three-toothed Whipwort				S2S4		5	47.5 ± 0.1
N	*Jungermannia pumila*	Dwarf Flapwort				S2S4	6 Not Assessed	1	50.9 ± 0.1
N	*Pleuridium subulatum*	a Moss				S3	3 Sensitive	1	82.0 ± 0.5
N	*Dicranella schreberiana*	Schreber's Forklet Moss				S3S4	4 Secure	3	51.6 ± 0.1
N	*Tortula truncata*	a Moss				S3S4	4 Secure	1	82.0 ± 1.0
N	*Stereocaulon paschale*	Easter Foam Lichen				S3S4	5 Undetermined	1	33.9 ± 1.0
N	*Hennediella heimii*	Long-Stalked Beardless Moss				SH	2 May Be At Risk	1	56.6 ± 10.0
P	*Symphyotrichum anticostense*	Anticosti Aster	Threatened	Threatened	Endangered	S1S3	1 At Risk	173	43.8 ± 0.01
P	*Symphyotrichum subulatum (Bathurst pop)*	Bathurst Aster - Bathurst pop.	Special Concern	Special Concern	Endangered	S2	1 At Risk	135	44.5 ± 0.01
P	*Isoetes prototypus*	Prototype Quillwort	Special Concern	Special Concern	Endangered	S2	1 At Risk	1	97.4 ± 0.05
P	*Eriocaulon parkeri*	Parker's Pipewort	Not At Risk		Endangered	S2	1 At Risk	82	74.6 ± 0.01
P	*Pterospora andromedea*	Woodland Pinedrops			Endangered	S1	1 At Risk	8	27.0 ± 0.01
P	*Arnica lonchophylla*	Northern Arnica				S1	2 May Be At Risk	5	40.3 ± 0.01
P	*Bidens eatonii*	Eaton's Beggarticks				S1	2 May Be At Risk	7	78.6 ± 0.01
P	*Erigeron acris ssp. politus*	Bitter Fleabane				S1	2 May Be At Risk	1	61.6 ± 100.0
P	*Hieracium robinsonii*	Robinson's Hawkweed				S1	3 Sensitive	1	97.8 ± 0.01
P	*Symphyotrichum laeve*	Smooth Aster				S1	5 Undetermined	2	82.7 ± 1.0
P	*Canadanthus modestus*	Great Northern Aster				S1	2 May Be At Risk	6	83.4 ± 0.01
P	*Betula glandulosa*	Glandular Birch				S1	2 May Be At Risk	13	22.3 ± 0.1
P	*Cynoglossum virginianum var. boreale*	Wild Comfrey				S1	2 May Be At Risk	5	20.7 ± 0.5
P	*Hackelia deflexa var. americana*	Nodding Stickseed				S1	2 May Be At Risk	4	48.2 ± 10.0
P	*Arabis x divaricarpa*	Limestone Rockcress				S1	2 May Be At Risk	14	51.2 ± 5.0
P	*Cardamine parviflora var. arenicola*	Small-flowered Bittercress				S1	2 May Be At Risk	1	39.5 ± 0.01
P	*Descurainia incana ssp. incana*	Gray Tansy Mustard				S1	2 May Be At Risk	4	58.9 ± 0.5
P	*Draba arabisans*	Rock Whitlow-Grass				S1	2 May Be At Risk	2	80.5 ± 0.5
P	*Draba breweri var. cana*	Brewer's Whitlow-grass				S1	2 May Be At Risk	1	83.3 ± 1.0
P	*Draba glabella*	Rock Whitlow-Grass				S1	2 May Be At Risk	8	50.2 ± 0.1

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	*Draba incana*	Twisted Whitlow-grass				S1	2 May Be At Risk	2	89.5 ± 0.5
P	*Stellaria crassifolia*	Fleshy Stitchwort				S1	2 May Be At Risk	1	52.0 ± 5.0
P	*Stellaria longipes*	Long-stalked Starwort				S1	2 May Be At Risk	9	49.2 ± 5.0
P	*Chenopodium capitatum*	Strawberry-blite				S1	2 May Be At Risk	1	50.9 ± 1.0
P	*Cuscuta pentagona*	Five-angled Dodder				S1	2 May Be At Risk	3	89.7 ± 0.5
P	*Drosera anglica*	English Sundew				S1	2 May Be At Risk	1	79.6 ± 0.1
P	*Vaccinium boreale*	Northern Blueberry				S1	2 May Be At Risk	12	22.3 ± 0.1
P	*Vaccinium uliginosum*	Alpine Bilberry				S1	2 May Be At Risk	5	22.3 ± 0.1
P	*Desmodium glutinosum*	Large Tick-Trefoil				S1	2 May Be At Risk	1	74.7 ± 0.01
P	*Pinguicula vulgaris*	Common Butterwort				S1	3 Sensitive	26	62.6 ± 0.1
P	*Polygonum viviparum*	Alpine Bistort				S1	2 May Be At Risk	1	55.1 ± 0.1
P	*Ranunculus lapponicus*	Lapland Buttercup				S1	2 May Be At Risk	1	45.7 ± 0.01
P	*Ranunculus sceleratus*	Cursed Buttercup				S1	2 May Be At Risk	3	43.3 ± 0.01
P	*Amelanchier fernaldii*	Fernald's Serviceberry				S1	2 May Be At Risk	1	47.6 ± 0.5
P	*Rosa acicularis ssp. sayi*	Prickly Rose				S1	2 May Be At Risk	102	25.6 ± 0.01
P	*Salix serissima*	Autumn Willow				S1	2 May Be At Risk	4	45.9 ± 0.1
P	*Agalinis paupercula var. borealis*	Small-flowered Agalinis				S1	2 May Be At Risk	7	89.4 ± 0.5
P	*Agalinis tenuifolia*	Slender Agalinis				S1	2 May Be At Risk	2	89.8 ± 0.01
P	*Limosella aquatica*	Water Mudwort				S1	2 May Be At Risk	18	58.5 ± 0.05
P	*Carex backii*	Rocky Mountain Sedge				S1	2 May Be At Risk	2	54.3 ± 0.5
P	*Carex bigelowii*	Bigelow's Sedge				S1	2 May Be At Risk	7	42.5 ± 0.01
P	*Carex cephaloidea*	Thin-leaved Sedge				S1	2 May Be At Risk	2	60.4 ± 1.0
P	*Carex glareosa var. amphigena*	Gravel Sedge				S1	2 May Be At Risk	2	56.4 ± 5.0
P	*Carex norvegica ssp. inferalpina*	Scandinavian Sedge				S1	2 May Be At Risk	3	74.7 ± 50.0
P	*Carex saxatilis*	Russet Sedge				S1	2 May Be At Risk	6	65.5 ± 0.01
P	*Carex viridula var. elatior*	Greenish Sedge				S1	2 May Be At Risk	14	45.8 ± 0.5
P	*Cyperus diandrus*	Low Flatsedge				S1	2 May Be At Risk	2	79.4 ± 1.0
P	*Cyperus bipartitus*	Shining Flatsedge				S1	2 May Be At Risk	14	59.5 ± 1.0
P	*Schoenoplectus smithii*	Smith's Bulrush				S1	2 May Be At Risk	18	75.8 ± 0.01
P	*Juncus greenei*	Greene's Rush				S1	2 May Be At Risk	1	84.2 ± 1.0
P	*Juncus subtilis*	Creeping Rush				S1	2 May Be At Risk	8	58.6 ± 0.01
P	*Juncus trifidus*	Highland Rush				S1	2 May Be At Risk	5	42.6 ± 0.1
P	*Allium canadense*	Canada Garlic				S1	2 May Be At Risk	1	89.5 ± 1.0
P	*Zigadenus elegans ssp. glaucus*	Mountain Death Camas				S1	2 May Be At Risk	10	47.8 ± 0.5
P	*Malaxis brachypoda*	White Adder's-Mouth				S1	2 May Be At Risk	2	47.6 ± 0.25
P	*Platanthera flava var. herbiola*	Pale Green Orchid				S1	2 May Be At Risk	1	63.9 ± 0.4
P	*Catabrosa aquatica var. laurentiana*	Water Whorl Grass				S1	2 May Be At Risk	2	54.0 ± 5.0
P	*Dichanthelium xanthophysum*	Slender Panic Grass				S1	2 May Be At Risk	3	45.6 ± 0.01
P	*Elymus hystrix var. bigeloviana*	Spreading Wild Rye				S1	2 May Be At Risk	2	54.7 ± 0.5
P	*Festuca subverticillata*	Nodding Fescue				S1	2 May Be At Risk	4	74.1 ± 0.5
P	*Puccinellia ambigua*	Dwarf Alkali Grass				S1	5 Undetermined	1	88.8 ± 0.5
P	*Zizania aquatica var. brevis*	Indian Wild Rice				S1	2 May Be At Risk	16	78.8 ± 0.1
P	*Stuckenia filiformis ssp. occidentalis*	Thread-leaved Pondweed				S1	2 May Be At Risk	1	59.8 ± 1.0
P	*Potamogeton friesii*	Fries' Pondweed				S1	2 May Be At Risk	6	58.5 ± 0.5
P	*Potamogeton nodosus*	Long-leaved Pondweed				S1	2 May Be At Risk	1	90.3 ± 0.01
P	*Cystopteris laurentiana*	Laurentian Bladder Fern				S1	2 May Be At Risk	1	34.5 ± 0.5
P	*Dryopteris filix-mas*	Male Fern				S1	2 May Be At Risk	2	60.9 ± 0.5
P	*Gymnocarpium robertianum*	Limestone Oak Fern				S1	2 May Be At Risk	14	43.3 ± 0.01
P	*Huperzia selago*	Northern Firmoss				S1	2 May Be At Risk	4	42.6 ± 0.01
P	*Cuscuta cephalanthi*	Buttonbush Dodder				S1?	2 May Be At Risk	23	43.4 ± 0.01
P	*Galium trifidum ssp. subbiflorum*	Three-petaled Bedstraw				S1?	5 Undetermined	2	43.4 ± 0.5
P	*Humulus lupulus var. lupuloides*	Common Hop				S1S2	3 Sensitive	3	47.9 ± 1.0
P	*Rumex aquaticus var. fenestratus*	Western Dock				S1S2	2 May Be At Risk	9	23.7 ± 0.01
P	*Anemone multifida var. richardsiana*	Cut-leaved Anemone				S1S2	5 Undetermined	3	76.4 ± 0.01
P	*Carex crawei*	Crawe's Sedge				S1S2	2 May Be At Risk	16	63.8 ± 0.5
P	*Carex rostrata*	Narrow-leaved Beaked Sedge				S1S2	3 Sensitive	7	20.0 ± 0.5
P	*Thelypteris simulata*	Bog Fern				S1S2	2 May Be At Risk	1	96.6 ± 1.0

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	*Osmorhiza depauperata*	Blunt Sweet Cicely				S2	3 Sensitive	7	32.7 ± 0.5
P	*Solidago altissima*	Tall Goldenrod				S2	4 Secure	10	49.7 ± 0.75
P	*Solidago simplex var. racemosa*	Sticky Goldenrod				S2	2 May Be At Risk	2	80.2 ± 0.5
P	*Solidago simplex ssp. randii*	Sticky Goldenrod				S2	2 May Be At Risk	6	75.1 ± 0.5
P	*Solidago simplex*	Sticky Goldenrod				S2	2 May Be At Risk	1	77.0 ± 0.01
P	*Ionactis linariifolius*	Stiff Aster				S2	3 Sensitive	42	43.1 ± 0.01
P	*Impatiens pallida*	Pale Jewelweed				S2	2 May Be At Risk	4	67.1 ± 1.0
P	*Betula minor*	Dwarf White Birch				S2	3 Sensitive	13	41.4 ± 0.05
P	*Arabis drummondii*	Drummond's Rockcress				S2	3 Sensitive	5	34.5 ± 0.5
P	*Sagina nodosa*	Knotted Pearlwort				S2	3 Sensitive	4	46.8 ± 0.01
P	*Stellaria longifolia*	Long-leaved Starwort				S2	3 Sensitive	1	39.1 ± 0.01
P	*Atriplex franktonii*	Frankton's Saltbush				S2	4 Secure	2	47.6 ± 0.5
P	*Chenopodium rubrum*	Red Pigweed				S2	3 Sensitive	1	54.0 ± 5.0
P	*Callitriche hermaphroditica*	Northern Water-starwort				S2	4 Secure	15	58.7 ± 0.05
P	*Hypericum dissimulatum*	Disguised St John's-wort				S2	3 Sensitive	1	47.6 ± 1.0
P	*Lonicera oblongifolia*	Swamp Fly Honeysuckle				S2	3 Sensitive	2	90.9 ± 0.01
P	*Shepherdia canadensis*	Soapberry				S2	3 Sensitive	19	49.4 ± 1.0
P	*Astragalus eucosmus*	Elegant Milk-vetch				S2	2 May Be At Risk	12	40.3 ± 0.01
P	*Oxytropis campestris var. johannensis*	Field Locoweed				S2	3 Sensitive	31	45.5 ± 10.0
P	*Gentiana linearis*	Narrow-Leaved Gentian				S2	3 Sensitive	12	44.1 ± 0.1
P	*Myriophyllum humile*	Low Water Milfoil				S2	3 Sensitive	1	62.5 ± 1.0
P	*Nuphar lutea ssp. rubrodisca*	Red-disked Yellow Pond-lily				S2	3 Sensitive	4	24.0 ± 0.01
P	*Orobanche uniflora*	One-Flowered Broomrape				S2	3 Sensitive	2	85.3 ± 10.0
P	*Polygala senega*	Seneca Snakeroot				S2	3 Sensitive	6	74.8 ± 0.01
P	*Polygonum amphibium var. emersum*	Water Smartweed				S2	3 Sensitive	1	90.3 ± 0.01
P	*Podostemum ceratophyllum*	Horn-leaved Riverweed				S2	3 Sensitive	8	84.0 ± 0.01
P	*Anemone multifida*	Cut-leaved Anemone				S2	3 Sensitive	16	57.0 ± 10.0
P	*Anemone parviflora*	Small-flowered Anemone				S2	3 Sensitive	24	70.9 ± 5.0
P	*Hepatica nobilis var. obtusa*	Round-lobed Hepatica				S2	3 Sensitive	4	32.6 ± 0.1
P	*Ranunculus longirostris*	Eastern White Water-Crowfoot				S2	5 Undetermined	4	10.3 ± 1.0
P	*Crataegus scabrida*	Rough Hawthorn				S2	3 Sensitive	2	45.5 ± 1.0
P	*Sanguisorba canadensis*	Canada Burnet				S2	4 Secure	44	44.1 ± 0.01
P	*Galium kamtschaticum*	Northern Wild Licorice				S2	3 Sensitive	8	48.1 ± 1.0
P	*Salix candida*	Sage Willow				S2	3 Sensitive	20	45.8 ± 0.1
P	*Castilleja septentrionalis*	Northeastern Paintbrush				S2	3 Sensitive	25	39.6 ± 1.0
P	*Viola novae-angliae*	New England Violet				S2	3 Sensitive	4	97.8 ± 0.01
P	*Sagittaria calycina var. spongiosa*	Long-lobed Arrowhead				S2	4 Secure	52	74.9 ± 0.01
P	*Carex concinna*	Beautiful Sedge				S2	3 Sensitive	33	52.0 ± 0.1
P	*Carex granularis*	Limestone Meadow Sedge				S2	3 Sensitive	32	49.1 ± 5.0
P	*Carex gynocrates*	Northern Bog Sedge				S2	3 Sensitive	15	45.7 ± 0.01
P	*Carex hirtifolia*	Pubescent Sedge				S2	3 Sensitive	13	63.7 ± 0.01
P	*Carex livida var. radicaulis*	Livid Sedge				S2	3 Sensitive	2	61.0 ± 0.1
P	*Carex prairea*	Prairie Sedge				S2	3 Sensitive	3	47.1 ± 1.0
P	*Carex salina*	Saltmarsh Sedge				S2	3 Sensitive	2	49.1 ± 5.0
P	*Carex sprengelii*	Longbeak Sedge				S2	3 Sensitive	5	45.2 ± 0.01
P	*Carex tenuiflora*	Sparse-Flowered Sedge				S2	2 May Be At Risk	1	50.0 ± 1.0
P	*Carex vacillans*	Estuarine Sedge				S2	3 Sensitive	4	59.7 ± 0.01
P	*Eriophorum gracile*	Slender Cottongrass				S2	2 May Be At Risk	1	47.0 ± 0.5
P	*Blysmus rufus*	Red Bulrush				S2	3 Sensitive	25	45.8 ± 0.01
P	*Elodea nuttallii*	Nuttall's Waterweed				S2	3 Sensitive	5	53.4 ± 0.1
P	*Juncus vaseyi*	Vasey Rush				S2	3 Sensitive	27	32.7 ± 0.01
P	*Allium tricoccum*	Wild Leek				S2	2 May Be At Risk	52	60.1 ± 5.0
P	*Amerorchis rotundifolia*	Small Round-leaved Orchis				S2	2 May Be At Risk	14	45.9 ± 0.3
P	*Calypso bulbosa var. americana*	Calypso				S2	2 May Be At Risk	8	19.4 ± 5.0
P	*Coeloglossum viride var. virescens*	Long-bracted Frog Orchid				S2	2 May Be At Risk	8	37.6 ± 1.0
P	*Cypripedium parviflorum var. makasin*	Small Yellow Lady's-Slipper				S2	2 May Be At Risk	4	42.9 ± 0.1
P	*Goodyera oblongifolia*	Menzies' Rattlesnake-plantain				S2	3 Sensitive	29	11.0 ± 10.0

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	*Spiranthes cernua*	Nodding Ladies'-Tresses				S2	3 Sensitive	1	94.4 ± 0.01
P	*Spiranthes lucida*	Shining Ladies'-Tresses				S2	3 Sensitive	4	89.8 ± 1.0
P	*Agrostis mertensii*	Northern Bent Grass				S2	2 May Be At Risk	58	21.7 ± 0.01
P	*Dichanthelium linearifolium*	Narrow-leaved Panic Grass				S2	3 Sensitive	3	41.9 ± 0.01
P	*Piptatherum canadense*	Canada Rice Grass				S2	3 Sensitive	3	41.4 ± 0.01
P	*Zizania aquatica var. aquatica*	Indian Wild Rice				S2	5 Undetermined	6	78.8 ± 0.1
P	*Piptatherum pungens*	Slender Rice Grass				S2	2 May Be At Risk	9	42.5 ± 0.1
P	*Stuckenia filiformis*	Thread-leaved Pondweed				S2	3 Sensitive	1	59.5 ± 0.05
P	*Stuckenia filiformis ssp. alpina*	Thread-leaved Pondweed				S2	3 Sensitive	11	53.5 ± 0.1
P	*Potamogeton richardsonii*	Richardson's Pondweed				S2	3 Sensitive	4	19.3 ± 1.0
P	*Asplenium trichomanes*	Maidenhair Spleenwort				S2	3 Sensitive	4	55.7 ± 0.5
P	*Woodsia alpina*	Alpine Cliff Fern				S2	3 Sensitive	32	40.3 ± 0.01
P	*Lycopodium sitchense*	Sitka Clubmoss				S2	3 Sensitive	4	42.4 ± 0.01
P	*Botrychium minganense*	Mingan Moonwort				S2	3 Sensitive	12	48.2 ± 1.0
P	*Selaginella selaginoides*	Low Spikemoss				S2	3 Sensitive	30	43.0 ± 0.1
P	*Osmorhiza longistylis*	Smooth Sweet Cicely				S2?	3 Sensitive	3	57.7 ± 5.0
P	*Symphyotrichum novi-belgii var. crenifolium*	New York Aster				S2?	5 Undetermined	1	81.1 ± 1.0
P	*Epilobium coloratum*	Purple-veined Willowherb				S2?	3 Sensitive	1	48.8 ± 0.1
P	*Crataegus macrosperma*	Big-Fruit Hawthorn				S2?	5 Undetermined	1	45.6 ± 0.75
P	*Galium obtusum*	Blunt-leaved Bedstraw				S2?	4 Secure	4	26.0 ± 0.1
P	*Salix myricoides*	Bayberry Willow				S2?	3 Sensitive	6	50.5 ± 0.35
P	*Platanthera huronensis*	Fragrant Green Orchid				S2?	5 Undetermined	4	46.4 ± 0.01
P	*Ceratophyllum echinatum*	Prickly Hornwort				S2S3	3 Sensitive	1	79.3 ± 0.01
P	*Elatine americana*	American Waterwort				S2S3	3 Sensitive	15	78.7 ± 0.01
P	*Rumex pallidus*	Seabeach Dock				S2S3	3 Sensitive	6	46.6 ± 17.0
P	*Galium labradoricum*	Labrador Bedstraw				S2S3	3 Sensitive	11	45.7 ± 0.1
P	*Valeriana uliginosa*	Swamp Valerian				S2S3	3 Sensitive	12	45.9 ± 0.3
P	*Carex adusta*	Lesser Brown Sedge				S2S3	4 Secure	6	38.1 ± 0.1
P	*Juncus brachycephalus*	Small-Head Rush				S2S3	3 Sensitive	6	45.9 ± 0.3
P	*Corallorhiza maculata var. occidentalis*	Spotted Coralroot				S2S3	3 Sensitive	2	55.9 ± 1.0
P	*Corallorhiza maculata var. maculata*	Spotted Coralroot				S2S3	3 Sensitive	8	47.0 ± 1.0
P	*Listera auriculata*	Auricled Twayblade				S2S3	3 Sensitive	14	15.1 ± 0.1
P	*Potamogeton praelongus*	White-stemmed Pondweed				S2S3	4 Secure	5	42.9 ± 5.0
P	*Isoetes acadiensis*	Acadian Quillwort				S2S3	3 Sensitive	1	79.0 ± 0.5
P	*Panax trifolius*	Dwarf Ginseng				S3	3 Sensitive	7	49.7 ± 0.5
P	*Arnica lanceolata*	Lance-leaved Arnica				S3	4 Secure	48	27.9 ± 0.01
P	*Artemisia campestris ssp. caudata*	Field Wormwood				S3	4 Secure	3	48.3 ± 0.1
P	*Bidens hyperborea*	Estuary Beggarticks				S3	4 Secure	70	43.7 ± 1.0
P	*Bidens hyperborea var. hyperborea*	Estuary Beggarticks				S3	4 Secure	19	43.9 ± 1.0
P	*Erigeron hyssopifolius*	Hyssop-leaved Fleabane				S3	4 Secure	56	23.3 ± 1.0
P	*Prenanthes racemosa*	Glaucous Rattlesnakeroot				S3	4 Secure	11	59.6 ± 0.01
P	*Tanacetum bipinnatum ssp. huronense*	Lake Huron Tansy				S3	4 Secure	11	73.0 ± 0.01
P	*Symphyotrichum boreale*	Boreal Aster				S3	3 Sensitive	6	46.1 ± 5.0
P	*Betula pumila*	Bog Birch				S3	4 Secure	6	45.9 ± 0.3
P	*Arabis glabra*	Tower Mustard				S3	5 Undetermined	14	31.2 ± 0.1
P	*Arabis hirsuta var. pycnocarpa*	Western Hairy Rockcress				S3	4 Secure	15	46.0 ± 0.1
P	*Cardamine maxima*	Large Toothwort				S3	4 Secure	1	67.1 ± 0.5
P	*Subularia aquatica var. americana*	Water Awlwort				S3	4 Secure	1	62.7 ± 1.0
P	*Stellaria humifusa*	Saltmarsh Starwort				S3	4 Secure	8	43.8 ± 0.5
P	*Hudsonia tomentosa*	Woolly Beach-heath				S3	4 Secure	20	42.5 ± 0.1
P	*Crassula aquatica*	Water Pygmyweed				S3	4 Secure	44	74.8 ± 1.0
P	*Penthorum sedoides*	Ditch Stonecrop				S3	4 Secure	5	58.5 ± 0.03
P	*Elatine minima*	Small Waterwort				S3	4 Secure	6	34.4 ± 1.0
P	*Astragalus alpinus var. brunetianus*	Alpine Milk-Vetch				S3	4 Secure	45	60.5 ± 1.0
P	*Hedysarum alpinum*	Alpine Sweet-vetch				S3	4 Secure	92	45.5 ± 0.01
P	*Gentianella amarella ssp. acuta*	Northern Gentian				S3	4 Secure	9	43.6 ± 5.0
P	*Geranium bicknellii*	Bicknell's Crane's-bill				S3	4 Secure	4	21.1 ± 1.0

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	*Myriophyllum farwellii*	Farwell's Water Milfoil				S3	4 Secure	3	66.8 ± 0.5
P	*Myriophyllum verticillatum*	Whorled Water Milfoil				S3	4 Secure	5	61.8 ± 0.1
P	*Myriophyllum sibiricum*	Siberian Water Milfoil				S3	4 Secure	20	50.1 ± 0.1
P	*Teucrium canadense*	Canada Germander				S3	3 Sensitive	1	83.4 ± 5.0
P	*Nuphar lutea ssp. pumila*	Small Yellow Pond-lily				S3	4 Secure	8	1.8 ± 1.0
P	*Epilobium hornemannii*	Hornemann's Willowherb				S3	4 Secure	32	29.4 ± 0.01
P	*Epilobium strictum*	Downy Willowherb				S3	4 Secure	2	72.7 ± 0.5
P	*Polygonum punctatum var. confertiflorum*	Dotted Smartweed				S3	4 Secure	26	74.5 ± 0.01
P	*Polygonum scandens*	Climbing False Buckwheat				S3	4 Secure	3	60.3 ± 1.0
P	*Littorella uniflora*	American Shoreweed				S3	4 Secure	2	19.5 ± 1.0
P	*Primula mistassinica*	Mistassini Primrose				S3	4 Secure	26	33.7 ± 10.0
P	*Samolus valerandi ssp. parviflorus*	Seaside Brookweed				S3	4 Secure	37	79.1 ± 0.01
P	*Pyrola minor*	Lesser Pyrola				S3	4 Secure	21	20.2 ± 1.0
P	*Clematis occidentalis*	Purple Clematis				S3	4 Secure	10	26.0 ± 1.0
P	*Ranunculus gmelinii*	Gmelin's Water Buttercup				S3	4 Secure	9	45.7 ± 0.1
P	*Thalictrum venulosum*	Northern Meadow-rue				S3	4 Secure	4	44.2 ± 0.01
P	*Agrimonia gryposepala*	Hooked Agrimony				S3	4 Secure	15	31.6 ± 0.01
P	*Rosa palustris*	Swamp Rose				S3	4 Secure	1	84.4 ± 1.0
P	*Rubus chamaemorus*	Cloudberry				S3	4 Secure	7	47.7 ± 0.1
P	*Salix interior*	Sandbar Willow				S3	4 Secure	16	62.6 ± 0.15
P	*Salix pedicellaris*	Bog Willow				S3	4 Secure	3	51.7 ± 0.5
P	*Comandra umbellata*	Bastard's Toadflax				S3	4 Secure	8	47.2 ± 0.5
P	*Geocaulon lividum*	Northern Comandra				S3	4 Secure	31	14.3 ± 0.01
P	*Parnassia glauca*	Fen Grass-of-Parnassus				S3	4 Secure	100	40.2 ± 0.5
P	*Limosella australis*	Southern Mudwort				S3	4 Secure	43	45.8 ± 0.1
P	*Veronica serpyllifolia ssp. humifusa*	Thyme-Leaved Speedwell				S3	4 Secure	14	23.3 ± 0.01
P	*Boehmeria cylindrica*	Small-spike False-nettle				S3	3 Sensitive	7	74.1 ± 0.01
P	*Pilea pumila*	Dwarf Clearweed				S3	4 Secure	6	75.1 ± 0.01
P	*Viola adunca*	Hooked Violet				S3	4 Secure	11	48.5 ± 0.35
P	*Viola labradorica*	Labrador Violet				S3	4 Secure	1	39.4 ± 0.01
P	*Viola nephrophylla*	Northern Bog Violet				S3	4 Secure	24	45.9 ± 0.3
P	*Carex arcta*	Northern Clustered Sedge				S3	4 Secure	8	40.0 ± 0.5
P	*Carex atratiformis*	Scabrous Black Sedge				S3	4 Secure	37	25.4 ± 0.01
P	*Carex capillaris*	Hairlike Sedge				S3	4 Secure	77	39.7 ± 0.1
P	*Carex conoidea*	Field Sedge				S3	4 Secure	2	54.0 ± 10.0
P	*Carex eburnea*	Bristle-leaved Sedge				S3	4 Secure	61	32.9 ± 0.01
P	*Carex exilis*	Coastal Sedge				S3	4 Secure	2	79.5 ± 0.5
P	*Carex garberi*	Garber's Sedge				S3	3 Sensitive	34	32.7 ± 0.01
P	*Carex haydenii*	Hayden's Sedge				S3	4 Secure	3	27.7 ± 0.01
P	*Carex michauxiana*	Michaux's Sedge				S3	4 Secure	7	61.9 ± 1.0
P	*Carex ormostachya*	Necklace Spike Sedge				S3	4 Secure	14	22.0 ± 1.0
P	*Carex rosea*	Rosy Sedge				S3	4 Secure	1	42.8 ± 5.0
P	*Carex tenera*	Tender Sedge				S3	4 Secure	2	89.9 ± 1.0
P	*Carex tuckermanii*	Tuckerman's Sedge				S3	4 Secure	8	37.8 ± 0.01
P	*Carex vaginata*	Sheathed Sedge				S3	3 Sensitive	29	45.8 ± 0.01
P	*Carex wiegandii*	Wiegand's Sedge				S3	4 Secure	6	34.8 ± 0.01
P	*Carex recta*	Estuary Sedge				S3	4 Secure	6	43.3 ± 0.01
P	*Cyperus dentatus*	Toothed Flatsedge				S3	4 Secure	1	51.1 ± 10.0
P	*Cyperus esculentus*	Perennial Yellow Nutsedge				S3	4 Secure	2	90.3 ± 0.5
P	*Eleocharis intermedia*	Matted Spikerush				S3	4 Secure	35	45.8 ± 0.01
P	*Eleocharis quinqueflora*	Few-flowered Spikerush				S3	4 Secure	29	62.6 ± 0.5
P	*Eriophorum chamissonis*	Russet Cotton-Grass				S3	4 Secure	4	47.6 ± 1.0
P	*Rhynchospora capitellata*	Small-headed Beakrush				S3	4 Secure	57	31.9 ± 0.01
P	*Rhynchospora fusca*	Brown Beakrush				S3	4 Secure	6	61.1 ± 1.0
P	*Trichophorum clintonii*	Clinton's Clubrush				S3	4 Secure	67	29.4 ± 0.01
P	*Schoenoplectus torreyi*	Torrey's Bulrush				S3	4 Secure	7	74.9 ± 0.01
P	*Triglochin gaspensis*	Gasp ├⌐ Arrowgrass				S3	4 Secure	34	44.5 ± 0.01

Taxonomic Group	Scientific Name	Common Name	COSEWIC	SARA	Prov Legal Prot	Prov Rarity Rank	Prov GS Rank	# recs	Distance (km)
P	*Triantha glutinosa*	Sticky False-Asphodel				S3	4 Secure	51	44.7 ± 50.0
P	*Cypripedium reginae*	Showy Lady's-Slipper				S3	3 Sensitive	17	45.9 ± 0.3
P	*Liparis loeselii*	Loesel's Twayblade				S3	4 Secure	2	41.3 ± 1.0
P	*Platanthera blephariglottis*	White Fringed Orchid				S3	4 Secure	6	72.7 ± 0.01
P	*Platanthera grandiflora*	Large Purple Fringed Orchid				S3	3 Sensitive	12	34.8 ± 0.25
P	*Bromus latiglumis*	Broad-Glumed Brome				S3	3 Sensitive	38	26.6 ± 0.01
P	*Dichanthelium depauperatum*	Starved Panic Grass				S3	4 Secure	13	41.9 ± 0.01
P	*Muhlenbergia richardsonis*	Mat Muhly				S3	4 Secure	24	63.5 ± 0.01
P	*Potamogeton obtusifolius*	Blunt-leaved Pondweed				S3	4 Secure	15	15.6 ± 0.5
P	*Xyris montana*	Northern Yellow-Eyed-Grass				S3	4 Secure	1	95.4 ± 5.0
P	*Zannichellia palustris*	Horned Pondweed				S3	4 Secure	22	43.6 ± 0.01
P	*Adiantum pedatum*	Northern Maidenhair Fern				S3	4 Secure	10	62.5 ± 1.0
P	*Cryptogramma stelleri*	Steller's Rockbrake				S3	4 Secure	41	28.8 ± 0.01
P	*Asplenium trichomanes-ramosum*	Green Spleenwort				S3	4 Secure	35	32.9 ± 0.01
P	*Dryopteris fragrans var. remotiuscula*	Fragrant Wood Fern				S3	4 Secure	43	21.9 ± 0.5
P	*Dryopteris goldiana*	Goldie's Woodfern				S3	3 Sensitive	58	62.0 ± 0.01
P	*Woodsia glabella*	Smooth Cliff Fern				S3	4 Secure	26	32.9 ± 0.01
P	*Equisetum palustre*	Marsh Horsetail				S3	4 Secure	8	32.7 ± 0.1
P	*Isoetes tuckermanii*	Tuckerman's Quillwort				S3	4 Secure	4	43.9 ± 1.0
P	*Lycopodium sabinifolium*	Ground-Fir				S3	4 Secure	9	24.5 ± 0.01
P	*Huperzia appalachiana*	Appalachian Fir-Clubmoss				S3	3 Sensitive	9	42.5 ± 0.5
P	*Botrychium lanceolatum var. angustisegmentum*	Lance-Leaf Grape-Fern				S3	3 Sensitive	5	33.0 ± 0.5
P	*Botrychium simplex*	Least Moonwort				S3	4 Secure	6	35.3 ± 0.05
P	*Polypodium appalachianum*	Appalachian Polypody				S3	4 Secure	1	49.2 ± 1.0
P	*Lobelia kalmii*	Brook Lobelia				S3S4	4 Secure	83	34.5 ± 0.5
P	*Suaeda calceoliformis*	Horned Sea-blite				S3S4	4 Secure	6	46.4 ± 0.01
P	*Potentilla arguta*	Tall Cinquefoil				S3S4	4 Secure	14	32.7 ± 0.1
P	*Cladium mariscoides*	Smooth Twigrush				S3S4	4 Secure	2	60.8 ± 0.5
P	*Corallorhiza maculata*	Spotted Coralroot				S3S4	3 Sensitive	16	30.1 ± 0.01
P	*Distichlis spicata*	Salt Grass				S3S4	4 Secure	3	46.5 ± 0.01
P	*Potamogeton oakesianus*	Oakes' Pondweed				S3S4	4 Secure	7	35.6 ± 0.05
P	*Stuckenia pectinata*	Sago Pondweed				S3S4	4 Secure	20	43.6 ± 0.01
P	*Polygonum raii*	Sharp-fruited Knotweed				SH	0.1 Extirpated	5	49.1 ± 10.0
P	*Montia fontana*	Water Blinks				SH	2 May Be At Risk	2	61.6 ± 100.0
P	*Aquilegia canadensis*	Red Columbine				SH	2 May Be At Risk	1	55.4 ± 10.0
P	*Phleum alpinum*	Alpine Timothy				SH	2 May Be At Risk	2	75.1 ± 0.5
P	*Gymnocarpium jessoense ssp. parvulum*	Asian Oak Fern				SH	2 May Be At Risk	12	58.5 ± 1.0
P	*Botrychium campestre*	Prairie Moonwort				SH	2 May Be At Risk	1	50.6 ± 0.5

5.1 SOURCE BIBLIOGRAPHY (100 km)

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
3147	Lepage, D. 2014. Maritime Breeding Bird Atlas Database. Bird Studies Canada, Sackville NB, 407,838 recs.
2235	Cowie, F. 2007. Electrofishing Population Estimates 1979-98. Canadian Rivers Institute, 2698 recs.
1516	Erskine, A.J. 1992. Maritime Breeding Bird Atlas Database. NS Museum & Nimbus Publ., Halifax, 82,125 recs.
633	Blaney, C.S.; Mazerolle, D.M.; Oberndorfer, E. 2007. Fieldwork 2007. Atlantic Canada Conservation Data Centre. Sackville NB, 13770 recs.
575	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2003.
506	Blaney, C.S.; Mazerolle, D.M.; Belliveau, A.B. 2013. Atlantic Canada Conservation Data Centre Fieldwork 2013. Atlantic Canada Conservation Data Centre, 9000+ recs.
382	Blaney, C.S.; Spicer, C.D.; Mazerolle, D.M. 2005. Fieldwork 2005. Atlantic Canada Conservation Data Centre. Sackville NB, 2333 recs.
281	Blaney, C.S.; Mazerolle, D.M. 2010. Fieldwork 2010. Atlantic Canada Conservation Data Centre. Sackville NB, 15508 recs.
224	Benedict, B. Connell Herbarium Specimens (Data) . University New Brunswick, Fredericton. 2003.
223	Tims, J. & Craig, N. 1995. Environmentally Significant Areas in New Brunswick (NBESA). NB Dept of Environment & Nature Trust of New Brunswick Inc, 6042 recs.

# recs	CITATION
180	Blaney, C.S.; Mazerolle, D.M. 2012. Fieldwork 2012. Atlantic Canada Conservation Data Centre, 13,278 recs.
157	Hinds, H.R. 1986. Notes on New Brunswick plant collections. Connell Memorial Herbarium, unpubl, 739 recs.
150	Speers, L. 2008. Butterflies of Canada database: New Brunswick 1897-1999. Agriculture & Agri-Food Canada, Biological Resources Program, Ottawa, 2048 recs.
147	Morrison, Guy. 2011. Maritime Shorebird Survey (MSS) database. Canadian Wildlife Service, Ottawa, 15939 surveys. 86171 recs.
133	Goltz, J.P. 2012. Field Notes, 1989-2005. , 1091 recs.
125	Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs.
122	Brunelle, P.-M. (compiler). 2009. ADIP/MDDS Odonata Database: data to 2006 inclusive. Atlantic Dragonfly Inventory Program (ADIP), 24200 recs.
115	Blaney, C.S. 1999. Fieldwork 1999. Atlantic Canada Conservation Data Centre. Sackville NB, 292 recs.
107	Benedict, B. Connell Herbarium Specimen Database Download 2004. Connell Memorial Herbarium, University of New Brunswick. 2004.
102	Blaney, C.S.; Mazerolle, D.M.; Klymko, J; Spicer, C.D. 2006. Fieldwork 2006. Atlantic Canada Conservation Data Centre. Sackville NB, 8399 recs.
89	Bagnell, B.A. 2001. New Brunswick Bryophyte Occurrences. B&B Botanical, Sussex, 478 recs.
76	Wilhelm, S.I. et al. 2011. Colonial Waterbird Database. Canadian Wildlife Service, Sackville, 2698 sites, 9718 recs (8192 obs).
70	Busby, D.G. 1999. 1997-1999 Bicknell's Thrush data, unpublished files. Canadian Wildlife Service, Sackville, 17 recs.
70	Clayden, S.R. 2007. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, download Mar. 2007, 6914 recs.
60	Coursol, F. 2005. Dataset from New Brunswick fieldwork for Eriocaulon parkeri COSEWIC report. Coursol, Pers. comm. to C.S. Blaney, Aug 26. 110 recs.
59	Blaney, C.S.; Spicer, C.D.; Popma, T.M.; Hanel, C. 2002. Fieldwork 2002. Atlantic Canada Conservation Data Centre. Sackville NB, 2252 recs.
57	Sollows, M.C,. 2008. NBM Science Collections databases: mammals. New Brunswick Museum, Saint John NB, download Jan. 2008, 4983 recs.
51	Klymko, J.J.D. 2014. Maritimes Butterfly Atlas, 2012 submissions. Atlantic Canada Conservation Data Centre, 8552 records.
38	Klymko, J.J.D. 2012. Maritimes Butterfly Atlas, 2010 and 2011 records. Atlantic Canada Conservation Data Centre, 6318 recs.
35	Hinds, H.R. 1999. Connell Herbarium Database. University New Brunswick, Fredericton, 131 recs.
35	Sabine, D.L. & Bishop, G. 2004. Vascular Plant Survey of Tidehead Boomground Marsh. New Brunswick Fisheries & Wildlife, 18pp.
33	Scott, Fred W. 1998. Updated Status Report on the Cougar (Puma Concolor couguar) [Eastern population]. Committee on the Status of Endangered Wildlife in Canada, 298 recs.
29	Blaney, C.S. 2000. Fieldwork 2000. Atlantic Canada Conservation Data Centre. Sackville NB, 1265 recs.
26	Mills, E. Connell Herbarium Specimens, 1957-2009. University New Brunswick, Fredericton. 2012.
24	Hicks, Andrew. 2009. Coastal Waterfowl Surveys Database, 2000-08. Canadian Wildlife Service, Sackville, 46488 recs (11149 non-zero).
23	Keppie, D.M. 2005. Rare Small Mammal Records in NB, PE. Pers. comm. to K. Bredin; PE 1 rec., NB 24 recs, 23 recs.
22	Erskine, A.J. 1999. Maritime Nest Records Scheme (MNRS) 1937-1999. Canadian Wildlife Service, Sackville, 313 recs.
19	Toner, M. 2005. Lynx Records 1996-2005. NB Dept of Natural Resources, 48 recs.
17	Bateman, M.C. 2000. Waterfowl Brood Surveys Database, 1990-2000 . Canadian Wildlife Service, Sackville, unpublished data. 149 recs.
17	Blaney, C.S.; Mazerolle, D.M. 2009. Fieldwork 2009. Atlantic Canada Conservation Data Centre. Sackville NB, 13395 recs.
17	Cowie, Faye. 2007. Surveyed Lakes in New Brunswick. Canadian Rivers Institute, 781 recs.
17	Webster, R.P. & Edsall, J. 2007. 2005 New Brunswick Rare Butterfly Survey. Environmental Trust Fund, unpublished report, 232 recs.
16	Blaney, C.S.; Spicer, C.D.; Rothfels, C. 2004. Fieldwork 2004. Atlantic Canada Conservation Data Centre. Sackville NB, 1343 recs.
15	Spicer, C.D. 2002. Fieldwork 2002. Atlantic Canada Conservation Data Centre. Sackville NB, 211 recs.
14	Campbell, G., Villamil, L. 2012. Heath Steele Mine Bird Surveys 2012.
14	Madden, A. 1998. Wood Turtle records in northern NB. New Brunswick Dept of Natural Resources & Energy, Campbellton, Pers. comm. to S.H. Gerriets. 16 recs.
14	Webster, R.P. 2001. R.P. Webster Collection. R. P. Webster, 39 recs.
13	Tingley, S. (compiler). 2001. Butterflies of New Brunswick. , Web site: www.geocities.com/Yosemite/8425/buttrfly. 142 recs.
12	Amirault, D.L. & Stewart, J. 2007. Piping Plover Database 1894-2006. Canadian Wildlife Service, Sackville, 3344 recs, 1228 new.
12	Blaney, C.S.; Mazerolle, D.M. 2011. Fieldwork 2011. Atlantic Canada Conservation Data Centre. Sackville NB.
12	McAlpine, D.F. 1998. NBM Science Collections: Wood Turtle records. New Brunswick Museum, Saint John NB, 329 recs.
11	Cronin, P. & Ayer, C.; Dubee, B.; Hooper, W.C.; LeBlanc, E.; Madden, A.; Pettigrew, T.; Seymour, P. 1998. Fish Species Management Plans (draft). NB DNRE Internal Report. Fredericton, 164pp.
10	Doucet, D.A. & Edsall, J. 2007. Ophiogomphus howei records. Atlantic Canada Conservation Data Centre, Sackville NB, 21 recs.
10	Doucet, D.A. & Edsall, J.; Brunelle, P.-M. 2007. Miramichi Watershed Rare Odonata Survey. New Brunswick ETF & WTF Report, 1211 recs.
9	Klymko, J.J.D.; Robinson, S.L. 2012. 2012 field data. Atlantic Canada Conservation Data Centre, 447 recs.
7	Blaney, C.S.; Mazerolle, D.M. 2008. Fieldwork 2008. Atlantic Canada Conservation Data Centre. Sackville NB, 13343 recs.
7	Edsall, J. 2001. Lepidopteran records in New Brunswick, 1997-99. , Pers. comm. to K.A. Bredin. 91 recs.
7	Klymko, J.J.D.; Robinson, S.L. 2014. 2013 field data. Atlantic Canada Conservation Data Centre.
7	Toner, M. 2005. NB DNR fieldwork on Parker's Pipewort. NB Dept of Natural Resources. Pers. comm to C.S. Blaney, Dec 12, 8 recs.
7	Wood Turtle (Glyptemys insculpta) Miramichi Watershed Synopsis 2013 Compiled by: Vladimir King Trajkovic, EPt Miramichi River Environmental Assessment Committee
6	Chaput, G. 2002. Atlantic Salmon: Maritime Provinces Overview for 2001. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-14. 39 recs.
6	Edsall, J. 2007. Personal Butterfly Collection: specimens collected in the Canadian Maritimes, 1961-2007. J. Edsall, unpubl. report, 137 recs.
6	McLeod, D. & Merrithew, C. 2005. The Inventory of the Flora and Fauna of the French Fort Cove Nature Park. French Fort Cove Development Commission, 7 recs.
6	Robinson, S.L. 2010. Fieldwork 2009 (dune ecology). Atlantic Canada Conservation Data Centre. Sackville NB, 408 recs.
6	Webster, R.P. 1999. Insects of the Stillwater Watershed, A Preliminary Study. , 11 recs.

# recs	CITATION
5	Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2000.
5	Dept of Fisheries & Oceans. 1999. Status of Wild Striped Bass, & Interaction between Wild & Cultured Striped Bass in the Maritime Provinces. , Science Stock Status Report D3-22. 13 recs.
5	Newell, R.E. 2000. E.C. Smith Herbarium Database. Acadia University, Wolfville NS, 7139 recs.
4	Bateman, M.C. 2001. Coastal Waterfowl Surveys Database, 1965-2001. Canadian Wildlife Service, Sackville, 667 recs.
4	Benedict, B. Connell Herbarium Specimens, Digital photos. University New Brunswick, Fredericton. 2005.
4	Dalton, M. & Saba, B.A. 1980. A preliminary report on the natural history of the Gaspé shrew. The Atlantic Center for the Environment, Ipwich, MA, 29 pp.
4	David, M. 2000. CNPA website. Club de naturalistes de la Peninsule acadienne (CNPA), www.francophone.net/cnpa/rares. 16 recs.
4	Doucet, D.A. 2008. Fieldwork 2008: Odonata. ACCDC Staff, 625 recs.
4	Hoyt, J.S. 2001. Assessment and update status report on the Bathurst Aster (Symphyotrichum subulatum) in Canada. Committee on the Status of Endangered Wildlife in Canada, 4 recs.
4	McLeod, D. & Saunders, J. 2004. Cypripedium reginae. Pers. comm. to C.S. Blaney. 4 recs, 4 recs.
4	Sollows, M.C. 2008. NBM Science Collections databases: herpetiles. New Brunswick Museum, Saint John NB, download Jan. 2008, 8636 recs.
4	Webster, R.P. 1997. Status Report on Maritime Ringlet (Coenonympha nipisquit) in Canada. Committee on the Status of Endangered Wildlife in Canada, 4 recs.
3	Boyne, A.W. 2000. Tern Surveys. Canadian Wildlife Service, Sackville, unpublished data. 168 recs.
3	Chaput, G. 1999. Atlantic Salmon: Miramichi & SFA 16 Rivers. Dept of Fisheries & Oceans, Atlantic Region, Science Stock Status Report D3-05. 6 recs.
3	Doucet, D.A. 2007. Lepidopteran Records, 1988-2006. Doucet, 700 recs.
3	Downes, C. 1998-2000. Breeding Bird Survey Data. Canadian Wildlife Service, Ottawa, 111 recs.
3	Holder, M. & Kingsley, A.L. 2000. Peatland Insects in NB & NS: Results of surveys in 10 bogs during summer 2000. Atlantic Canada Conservation Data Centre, Sackville, 118 recs.
3	Klymko, J.J.D. 2012. Insect fieldwork & submissions, 2011. Atlantic Canada Conservation Data Centre. Sackville NB, 760 recs.
3	Nelson Poirier. 2009. Rare plant finds in the Exmoor & Lyttleton areas. Pers. comm. to S. Blaney. 4 recs, 4 recs.
3	Scott, F.W. 1988. Status Report on the Gaspé Shrew (Sorex gaspensis) in Canada. Committee on the Status of Endangered Wildlife in Canada, 12 recs.
3	Speers, L. 2001. Butterflies of Canada database. Agriculture & Agri-Food Canada, Biological Resources Program, Ottawa, 190 recs.
3	Spicer, C.D. 2004. Specimens from CWS Herbarium, Mount Allison Herbarium Database. Mount Allison University, 5939 recs.
3	Toner, M. 2001. Lynx Records 1973-2000. NB Dept of Natural Resources, 29 recs.
2	Doucet, D.A. 2008. Wood Turtle Records 2002-07. Pers. comm. to S. Gerriets, 7 recs, 7 recs.
2	Majka, C. 2009. Université de Moncton Insect Collection: Carabidae, Cerambycidae, Coccinellidae. Université de Moncton, 540 recs.
2	McAlpine, D.F. 1998. NBM Science Collections databases to 1998. New Brunswick Museum, Saint John NB, 241 recs.
2	Pike, E., Tingley, S. & Christie, D.S. 2000. Nature NB Listserve. University of New Brunswick, listserv.unb.ca/archives/naturenb. 68 recs.
1	Basquill, S.P. 2003. Fieldwork 2003. Atlantic Canada Conservation Data Centre, Sackville NB, 69 recs.
1	Bouchard, A. Herbier Marie-Victorin. Universite de Montreal, Montreal QC. 1999.
1	Brunelle, P.-M. 2005. Wood Turtle observations. Pers. comm. to S.H. Gerriets, 21 Sep. 3 recs, 3 recs.
1	Cameron, R.P. 2009. Erioderma pedicellatum database, 1979-2008. Dept Environment & Labour, 103 recs.
1	Clayden, S.R. 2012. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 57 recs.
1	Collins, H. 2014. Email to John Klymko regarding CHELserp record from Miramichi watershed. Miramichi River Environmental Assessment Committee, 1 record.
1	Daury, R.W. & Bateman, M.C. 1996. The Barrow's Goldeneye (Bucephala islandica) in the Atlantic Provinces and Maine. Canadian Wildlife Service, Sackville, 47pp.
1	Douglas, S.G. & G.C. Chaput & R. Bradford. 2001. Status of Striped Bass (Morone saxatilis) in the southern Gulf of St. Lawrence in 1999 & 2000. DFO Canadian Science Advisory Secretariat Res. Doc. 2001/058, 2001/058. 1 rec.
1	Edsall, J. 1993. Summer 1993 Report. New Brunswick Bird Info Line, 2 recs.
1	Elderkin, M. 2001. Bog Lemming record for Popple Depot NB. , Pers. comm. to K.A. Bredin. 1 rec.
1	Forbes, G. 2001. Bog Lemming, Phalarope records, NB. , Pers. comm. to K.A. Bredin. 6 recs.
1	Forster, J. 1999. [Story about Lynx in New Brunswick]. Moncton Times & Transcript, November 5, 1999. 1 rec.
1	Gautreau-Daigle, H. 2007. Rare plant records from peatland surveys. Coastal Zones Research Institute, Shippagan NB. Pers. comm. to D.M. Mazerolle, 39 recs.
1	Goltz, J.P. & Bishop, G. 2005. Confidential supplement to Status Report on Prototype Quillwort (Isoetes prototypus). Committee on the Status of Endangered Wildlife in Canada, 111 recs.
1	Gravel, Mireille. 2010. Coordonnées GPS et suivi des tortues marquées, 2005-07. Kouchibouguac National Park, 480 recs.
1	Hinds, H.R. 2000. Flora of New Brunswick (2nd Ed.). University New Brunswick, 694 pp.
1	Klymko, J.J.D. 2011. Insect fieldwork & submissions, 2010. Atlantic Canada Conservation Data Centre. Sackville NB, 742 recs.
1	Klymko, J.J.D. 2012. Odonata specimens & observations, 2010. Atlantic Canada Conservation Data Centre, 425 recs.
1	Sabine, D.L. 2013. Dwaine Sabine butterfly records, 2009 and earlier.
1	Saunders, J. 2009. White-Fringe Orchis photo and coordinates. Pers. comm. to S. Blaney, July 17. 1 rec, 1 rec.
1	Toner, M. 2009. Wood Turtle Sightings. NB Dept of Natural Resources. Pers. comm. to S. Gerriets, Jul 13 & Sep 2, 2 recs.