



Environmental Impact Assessment Registration

Maquac Generating Station
Alkali-Aggregate Reaction Mitigation:
Effluent and Sludge Treatment
and Disposal
Keswick Ridge, NB

New Brunswick
Power Corporation

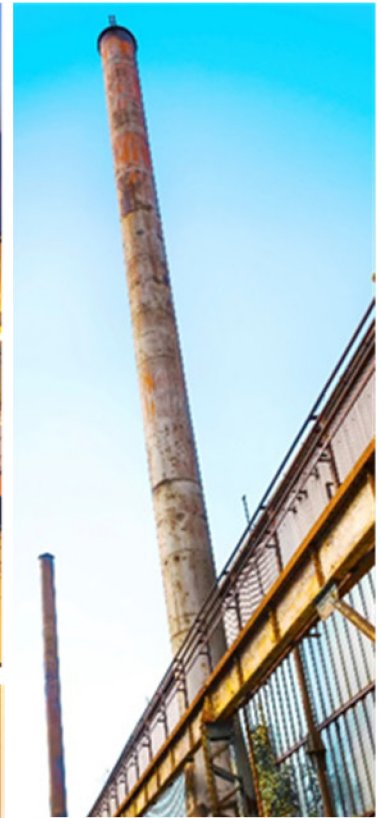




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Glossary of Terms, Abbreviations, and Units

°C	Degree Celsius
%	Percent
AAR	Alkali-Aggregate Reaction
AARMO	Alkali-Aggregate Reaction Mitigation Operations
ACCDC	Atlantic Canada Conservation Data Centre
amsl	Above mean sea level
CBOD	Carbonaceous Biochemical Oxygen Demanding Matter
CCME	Canadian Council of Ministers of the Environment
CER	Comparative Environmental Review
cm	Centimetre
CO ₂	Carbon dioxide
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CRI	Canadian Rivers Institute
ECCC	Environment and Climate Change Canada
EEP	East End Pier
EIA	Environmental Impact Assessment
EPP	Environmental Protection Plan
ESA	Environmentally Significant Area
FWAL	Freshwater Aquatic Life
ha	Hectare
IKM	IKM Testing Limited
km	Kilometre
km ²	Square kilometre
L	Litre
LTTSS	Long-term Treatment Suitability Study
LSD	Local Service District
m	Metre
M	Million
m ³	Cubic metre
MAES	Mactaquac Aquatic Ecosystem Study
MBF	Mactaquac Biodiversity Facility
mg	Milligram
MGS	Mactaquac Generating Station



Glossary of Terms, Abbreviations and Units

min	Minute
mm	Millimetre
MSCs	Mobile Settlement Containers
NBDNR	New Brunswick Department of Natural Resources
NBDELG	New Brunswick Department of Environment and Local Government
NB Power	NB Power Corporation
NTU	Nephelometric Turbidity Unit
PID	Parcel Identifier
RDCC	Resource Development Consultation Coordinator
RSC	Regional Service Commission
SAR	Species at Risk
SARA	Species at Risk Act
SNB	Service New Brunswick
TSS	Total Suspended Solids
VEF	Valued Environmental Feature
WAWA	Watercourse and Wetland Alteration
WNNB	Wolastoqey Nation in New Brunswick



1. Introduction

New Brunswick Power Corporation (NB Power) retained GHD to prepare an Environmental Impact Assessment (EIA) Registration document for the treatment and disposal of the effluent and sludge generated by the Alkali-Aggregate Reaction Mitigation Operations (AARMO) at the Mactaquac Generating Station (MGS). The MGS is located in the Keswick Ridge Local Service District (LSD), New Brunswick. A Site location map is provided in Figure 1 (in attachment).

1.1 Project Overview

The AARMO involves slot-cutting, drilling and grouting on concrete structures of the MGS. These activities are essential to maintaining the safe operation of critical equipment associated with the MGS. NB Power is currently preparing a Pilot Test on the treatment and disposal of effluent and sludge resulting from the slot-cutting component of the AARMO (Pilot Test) to inform a Long-term Treatment Suitability Study (LTTSS) that is being developed concurrently with the proposed Pilot Test. The purpose of the LTTSS is to develop options for the long-term treatment and disposal of the effluent and sludge generated by the AARMO, including drilling and grouting.

The Project consists of two broad components:

- Conduct the Pilot Test, which involves slot-cutting at the East End Pier (EEP) of the MGS, specifically at EEP Intake 6, as well as treatment and disposal of the resulting slurry. The Pilot Test will be of short duration and small scale and conducted as a field assessment.
- Finalize the LTTSS on the basis of the Pilot Test results (in particular, the achievement of discharge criteria) and implement long-term effluent and sludge treatment and disposal for the ongoing AARMO at the MGS.

The New Brunswick Department of Environment and Local Government (NBDELG) has advised NB Power that the conduct of the Pilot Test and the implementation of long-term effluent and sludge treatment and disposal must be registered pursuant to Section 5(2) of the Environmental Impact Assessment Regulation 87-83 of the Clean Environment Act.

The NBDELG's document "A Guide to Environmental Impact Assessment in New Brunswick" (January 2018) provides for phased EIAs where a proponent must first collect and analyze data prior to finalizing the "design, location or feasibility of an undertaking before submitting a complete registration document".

The present Registration document is submitted to the NBDELG under the above-noted regulation for the phased approval of the Project. Approval is sought in two stages:

- Conditional approval to implement the Pilot Test, with the assurance that the EIA Registration document will be amended on the basis of the Pilot Test results and the finalization of the LTTSS.
- Approval for the installation and operation of the selected long-term effluent and sludge treatment and disposal option following an updated EIA Registration document and the associated public involvement and Aboriginal engagement activities.



The EIA Guide as well as the Additional Information Requirements for Wastewater Treatment Projects (Version 04-11-25) of the NBDELG, the latter applying to municipal and industrial wastewater treatment and disposal facilities, were reviewed in preparing the present Registration document.

1.2 Proponent Information

The Proponent is NB Power, which owns the MGS. NB Power is a Crown corporation owned by the Province of New Brunswick and regulated by the New Brunswick Energy and Utilities Board. It also reports to an independent Board of Directors.

The contact information for the present document is as follows:

Proponent Chief Executive Officer: Mr. Keith Cronkhite, NB Power, President and CEO

Proponent Contact Information: Mr. Mat Gorman, P.Eng.
Corporate Environmental Services
NB Power
P.O. Box 2000, 515 King Street
Fredericton, NB E3B 4X1
Tel: (506) 478-4475
MaGorman@nbpower.com

Consultant Contact Information: Mr. Troy Small, M.Sc., CE
GHD
466 Hodgson Road
Fredericton, NB E3C 2G5
Tel: (506) 458-1248
troy.small@ghd.com

1.3 Property Ownership

The MGS is located on property identified by Service New Brunswick (SNB) as Parcel Identifier (PID) 75258699, which covers a total area of 421.5 hectares (ha). Several small properties are situated within the north-eastern section of the NB Power-owned MGS property and include five residential properties and one property owned by the NB Department of Transportation and Infrastructure. These third-party properties are all located approximately 1 kilometre (km) from the MGS infrastructure.

The MGS property forms part of the Keswick Ridge LSD. The Kingsclear and the Bright LSDs are located to the south and the west of the Keswick Ridge LSD, respectively. LSDs are unincorporated areas that provide such services as fire protection, solid waste collection and disposal and street lighting (SNB, 2021).

The Keswick Ridge LSD is part of Regional Service Commission (RSC) 11 (York County). RSCs provide such services as development and planning (including regional emergency measures planning and regional sport, recreational and cultural infrastructure planning), solid waste management, regional policing collaboration and cost-sharing (Stantec, 2016).



Figure 2 , in attachment, shows the property limits of the MGS and the surrounding LSDs.

2. The Project

2.1 Project Name

The full name of the Project is **Treatment and Disposal of Effluent and Sludge Generated by the Alkali-Aggregate Reaction Mitigation Operations at the Mactaquac Generating Station.**

2.2 Historical Context

The MGS is a run-of-the-river hydroelectric generating station located on the Saint John River, approximately 19 km west (upstream) of Fredericton, in Keswick Ridge, NB. The MGS, the largest of NB Power's hydroelectric generating stations, began operating in 1968 after the Mactaquac Headpond, stretching over 97 km, had completely filled. It has the capacity to generate approximately 660 megawatts of energy and supplies approximately 12 percent of New Brunswick homes and businesses. Its major components are as follows (Stantec, 2016; NB Power, 2021):

- An Earthen Dam, which rises 42.37 metres (m) above mean sea level (amsl) and spans 518 m.
- Two concrete spillways, the main spillway, and the diversion sluiceway. The former spans 83 m and contains water up to 40.5 m amsl, whereas the latter is used only during high-flow periods.
- An Intake structure, which is 42 m high and directs water into 6 steel tubes encased in concrete, called penstocks.
- A Powerhouse that houses six hydroelectric turbines that receive the water from the penstocks. Each turbine must spin at precisely 112.5 revolutions per minute.
- An electrical switchyard.

The MGS and associated infrastructure are collectively referred to as the "Site" throughout this document. Images of the MGS are provided in Figure 2.1.



Figure 2.1 Mactaquac Generating Station

The MGS was originally designed to have a 100-year lifespan; however, the concrete structures have been affected since the 1980s by a chemical reaction, known as Alkali-Aggregate Reaction (AAR). AAR occurs when alkali in the cement paste reacts with silica in the sand and gravel mix used as aggregates in the concrete. The reaction causes the concrete to slowly expand over time, resulting in its deformation or cracking. AAR-induced movement slowly shifts critical, embedded equipment, such as turbines, generators, gates, and pipes. The Earthen Dam, which supports the Mactaquac Headpond and is a rock-filled structure sealed with clay, is not subject to AAR. The following photographs (Figure 2.2) show some of the effects of AAR at the MGS.



Figure 2.2 Effects of AAR at the Mactaquac Generating Station

AARMO has been required to counteract the effects of AAR and ensure the safe continuation of operations at the MGS. Two broad activities are associated with the AARMO:

- Slot-cutting the concrete structures to create expansion joints within the structure, in order to manage deformation. This activity has not been completed at the MGS since 2015. It is typically conducted every 4 to 5 years. Section 2.6.1 describes further the slot-cutting process.
- Drilling and grouting to consolidate the concrete structures. This activity has been ongoing at the MGS since the mid-1990s. Drilling occurs at the MGS year-round (4 to 5 days per week), whereas grouting occurs between approximately June and November annually. In brief, five-centimetre (cm) diameter pilot holes are drilled within the concrete structures to identify



significant cracks or void spaces. The horizontal spacing between drill holes varies depending on the location but generally ranges from 0.3 to 3 m intervals. Following completion of the drill holes, cementitious grout is pumped into the pilot holes in an effort to seal cracks/voids within the concrete structure and reduce water infiltration as well as leakage.

During the drilling, river water is injected into the drill hole to cool the drill bit and return the drill cuttings. The return water and drill cuttings are collected in a Sludge Recovery Box installed over the drill hole. This box is equipped with a vacuum pump that collects the water/sludge mixture and pumps the material to a mobile settlement container (MSC). Once the drill hole is completed, water or dye testing is conducted in an effort to establish the vertical depths containing cracks/voids. Grout is then pumped into the drill holes at specified depths in an effort to fill the cracks/voids. The excess grout produced is also collected and pumped to an MSC.

The excess grout and/or drilling fluids collected in the MSCs are allowed to settle for approximately 12 hours (overnight). The following day, the solids in the mixture have settled to the bottom of the MSC and clear water (supernatant) accumulated on the surface. The clear supernatant was historically discharged directly to the Site stormwater collection infrastructure or the surrounding environment. The historical discharge locations of the clear supernatant water varied depending on the AARMO location. However, since approximately 2019, the supernatant water contained in the MSC is collected by an approved wastewater management contractor for off-Site disposal.

Solids accumulated in the MSCs have historically been collected by a local carrier for off-Site disposal. Currently, the solids are transported to Envirem Technologies Inc. (Envirem) in Fredericton, NB for disposal. Envirem is a privately-owned soil treatment facility that is licensed to receive contaminated soils.

The volume of water accumulated in the MSCs is approximately 4,000 to 8,000 litres (L) per day (4 days per week).

The drilling and grouting activities are conducted under a Watercourse and Wetland Alteration (WAWA) permit, as explained in Section 2.5.2.

NB Power also holds an Approval to Operate a domestic wastewater treatment plant at the MGS, described further in Section 3.4.

2.3 Mactaquac Generating Station Life Achievement

The AAR phenomenon reduces the planned 100-year lifespan of the MGS to about 70 years, which means that the MGS useful service life is currently scheduled to end in 2030. NB Power thus underwent a lengthy options analysis process, known as the Mactaquac project, which resulted in the Final Comparative Environmental Review (CER) report (Stantec, 2016). One of the options identified was the Life Achievement Option, which involves exploring approaches to pursue operations at the MGS beyond 2030, preferably up to the originally planned end-of-life year of 2068. The Final CER Report describes this option as follows:

“The Life Achievement Option would consist of one of various approaches that are being considered to maintain/repair/refurbish existing infrastructure at the Station (e.g., intake channel, powerhouse, main spillway, diversion sluiceway). The specific approach will be further developed based on results of ongoing studies and detailed planning to define how existing concrete



structures and their associated mechanical components could be maintained as operational, repaired as necessary, or partially or fully refurbished in place. Possible approaches could range from maintenance and repair activities so that units are operational for as long as possible until their mechanical failure, to partially demolishing components and rebuilding them with refurbished or new components in the same footprint”.

NB Power confirmed its selection of the Life Achievement Option in 2017. Comprehensive studies are being led in preparation of an EIA Registration, planned in 2022, for a full-scale rehabilitation project. The current Registration document represents a subset of those studies, since the results of the proposed Pilot Test and LTTSS will inform, to some extent, the future EIA Registration document for the Life Achievement Option.

2.4 2019 Discharge Occurrence

Environment and Climate Change Canada (ECCC) visited the Site on August 1, 2019, to observe the effluent and sludge generated as part of the AARMO and pumped to MSCs.

During the Site visit, the ECCC enforcement officer collected a sample of the supernatant water accumulated in the MSC on the South End Pier of the MGS. This water, generated as part of the ongoing AARMO, was identified to be acutely toxic to fish. ECCC issued to NB Power a Notice of Intent to Issue a Direction Pursuant to the Fisheries Act on September 6, 2019 (Appendix A). Said Notice put forth measures to be taken to remedy the situation, which involve stopping the release of the deleterious substance into waters frequented by fish and providing ECCC with documentation of the corrective measures implemented. Following the ECCC Site visit, NB Power also collected samples of supernatant water from the MSCs for laboratory analysis. Upon receipt of the test results on August 26, 2019, MGS personnel were directed to immediately cease emptying the surface layer effluent from the MSCs and to hold it until an acceptable solution for handling and disposal was identified, as outlined in a NB Power letter issued to ECCC on September 19, 2019 (Appendix B).

Since August 26, 2019, supernatant water accumulated in the MSCs has been collected by a local carrier and transported to an off-Site treatment facility. Consistent with historical (and current) practices, the solids accumulated in the MSCs were collected by a local carrier and transported to Envirem for disposal. NB Power formalized the process for treating and disposing of the grout waste by setting out the procedures for its disposal based on the parameters measured.

A meeting between ECCC and NB Power was held on September 30, 2019, to review the situation. GHD was thereafter retained by NB Power to provide a third-party review of the historical AARMO and discharge occurrence and document the corrective measures undertaken by NB Power. A description of GHD's 2019 review is provided in Section 2.5.

2.5 2019 Discharge Occurrence Investigation

GHD investigated the discharge occurrence identified by ECCC during a Site visit on August 1, 2019. The scope of GHD's investigation included interviews conducted with NB Power staff about the AARMO, a Site visit on September 17-18, 2019, photographs of the ongoing AARMO and documentation of the corrective measures completed since the ECCC Site visit. GHD submitted its investigation report on October 23, 2019. The general findings of the investigation are outlined in the following sections and focus on the historical and ongoing drilling and grouting operations.



2.5.1 Interviews and Site Visit

Interviews conducted with NB Power staff during GHD's 2019 investigation indicated that the drilling and grouting methodology for the collection of drilling fluids and excess grout material, as described in Section 2.2, has been ongoing since the 1990s. This operation has occurred throughout the MGS facility including but not limited to the following:

- North and South End Piers and North Bulkhead Wall of the Diversion Sluiceway
- Intake Inspection Gallery (Deck)
- Powerhouse (various elevations)
- Cut-off wall of Rock Island.

During GHD's September 2019 Site visit, it was identified that a secondary grouting operation occurs as part of the AARMO: chemical grout (Polyurethane) has been injected into small surficial cracks of exposed concrete at the North End Pier as well as in several areas of the Powerhouse. However, the application of the chemical grout appears to be limited to isolated areas with minimal waste being generated during the grout application. This chemical grout application would be similar to polyurethane injections used to repair small cracks in basement walls/floors of residential or commercial buildings.

2.5.2 Background Documentation

2.5.2.1 Watercourse and Wetland Alteration Permit

NB Power provided GHD with the current WAWA permit for maintenance-related work associated with NB Power Hydro facilities, including the MGS (Appendix C). It consists of a five-year multiple activities WAWA permit granted to NB Power by the NBDELG in March 2018, expiring on December 31, 2022. Although the permit is not specific to the AARMO of the MGS, it does specify that it includes "various cement and brick work on existing infrastructures". As such, it is reasonable to assume that the AARMO are included in this permit since the AARMO are related to Site maintenance.

The WAWA permit includes a requirement for NB Power to submit an Annual Summary of Work report to the NBDELG. The 2018 Annual Summary of Work report lists chemical grouting, concrete repair on the Intake/Tailrace Deck and cementitious grouting as work activities completed at the MGS in 2018 (amongst others). It also lists drilling as an activity to be completed at the MGS in 2019 (amongst other activities).

2.5.2.2 Water Quality

A water sample collected from an MSC on August 21, 2019, by NB Power, was analyzed for total suspended solids (TSS), pH and metals. The analytical results indicated a pH of 11.03, which is consistent with the pH value in the water sample collected from the MSC on August 1, 2019, by ECCC (pH value of 11.5). The elevated pH value is assumed to be the causative agent associated with the fish toxicity observed in the ECCC and NB Power supernatant water samples. The analytical results of the August 21, 2019 sample, also contained elevated concentrations of several metals, including aluminum, chromium, and copper. Concentrations of these three metals were



greater than the Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of Freshwater Aquatic Life (FWAL). The CCME FWAL guidelines are conservative values developed for the protection of the most sensitive aquatic organisms in Canadian waters. These values are commonly used by provincial and federal regulators to screen contaminants of concern in surface water bodies. The metal concentrations present in the August 21, 2019 sample were below the Approval to Operate discharge limits issued by the NBDELG for other NB Power facilities.

2.5.2.3 Drilling Fluids and Grout Material

The basic ingredient for cementitious grout material used in the AARMO is Type 10 Portland cement, a common ingredient for concrete, mortar, and non-specialty grout. Although a material safety data sheet was not available for the grout at the time of GHD's 2019 investigation, Portland cement is considered to be caustic due to its high pH and is likely the primary contributor to the elevated pH observed in the supernatant water samples taken from the MSCs. However, the quality of drilling fluids being pumped to the MSCs was not known and there is the potential that this water/sludge material could also have elevated pH or metal concentrations. The supernatant water collected from the MSCs in August 2019 was a mixture of grout and drilling fluids (cooling water and drill cuttings). As such, it is not known if the elevated pH and metal concentrations are primarily related to grouting mixture or drilling fluids (or both).

2.5.3 Conclusions

GHD provided the following conclusions on the historical AARMO and associated corrective measures implemented since August 26, 2019:

- The historical drilling and grouting process of the AARMO produced wastewater that had the potential to be directly discharged into the environment.
- Drilling and grouting operations have been ongoing at various locations at the MGS since the mid-1990s. Over this period, wastewater was generated between June and November as needed. During the winter/spring months, when only drilling activities are being completed, significantly less wastewater is likely to be generated (volume of water generated per day from drilling activities not confirmed).
- Until the results of the fish toxicity tests were received on August 26, 2019, supernatant water accumulated in the MSCs as part of the drilling/grouting was directly discharged to the Site stormwater collection infrastructure, the Earthen Dam, or the environment. The quality of water previously discharged is not known, but the methodology for collection of drilling fluids and excess grout material along with the disposal of this material has been relatively unchanged between the 1990s and 2019.
- There is the potential that drilling fluids and grout material being pumped into the drill holes could penetrate surficial cracks in the Diversion Sluiceway, Intake Structure or Powerhouse.
- The WAWA permit for NB Power Hydro operations includes general concrete maintenance activities, but it does not specifically identify the MGS AARMO or specific mitigation measures to be applied. However, specific AARMO tasks were identified in the 2018 Annual Work Summary report provided to NBDELG as part of the permit's requirements.



- The NB Power environmental auditing process did not include the AARMO, but the audits did identify that NB Power Hydro does not have an active EMS and recommended that the EMS be revitalized. The lack of an active EMS and exclusion of the AARMO from historical compliance and EMS audits are likely the primary contributors related to the discharge occurrence. Based on GHD's experience reviewing EMSs associated with other NB Power generation facilities, long-term operational activities such as the AARMO are typically captured in the site-specific EMS as well as the associated compliance or internal EMS auditing program.
- Analytical results of the supernatant water collected from the MSCs in August 2019 identified elevated pH values likely related to the grouting, but the results also identified elevated concentrations of several metals, including aluminum, chromium, and copper. However, the metal concentrations present in the supernatant water were below provincial Approval to Operate discharge limits established for other NB Power facilities.
- Interviews with NB Power staff and Site observations recorded by GHD at the MGS on September 17 and 18, 2019 confirmed that the supernatant water accumulating in the MSCs as part of ongoing AARMO is no longer being discharged to the environment and that NB Power representatives were reviewing alternatives for treatment and/or disposal of the supernatant water and the sludge material. In the interim, the supernatant water and the sludge material are being collected by local waste disposal companies for off-Site disposal and treatment.
- On September 19, 2019, NB Power ceased all grouting activities at the MGS until a formalized process for treating and disposing of the grout waste was developed.

NB Power contracted GHD in June 2020 to conduct a study into the long-term treatment and disposal of the effluent and sludge produced by the AARMO. That scope of work is described in Section 2.6.2.

2.6 Project Description

The Project involves slot cutting at EEP Intake 6 and the treatment and disposal of the slurry generated, in the form of a Pilot Test. The analytical results of the Pilot Test will assist in finalizing the LTTSS that is underway to identify the preferred option for long-term effluent and sludge treatment and disposal for the ongoing AARMO at the MGS. Ultimately, the Project involves the implementation of the selected option.

The Project is divided into two phases, first, to conduct the Pilot Test for which approval is sought as part of the present EIA Registration, on the condition that the Registration document is amended in a second phase to incorporate the conclusions of the LTTSS and the description of the selected long-term treatment and disposal option for effluent associated with the AARMO (drilling and grouting as well as slot-cutting). The purpose of the Pilot Test is to determine if the effluent generated by intermittent slot-cutting activities (approximately once every five years) can be effectively treated using a temporary portable treatment system or if this component of the AARMO also requires incorporation into the LTTSS.

The following sections provide an overview of the Project in more detail.

2.6.1 Pilot Test

The Pilot Test consists of slot cutting as well as the treatment and discharge of the resulting slurry. It does not involve drilling or grouting activities.

Through an open tendering process, NB Power conditionally awarded and contracted IKM Testing Limited (IKM), of Halifax, Nova Scotia, to prepare and carry out the Pilot Test. The contract is dependent on receiving regulatory approval to proceed with the slot-cutting activities as described below.

2.6.1.1 Slot-Cutting

The proposed slot-cutting at EEP Intake 6 involves a diamond-wire saw to create space for concrete expansion; 10 to 15 millimetres (mm) of concrete will be cut. The diamond cutter will sit on the top of the EEP deck. The cut will be conducted in three stages, starting at the top and advancing from the Tailrace to the Headpond face of the EEP.

The slot-cutting will generate slurry containing concrete fines. Based on past slot-cutting activities completed at the MGS and IKM experience, the anticipated slurry flow rate is between 42 and 55 L per minute (min). The slurry will be collected at the bottom of the cut in a containment area with a berm made of rubber tarp, sealant, and wooden boards. The collected slurry will be conveyed to a 15,000 L tank and then to a temporary on-Site treatment system, from where the treated slurry will be sent to a settling tank. The settled sludge will be put into filter bags, while a second 15,000 L tank will receive the treated effluent from the settling tank. An 80,000 L holding tank will also be installed for discharge to a catch basin during overflow conditions.

A high-level Site layout for the Pilot Test is provided below. Figure 3, in attachment, presents a detailed layout of the slot-cutting and containment area.

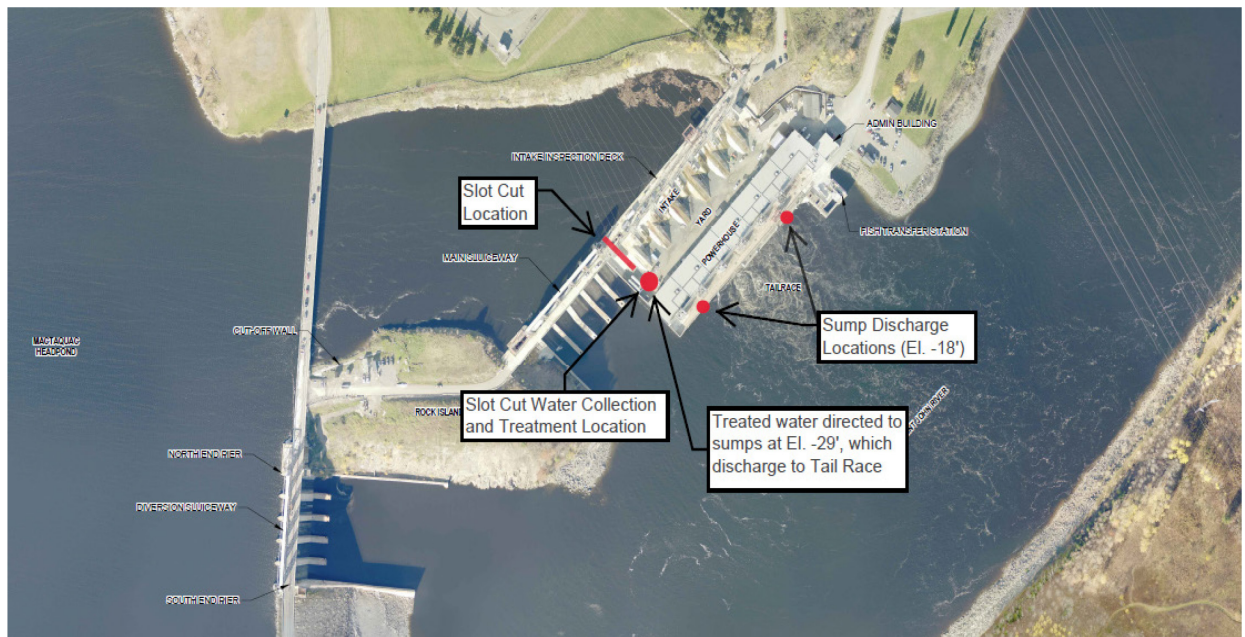


Figure 2.3 High-level Site Layout for the Pilot Test

An additional illustration of the proposed slot-cutting is also provided in Figure 2.4.

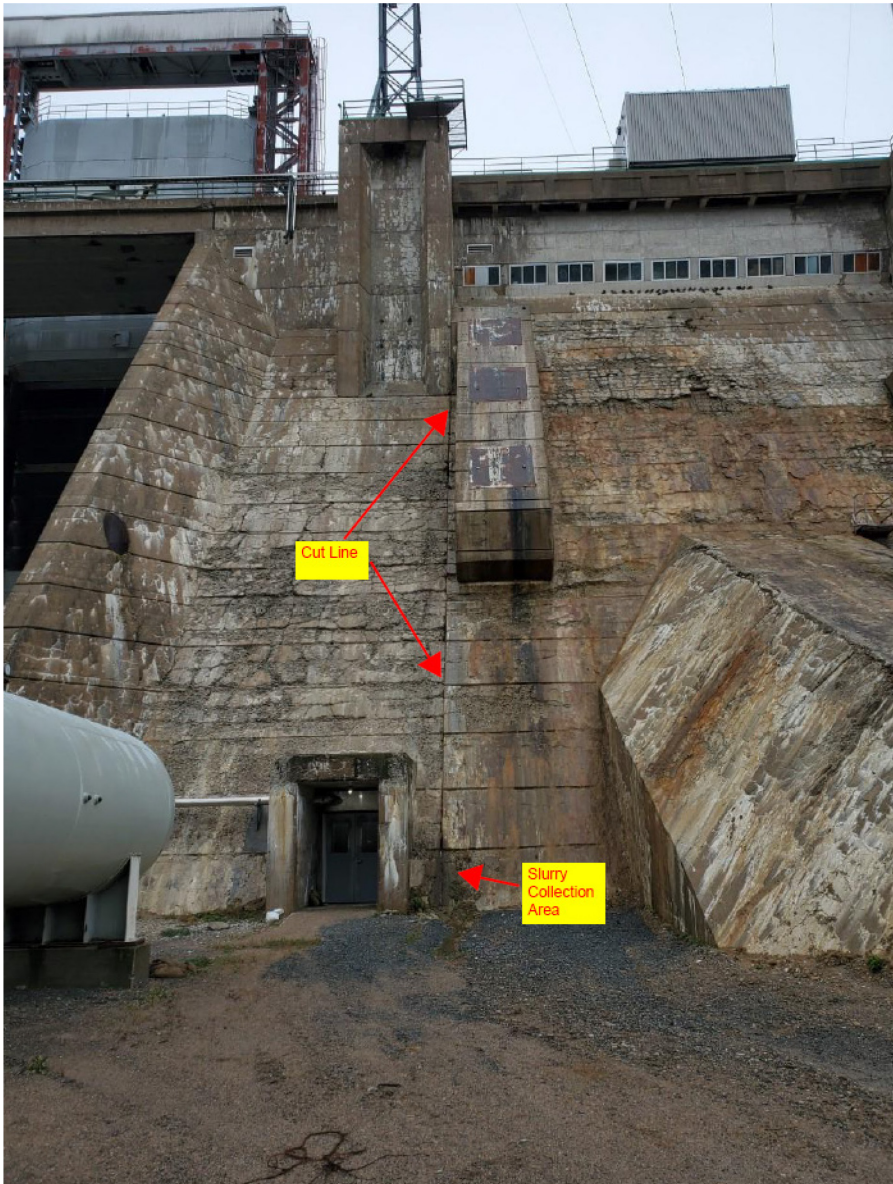


Figure 2.4 Proposed Slot-Cutting

2.6.1.2 Slurry Treatment

A temporary on-Site treatment system will be anchored to a concrete pad immediately adjacent to the slurry collection area (see Figure 3; in attachment) to separate suspended concrete fines from treated effluent using filter bags placed on a containment tray. The separated sludge will be transported off-Site to a licensed regional landfill (Fredericton or St. John). The treated effluent will be discharged into the Saint John River at the Tailrace, using the MGS' existing drainage system.

The proposed treatment system is the SLS60 Slurry Removal System, manufactured by Full Circle Water / Pristine Environmental. Its main features are as follows:

- System capacity is 140,000 L/day.
- Expected volume from slot-cutting is 60,000 to 80,000 L/day.
- The process uses polymer commonly used in the wastewater and drinking water treatment industries (PC MEGAFLOC 8629; Safety Data Sheet provided as Appendix D).
- Polymer is pumped into the treatment train using a dosing control panel at approximately 10 parts per million with the injection rate adjusted depending on the water turbidity.
- Polymer attaches to suspended solids present in the slurry which generates a precipitate that settles to the bottom of a Slurry Silo, where solids are periodically evacuated into a filter bag.
- Filter bags are dried, slump-tested and disposed of as non-hazardous waste.

The SLS60 Slurry Removal System is illustrated in Figure 2.5.



Figure 2.5 SLS60 Slurry Removal System



2.6.1.3 Treated Effluent Discharge

The treated effluent produced by the SLS60 Slurry Removal System will be discharged to the Tailrace through the Powerhouse sumps. The effluent discharge rate to the sumps is estimated at between 42 and 55 L/min. The sump discharge rate to the Tailrace is estimated at between 7,500 and 15,000 L/min. As such, the anticipated treated effluent discharge to the Tailrace through the existing sump system would only contribute approximately 0.3 to 0.5% of water currently being conveyed through the system. The anticipated discharge from the temporary treatment system will be in the form of continuous discharge, but the system is equipped with a built-in storage capacity that can accommodate batch discharge to allow for testing between batches if required.

The treated effluent will be tested once to twice daily using a dual-reading hand-held pH and turbidity meter. RPC Laboratories will complete independent confirmatory analysis for those parameters, as well as suspended solids and metals at least twice a week from the start of the slot-cutting and effluent discharge activities. A 24-hour turnaround time for sampling results will be sought to ensure effluent being discharged meets applicable water quality requirements. Baseline data on the water quality upstream and downstream of the EEP will be collected during discharge daily for pH and turbidity (hand-held unit) and twice a week for suspended solids and metals (laboratory analysis). The baseline data and the seasonality of the slot-cutting activity will inform the application of discharge criteria. For example, if slot-cutting occurs during heavy rain events, it would be more appropriate to compare the discharge sampling data to the baseline data instead of the Canadian Council of Ministers of the Environment (CCME) Freshwater Aquatic Life (FWAL) guidelines. In addition, several of the CCME FWAL guidelines likely to be applied as discharge criteria, such as TSS and turbidity, take into account background conditions of the receiving environment as part of the guideline derivation.

GHD received baseline river water quality data, as shown in Table 2.1, which will be used in establishing a baseline for water quality as part of the AARMO.

Table 2.1 Baseline River Water Quality Data

Location	pH	Turbidity (NTU)
Forebay Bridge	7.50	6.35
-29 Sump	7.18	1.21
Tailrace Boat Launch	6.36	1.56
Across River Boat Launch	7.62	2.12

Data received from MGS on September 22, 2020.

When seasonal factors need not be considered, the CCME FWAL criteria will be applied, as presented in Table 2.2. Additional parameters may be considered through discussions with NBDELG (or other regulators) as part of the EIA registration and approval process.



Table 2.2 CCME FWAL Criteria

Parameter	CCME Criteria	Tailrace Background (September 2020)
pH	6.5 – 9.0	6.36
Turbidity	Maximum increase of 8 NTUs in 24 hours Maximum increase of 2 NTUs in 30 days	1.5
TSS	Maximum increase of 25 mg/L in 24 hours Maximum increase of 5 mg/L in 30 days	---

2.6.1.4 Sludge Disposal

The sludge (concrete fines) separated by the treatment system will be transported by a local carrier and disposed of at either the Fredericton or Saint John regional landfill as non-hazardous waste with the following acceptance criteria: Water Content < 3%; Pass 150-mm Slump Test. If the acceptance criteria are not met, the sludge will be left to dry further on-Site in the filter bags (3 to 4 days of drying time).

The anticipated total volume of sludge requiring disposal over the course of the Pilot Test is estimated between 10 and 15 bags (or 10 to 15 m³).

2.6.1.5 Environmental Protection

As previously indicated, specific measures have been developed to mitigate the potential release of untreated slurry into river water, as follows:

- Back-up storage for unanticipated slurry flows and storage for effluent requiring additional treatment:
 - A containment area with a berm made of rubber tarp, sealant, and wooden boards
 - Two 15,000 L bins
 - A settling tank
 - An 80,000 L steel holding tank (Baker Tank) and
 - A catch basin.
- All drains within and nearby the slurry collection area are to be sealed to prevent leaching of untreated water into Powerhouse sumps.
- Back-up pumps are readily available on-Site for all water conveyances.

In the event of an accidental release, slot-cutting will be ceased immediately by shutting down the pumps and licensed vacuum trucks will be mobilized to assist with recovery of the slurry for off-Site disposal.

The handling precautions and storage requirements for the polymer will be strictly adhered to; notably, the product will be stored in closed and properly labelled containers and guarded against temperature extremes.



IKM will apply the relevant sections of NB Power's Environmental Protection Plan (EPP) to the Pilot Test, such as leak and spill prevention, work near-surface water, waste collection, contingency plans (including spill notification and clean-up protocols), health and safety, and Site access.

2.6.1.6 Schedule

The approximate duration of the Pilot Test is 23 days, broken down as follows:

- Site set-up and inductions – 2 days.
- Slot-cutting and slurry treatment – 19 days.
- Site clean-up and demobilization – 2 days.

The Pilot Test is scheduled to be initiated this fall, following receipt of its approval to proceed from the NBDELG, as well as following the completion of planned unit outages that are scheduled this summer.

2.6.2 Long-term Effluent and Sludge Treatment Suitability Study

GHD was contracted by NB Power to assess options for the long-term treatment and disposal of effluent and sludge generated by the AARMO. Its scope of work encompasses the following:

- Interview MGS personnel involved in the AARMO to understand current practices and obtain information on:
 - How the current AARMO were developed
 - Type of grout used
 - Anticipated flow rates for typical drilling and grouting activities
 - Current river water management practices during drilling and grouting
 - Suitability of current treatment and discharge locations and
 - Constraints in developing monitoring, treatment, and disposal options.
- Review available chemical analyses on existing samples collected from discharges, grouting materials, decant water samples, and sludge material. Collect samples of the preceding where not readily available for submission to laboratory analysis.
- Assess sample results in developing treatment and disposal options to achieve acceptable discharge criteria.
- Develop options to monitor water quality in selected seepage sumps that discharge directly into the river.
- Develop options to obtain effluent and sludge samples from ongoing AARMO.
- Develop options for on-Site and off-Site disposal of the effluent and sludge.
- Identify the applicable permitting requirements for off-Site disposal facilities.
- Develop a conceptual design for on-Site effluent treatment.

The options being assessed under the LTTSS include the following:



- A multi-stage treatment system to settle out solids and adjust the pH.
- A collection, retention, and conveyance system to capture AARMO-generated effluent in a centralized containment chamber prior to discharge.

As previously indicated, the results of the proposed Pilot Study will inform the LTTSS to determine if effluent generated as part of future slot-cutting activities also needs to be included in the options being considered as part of the LTTSS.

2.7 Project Rationale

The MGS is the object of AARMO since the mid-1990s, in order to ensure the continued safe operation of critical equipment. The AARMO consists of slot-cutting, drilling and grouting, as explained in Section 2.2, and produces effluent and sludge that require environmentally compliant treatment and disposal.

Slot-cutting has not been conducted since 2015 and is required in the short term for the ongoing safety of the MGS operations. The requirement for future collection and treatment of effluent generated during the slot-cutting activities is also needed for the completion of the LTTSS. Given these circumstances, the Project consists first of a Pilot Test, the results of which will be used to finalize the LTTSS and select the preferred method for long-term treatment and disposal. For that reason, Project approval is requested in two phases:

- Conditional approval to implement the Pilot Test, with the assurance that the EIA Registration document will be amended on the basis of the Pilot Test results and the finalization of the LTTSS.
- Approval for the installation and operation of the selected long-term effluent and sludge treatment and disposal option following an updated EIA Registration document and the associated public involvement and Aboriginal engagement activities.

Depending on the results of the Pilot Test, it is possible that the LTTSS may determine that the treatment and disposal of the slot-cutting slurry be carried out independently of the treatment and disposal of the effluent and sludge produced by the drilling and grouting activities. For instance, the slurry treatment and disposal method used for the Pilot Test could be retained for the slot-cutting activities that occur every 4 to 5 years, whereas a separate treatment and disposal method could be proposed for the drilling and grouting activities that are carried out annually.

2.8 Project Location

The MGS is located at 451 Route 105, Keswick Ridge, NB in the LSD of Keswick Ridge. Its Earthen Dam straddles the Saint John River. The Powerhouse is situated on the northern side of the Saint John River; it faces the Kingsclear LSD, Kingsclear Indian Reserve No. 6 and French Village, located on the southern riverbank. The Kingsclear LSD also stretches downstream of the MGS towards the east. French Village is a dispersed rural community that is unincorporated. Mactaquac, located on the northern riverbank, south of Mactaquac Provincial Park, has the same designation (Statistics Canada, 2016). The Mactaquac Provincial Park is located to the west of the Site, across the Mactaquac Arm.



Regionally, the MGS is situated in Bright Parish, York County, approximately 17 km west of Fredericton and 30 km east of Nackawic. The Site is accessed by Route 102 on the south side of the Saint John River and by Route 105 on the north side. The Mactaquac Road crosses the Saint John River at the Site, connecting both provincial highways. Approximately 4,500 vehicles use the Mactaquac Road daily (Stantec, 2016). Powerhouse Lane leads to the Powerhouse from Route 105.

Figure 2, in attachment, illustrates the Site and its surroundings. The geographic coordinates of the Site, more specifically the centre of the Powerhouse, are 45.952981N and 66.870536W.

2.9 Siting Considerations

Siting considerations for the Project are generally not warranted, as it concerns existing infrastructure contained within a developed and secured property. The off-Site disposal of the sludge generated as part of the first phase of the Project, i.e., the Pilot Test, is addressed in Section 2.6.1.4.

2.10 Physical Components and Dimensions of the Project

The Site encompasses a total area of 421.5 ha. The Mactaquac Road is the primary access route to the Site, connecting Route 102 and Route 105. It will be used for the transportation of equipment and materials into and out of the Site for the purposes of the Project.

The Site houses major infrastructure and equipment, as described in Section 2.2.

The Project activities will be contained within the Site property boundaries, with the exception of the off-Site transportation of the resulting sludge to a licensed landfill.

The first phase of the Project, namely the Pilot Test, is of small scale (Figure 3; in attachment). Details on the activities foreseen for the Pilot Test and the associated physical components are provided in Sections 2.6.1 and 2.11. Details on the second phase of the Project, i.e., the completion of the LTTSS, will be provided in the revised Registration document.

2.11 Project Details

As noted above, Project details are available only for the Pilot Test at this stage. Section 2.6.1 describes in large part the Pilot Test; additional information follows.

2.11.1 Approvals and Permits

At this time, it is anticipated that the only approval required for the Pilot Test will be a short-term Approval to Operate under the Clean Water Act for Pilot Test effluent discharge. Should any other approvals/permits be required as a condition of an EIA Determination, applications for them will be filed immediately following receipt of the EIA Determination.

2.11.2 Site Set-Up

Site set-up will involve mounting the treatment system, which will be transported to the Site in a highway-registered truck, on an existing concrete pad. The treatment system will be connected to NB Power's existing electrical system at the MGS and will not require a separate power supply source.



2.11.3 Slot-Cutting and Slurry Treatment

The principal components of the Pilot Test are the slot-cutting and the slurry treatment, which will occur 24 hours per day over the course of approximately 19 days. Approximately six workers will be required per shift. Meals will be taken in the office trailer and a portable toilet will be installed by a subcontractor.

Diamond-wire saws emit minimal air emissions and noise. The treatment system is based on gravitational settling and requires only the injection of flocculant (polymer).

The waste emissions will be essentially limited to the slurry, which will be treated and disposed of in accordance with the procedures described in Section 2.6.1. All miscellaneous waste (e.g., food wrappings and beverage containers) will be removed from the Site in compliance with current MGS operational practices.

2.11.4 Site Clean-Up and Demobilization

The treatment equipment will be demobilized and transported off-Site with a highway-registered truck. Final Site clean-up (i.e., safe removal of any miscellaneous or extraneous materials or waste) will be completed as part of demobilization activities.

2.12 Future Modifications, Extensions or Abandonment

The Project is essentially divided into two broad phases: the Pilot Test, conducted as a field assessment to inform the LTTSS; and the finalization of the LTTSS and selection of the preferred option for the long-term treatment and disposal of effluent and sludge produced by the AARMO.

Conditional approval is currently sought for the Pilot Test. The anticipated duration of the Pilot Test is 23 days. A revised EIA Registration document will be presented to the NBDELG following the assessment of the Pilot Test results and the conclusion of the LTTSS. Public involvement and Aboriginal engagement activities will form part of the preparation of the revised Registration document.

2.13 Project Funding

The Project will be fully funded by the Proponent, NB Power, without any financial support from another party.

2.14 Project-Related Documents

The present EIA Registration document, including its appendices, represents the whole of the information provided for the purposes of Project approval, along with the documents and literature cited in Section 9.

In preparation of this document, meetings were held with the NBDELG on October 30 and December 11, 2020, to discuss various aspects of the Project and the EIA Registration.



3. Existing Environment

The Site is located on the northern bank of the Saint John River, approximately 17 km west of Fredericton, NB. Section 2.8 provides a general overview of the Site location.

The following sections describe the environmental components, both biophysical and socio-economic, of relevance to the Project. They are based in large part on the 2016 Final CER Report on the Mactaquac Project (Stantec, 2016). An important source of information for the Final CER Report was the Mactaquac Aquatic Ecosystems Study (MAES), which the Canadian Rivers Institute has been conducting since 2014 with funding from NB Power and the Natural Sciences and Engineering Research Council of Canada.

The vast area of review retained for the Mactaquac Project (roughly the Saint John River from upstream of Woodstock to Oromocto, and 1 km inland from either side of the river) contrasts greatly with the very small area that might be affected by the current Project. For that reason, the baseline data presented in the 2016 Final CER Report are for the most part of little direct relevance to the area of potential impact for the present EIA Registration document.

The study area defined for the Pilot Test ranges from the EEP, where the slot-cutting will occur, to the Tailrace where the treated effluent will be discharged and approximately 500 m downstream of the Tailrace. Consequently, the description of the existing environment for the current Project is very succinct, relying mainly on information from the Final CER Report that could be tied to the vicinity of the MGS, as well as on other available information sources. Because most of the information provided emanates from the Final CER Report, it is not systematically referenced when included in the sections below; references are provided for the other information sources.

3.1 Regional Ecological Features

The Saint John River is Atlantic Canada's largest river and one of the largest rivers that flows into the Atlantic Ocean. Originating in Little Saint John Lake in Maine, United States, it extends over 700 km before reaching the Bay of Fundy (135 km south of the MGS), draining an area of New Brunswick, Maine, and eastern Québec greater than 55,000 km².

The MGS is located in an area where the Saint John River naturally drops significantly in elevation, which favours the generation of hydroelectricity.

The Project region lies within the Grand Lake Lowlands Ecoregion, which includes the Grand Lake Basin, the Oromocto River watershed, and the lower reaches of the Saint John River and its floodplains. Its climate is the warmest in New Brunswick, which, combined with the rich floodplain soils, gives rise to southern vegetation species (NBDNR, 2007).

3.2 Special Areas

A review of the New Brunswick Department of Natural Resources (NBDNR) Protected Natural Area database indicates that current or proposed Protected Natural Areas are not found within several kilometres of the Site.



There are two Environmentally Significant Areas (ESAs) in the Project area. The Keswick Ridge Escarpment ESA, located on the northern bank of the Saint John River approximately 1.5 km downstream of the MGS, showcases diverse habitat types, such as beach, exposed ledge and hardwood and mixed-wood forests, and is rich in uncommon plant species.

The Mactaquac Dam ESA is situated approximately 1 km downstream of the MGS. It consists of the riverbank and water and serves as an area of congregation for osprey and bald eagles, particularly during late fall.

3.3 Climate

The Site and its vicinity likely harbour microclimates created by the MGS Headpond. Microclimates are defined by shelter, landscape, wind, temperature, pressure, precipitation, clouds, soil, vegetation, or drainage that differ from the general surroundings. They can span an area of up to 1 km².

The Mactaquac Headpond is located in the Atlantic Maritime Ecozone, which features rough upland terrain and coastal lowlands. Mixed-wood Acadian forests, coastal islands, sand dunes, and lakes also characterize this ecozone. The Ecological Framework of Canada (2015) indicates that the Atlantic Maritime Ecozone “experiences long, mild winters (averaging about -4 °C in January) and cool summers (the mean daily July temperature is 18 °C). Coastal communities are generally several degrees warmer in winter and slightly cooler in summer”.

Nonetheless, the climate in the Project region may be closer to the continental climate that characterizes nearby Fredericton (i.e., warmer summers and colder winters); both the MGS and Fredericton are a long distance from the ocean and situated on or close to the Saint John River. The climate normal over the 1981-2010 period emanating from the Fredericton Airport weather station reveals daily mean temperatures of -9.4 °C and 19.3 °C in January and July, respectively. Precipitation averages 1,077.7 mm (79.7% of which is in the form of rain) annually. The weather station is located near the Saint John River, approximately 30 km from the MGS (as the crow flies).

3.4 Aquatic Environment

Sections 3.4.1 to 3.4.4 provide general information found on components of the aquatic environment in the vicinity of the MGS.

Concerning anthropogenic structures in the aquatic environment, there are no provincial wellfield protected areas on or near the Site. The nearest intake well or outfall is greater than 500 m from the centre of the Site (Figure 4; in attachment). In particular, the potable water wells for the Kingsclear First Nation community are located approximately 800 m downstream of the Tailrace.

A sewage discharge outfall is situated immediately downstream of the MGS (Figure 4; in attachment). NB Power’s Approval to Operate the MGS domestic wastewater treatment plant concerns a submerged discharge through a 15.2-cm pipe to the Saint John River. The Approval to Operate stipulates the following limiting criteria for the annual average concentration of contaminants in the final effluent from the wastewater works: 25 mg CBOD₅/L (average); and 25 mg/L suspended solids (average). Grab samples must be taken at the final discharge point monthly during operations. The Approval to Operate is valid from May 15, 2019 to May 14, 2024.



The outfall for the MGS fish hatchery is located further downstream of the MGS outfall; the hatchery is described in Section 3.4.4.

3.4.1 Flow Regime

The Water Survey of Canada, which produces long-term flow data, operates monitoring stations along the Saint John River, including one situated 3.5 km downstream of the MGS (WSC ID 01AK004). During the 1961-1995 period, a mean flow rate of 813 m³/s, over a 39,000-km² drainage area, was recorded at that station. The river flows reach a peak during the spring freshet, in April and May.

Solid ice covers the Saint John River in winter in the Project region, except immediately below the MGS due to significant flow turbulence.

The debris that accumulate in the Headpond area directly upstream of the MGS at freshet are cleared annually by NB Power.

3.4.2 Sediments

The Saint John River transports sediments suspended in its flow and at/near the river bottom. The presence of the Headpond has reduced upstream flow velocity, thus augmenting sediment deposition rates therein; small sediment particles may pass through the Tailrace. Particle size diminishes from the upper reaches of the Headpond to the vicinity of the MGS, where very fine to coarse silt has been sampled.

Sediment deposition and erosion have changed little at the Site since the construction of the MGS. The Headpond follows the mostly linear river path, and its storage capacity is small relative to its annual flow input. In general, relatively fine, unconsolidated sediments are thinly and uniformly distributed from upstream of the MGS vicinity to Nackawic.

The MAES identified some sediment contamination in exceedance of the CCME Interim Sediment Quality Guidelines for the Protection of Aquatic Life in the Headpond, though “hot spots” were not recorded.

3.4.3 Water Quality

Compared to the Headpond, the water downstream of the MGS is faster-flowing and shallower, which provides for more mixing, less thermal stratification, and more uniform dissolved oxygen concentrations.

An adequate pH for most freshwater life ranges from 6.5 to 9.0. As noted in Section 2.6.1.3, a pH of 6.36 was measured at the Tailrace in September 2020. The MAES reports consistent pH values between 7.6 and 7.8 at the Fredericton walking bridge during the warmer months of the 2014-2016 period. The MAES also reports adequate turbidity and water chemistry for aquatic life. The turbidity measured at the Tailrace in September 2020 was 1.5 NTU.

Overall, the groundwater quality in the Project region is reported as being of generally good quality and characterized as hard, slightly alkaline with a dominant calcium-bicarbonate water type, and the dissolved solids are low.



3.4.4 Fish and Fish Habitat

The Mactaquac Biodiversity Facility (MBF) was built in 1968 adjacent to the MGS. Operated by DFO, it is one of the largest Atlantic salmon (*Salmo salar*) hatcheries worldwide, occupying 5.3 ha and using up to 70 million (M) L of water daily to rear over 2 M eggs and 1 M fish annually. Its components include a Fish Collection Facility, located near the Tailrace, and the associated trucking operation, a Fish Sorting Facility, an Early Rearing Facility, and the Main Salmon Hatchery. The MBF receives wild adult juveniles caught upstream of the Headpond; most of the mature fish in the hatchery are put back into the river to spawn, while some are kept for captive breeding (DFO, 2020). Atlantic salmon and gaspereau (*Alosa pseudoharengus*) are collected at the Fish Collection Facility immediately downstream of the Powerhouse and trucked upstream for release.

Much fewer salmon returns to the Fish Collection Facility since the construction of the MGS. Atlantic salmon populations have declined over the past few decades and commercial, recreational, and Aboriginal Atlantic salmon fisheries on the Saint John River were closed over the 1985-1998 period.

Gaspereau has thrived in the lacustrine environment of the Headpond since the construction of the MGS. However, it is considered likely that many fish that pass through the MGS do not survive in the downstream passage.

Most fish species recorded in the Saint John River reside in the area permanently and breed upstream and downstream of the MGS. In general, the benthic macroinvertebrate community downstream of the MGS is rich and suggests a healthy river system.

3.5 Terrestrial Environment

3.5.1 Flora and Wetlands

Flora at the Site and areas immediately downstream consist of areas of manicured lawns, open field habitat (farmland), as well as mix coniferous/deciduous forest habitat. In general, flora is absent in the Project area being considered for the Pilot Test. In addition, rare plants have not previously been identified at the Site, although Woodland pinedrops (*Pterospora andromeda*), in decline in the region, have been recorded in the Keswick Ridge Escarpment ESA or its surroundings.

There are no regulated wetlands at or near the Site, the nearest wetland being approximately 2 km to the east.

3.5.2 Fauna

Waterfowl use the Headpond while migrating north to breed. The large wetlands and islands found in the Mactaquac Stream Basin, also called the Mactaquac Arm, serve as stopovers during spring and fall migration patterns.

Among the waterfowl species observed in winter at the Mactaquac Provincial Park, located at the mouth of the Mactaquac Arm, are American black duck (*Anas rubripes*), mallard (*Anas platyrhynchos*), Common goldeneye (*Bucephala clangula*), Common merganser (*Mergus merganser*), Canada goose (*Branta canadensis*), Barrow's goldeneye (*Bucephala islandica*) and Hooded merganser (*Lophodytes cucullatus*).



The floodplains, the high waters in spring and fall and the large wetland complexes downstream of the MGS also attract waterfowl. Blue-winged teal (*Anas discors*), American black duck (*Anas rubripes*), Green-winged teal (*Anas crecca*), Wood duck (*Aix sponsa*), Ring-necked duck (*Aythya collaris*) and Common goldeneye are among the waterfowl species that breed there.

The Mactaquac Provincial Park located west of the Site (across the Mactaquac Arm) is used for nesting by all nine species of flycatchers in Atlantic Canada.

In addition to waterfowl and other migratory birds, the Saint John River system in the vicinity of the MGS likely also serves as a habitat for a variety of aquatic or semi-aquatic mammalian species such as Muskrat (*Ondatra zibethicus*), American mink (*Neovison vison*) and Beaver (*Castor canadensis*).

3.6 Species at Risk

Information obtained in February 2021 from the Atlantic Canada Conservation Data Centre (ACCDC) regarding the historical and current occurrence of animal and plant species of concern in the Site area was used to determine if potential species at risk (SAR) occur in the vicinity of the MGS (report attached as Appendix E).

Due to the small scale of the Project, particularly the Pilot Test for which approval is sought as a first phase, the present discussion is limited to the SAR listed pursuant to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), the federal Species at Risk Act (SARA) or the NB Species at Risk Act that may occur within approximately 2 km and 0.5 km of the Site centroid for fauna and flora respectively. The ACCDC also identifies and ranks species of concern that are not protected by legislation, and thus not considered as SAR. Those species, listed in Appendix E, are not discussed in the present section.

The ACCDC data-base identified six wildlife SAR within 2 km of the centre of the Site, as follows: Atlantic salmon (*Salmo salar*); Shortnose sturgeon (*Acipenser brevirostrum*); Barn swallow (*Hirundo rustica*); Barrow’s goldeneye (*Bucephala islandica*); Monarch (*Danaus plexippus*); and Eastern cougar (*Puma concolor cougar*). The nearest plant SAR identified by the ACCDC occurs approximately 1.5 km from the Site.

Table 3.1 indicates the status for each of those species pursuant to COSEWIC, the SARA and the NB Species at Risk Act. A brief description of the identified SAR follows.

Table 3.1 Species at Risk Status

Common Name	COSEWIC	SARA Status	Provincial Status
Atlantic salmon	Endangered	---	Endangered
Shortnose sturgeon	Special Concern	Special Concern	Special Concern
Monarch	Endangered	Special Concern	Special Concern
Eastern cougar	Data Deficient	---	Endangered
Barn swallow	Threatened	Threatened	Threatened
Barrow’s goldeneye	Special Concern	Special Concern	Special Concern

The NBDNR has classified several species as “location-sensitive”, meaning that the ACCDC does not provide specific location information for them. Concern about the exploitation of location-sensitive species precludes identification of coordinates. If any of these species are present within 5 km of the centre of a site, the ACCDC report identifies them as present. The ACCDC reported



three such location-sensitive species for the MGS: Snapping turtle (*Chelydra serpentina*) – Special concern; Bald eagle (*Haliaeetus leucocephalus*) – Endangered; bat (*Bat hibernaculum*) – Endangered.

Atlantic Salmon

Atlantic salmon of the Saint John River belong to the Outer Bay of Fundy population; recent returns to the Saint John River represent a small proportion of historical stocks (DFO, 2014). An anadromous species, Atlantic salmon feeds and grows at sea and returns to reproduce in its natal streams and rivers. Spawning typically peaks in October and November, in gravel beds. After spawning, adult salmon usually return to sea before winter. This population has historically suffered from dams that have impeded migrations and flooded spawning habitats, as well as from other anthropogenic influences that have degraded freshwater habitats (COSEWIC, 2010a).

Shortnose Sturgeon

Shortnose sturgeon, an anadromous species, occurs in the lower Saint John River system. A bottom-dwelling fish, it spawns in spring in fast-flowing water over boulder and gravel substrate (COSEWIC 2005). It is possible that this species spawns just below the Earthen Dam or the Tailrace area of the MGS.

Monarch

The monarch is a migratory butterfly. Monarch caterpillars depend exclusively on milkweed (*Asclepias* spp.), which is typically found in open and periodically disturbed habitats, including roadsides, fields, wetlands, prairies, and open forests (COSEWIC, 2010b). While suitable habitat for the monarch is present in the surrounding area, there is no potential habitat within the Pilot Test footprint for this SAR.

Eastern Cougar

Eastern cougar can be found in natural settings, generally far away from people and human activities. As the Site essentially consists of a man-made structure with no natural vegetation, the potential for cougars to be present is practically nil.

Barn Swallow

Barn swallow usually forages in open habitats, such as fields, pastures, crops, shorelines, islands, and wetlands. Barn swallow nests are typically constructed on building structures, bridges, or culverts (COSEWIC, 2011), making its presence on-Site possible.

Barrow's Goldeneye

Barrow's goldeneye nests in the boreal forest north of the Saint Lawrence Estuary and Gulf and winters along the saltwater coasts of Québec and the Maritime provinces (Environment Canada, 2013). This species could possibly be found near the Site during its migration, but its presence in the Pilot Test area is considered unlikely.

Bald Eagle

Bald eagle is considered not at risk according to COSEWIC but is listed as endangered in the province of New Brunswick. It nests in large trees near open water and coastal islands are common



nesting locations in the province (New Brunswick, 2021). Since the Site is disturbed by human activities and does not contain large trees, it is not a suitable nesting habitat. Since the Bald eagle feeds on fish, it could, however, use the river on either side of the MGS as a feeding habitat.

Snapping Turtle

Snapping turtle prefers slow-moving water with a soft mud bottom and dense vegetation in ponds, marshes, swamps, peat bogs, shallow bays, rivers, lakes, and slow-moving streams (ECCC, 2016). It is, therefore, possible that this aquatic reptile could be found at the Site, although the likelihood of finding it near the Pilot Test footprint is considered low.

3.7 Socio-Economic Environment

The Bright Parish census subdivision, which includes the Bright and Keswick Ridge LSDs, counted 3,289 residents and 1,440 private dwellings in 2016; the population density was 8.1 persons/km², compared to 10.5 for the Province of New Brunswick. The Kingsclear Parish census subdivision counted 2,822 residents and 1,069 private dwellings, with a population density of 18.6 persons/km² (Statistics Canada, 2016).

Forestry is an important industry in the Project region, especially in Nackawic, where a pulp mill is a significant employer. Agriculture and tourism are also important economic activities along the Headpond and riverbanks. On-water recreational activities and fishing are also popular immediately upstream of the MGS.

The Riverside Resort and Conference Centre, located in French Village on the Saint John River shore, has 85 rooms and its own dock space. The Mactaquac Provincial Park, spreading over 525 ha and visited by thousands of residents and non-residents annually, features over 300 campsites, two freshwater beaches, a golf course, an aerial adventure course and several trails. The Marina at the Mactaquac Provincial Park harbours an average of 120 boats seasonally. Several other businesses offer recreational activities in the Project region.

The Aboriginal community nearest the Site is Kingsclear First Nation. Its reserve is located on the right side (south side) of the river, opposite the Powerhouse structure. It is a member of Wolastoqey Tribal Council Inc., a not-for-profit organization that supports the capacity-building of its member communities within the traditional Wolastoqey territory in New Brunswick. It is also part of the comprehensive land claims negotiations involving the Mi'kmaq and Maliseet First Nations of Brunswick.

The Wolastoqey have Aboriginal and treaty rights to fish within Wolastoqey territory, including the Site. The Wolastoqey Nation in New Brunswick (WNNB) works with NB Power to review the design and management of improved fish passage at the MGS (WNNB, No Date).

For at least the past 8,000 years, the Maliseet (Wolastoqiyik) congregated along the Saint John River (THRIVE Consulting, 2015), while the Mi'kmaq generally gathered along the coasts and interior highlands. The Saint John River, called the Wolastoq, served as an important travel route for the Wolastoqiyik, providing them with access to a large territory for hunting, fishing, trapping, and gathering. The establishment of villages and camps throughout the river's watershed is evidenced by diverse types of archaeological sites.



The historical importance of the Saint John River for the Maliseet suggests richness in archaeological resources in the Headpond. There is, however, an absence of detailed information about the archaeological resources. Figure 4, in attachment, presents the archaeological sites and cemeteries known to be in the vicinity of the MGS, none of which is found within 500 m downstream of the MGS.

Given that the Project is restricted to a small area of the MGS footprint, which has been disturbed for over 55 years, and to the use of existing, often-travelled roads, an archaeological survey is not planned as part of the EIA submission.

4. Impact Assessment

In the light of the phased nature of this EIA Registration document (as explained in Section 1.1), the following EIA discussion focuses on the Pilot Test.

4.1 Study Area

The study area defined for the Pilot Test ranges from the EEP, where the slot-cutting will occur, to approximately 500 m downstream of the Tailrace, from where the treated effluent will be discharged. The temporal boundaries encompass the duration of the Pilot Test.

In the second phase of the Project, namely the conclusion of the LTTSS and the recommendation of a long-term effluent and sludge treatment and disposal for the ongoing AARMO at the MGS, the study area will be expanded (as required), as all the concrete structures of the MGS will be targeted. The study area for this second phase will be confirmed in the amended EIA Registration document following approval of the Pilot Test.

4.2 Methodology

The present EIA establishes the interactions between the Pilot Test activities, focusing on those with the potential to cause impacts, and the Valued Environmental Features (VEFs), in order to centre the assessment on the issues of greatest ecological and socio-economic concern. The VEFs were established principally on the basis of protection afforded by legislation and importance accorded by regulators, stakeholders, and the scientific community. Several components of the biophysical and socio-economic environments were determined not to constitute VEFs in the context of the Pilot Test; the attached Table 1 lists those components and the reasons for their exclusion.

Section 4.3 outlines the interactions between the Pilot Test and the VEFs based on the descriptions of the Pilot Test (Section 2.0) and the existing environment (Section 3.0); it then assesses the significance of potential impacts on the VEFs and suggests measures to avoid or mitigate them.

The potential impacts are assessed in the context of their magnitude, geographic extent, duration, degree of reversibility and probability of occurrence, where possible. The significance of any residual negative impacts is ascribed to one of four categories: negligible; low; moderate; or high.

Section 5.0 proposes a monitoring program as part of an environmental management planning process.



4.3 Predicted Impacts

The Pilot Test is of a small scale and will occur within a small area of the existing MGS footprint during a short period of time (roughly three weeks). Due to its nature, the potential interactions between the Pilot Test activities and the VEFs are limited, as demonstrated in the following sections.

In a commitment to adhering to best management practices, NB Power will ensure the application of its EPP for the MGS also be utilized for the Pilot Test. A dedicated NB Power representative will be responsible to ensure that it is being followed by NB Power personnel and IKM for the duration of the Pilot Test.

4.3.1 Aquatic Environment

The Pilot Test does not have the potential to affect most aspects of the Saint John River in the study area, such as the flow regime or sediment quality, either upstream or downstream of the MGS. Also, there are no wellfield protected areas, intake wells or outfalls in the study area.

The foremost potential impact of the Pilot Test is to affect surface water quality in the event of an uncontrolled flow of untreated slurry during the slot-cutting, which in turn might also affect fish and fish habitat.

Several measures, as discussed in Section 2.6.1 and illustrated in Figure 3, in attachment, will be put in place to contain the slurry resulting from the slot-cutting prior to its treatment and authorized disposal. In the event of an accidental release, slot-cutting will be ceased immediately by shutting down the pumps and licensed vacuum trucks will be mobilized to assist with the recovery of untreated slurry for off-Site disposal. The potential for accidental contamination of water as a result of other activities related to the Pilot Test, such as materials or waste management, is considered small and utilization of the existing MGS EPP will provide for effective controls to limit accidental releases to the aquatic environment.

Slot-cutting is a necessary procedure at the MGS, as explained in Section 2.2. The Pilot Test will serve to better protect the environment by containing and treating the resulting slurry in a controlled manner, disposing of the treated effluent according to the applicable discharge criteria and disposing of the sludge at an approved facility. The design, mitigation and environmental protection measures that will apply to surface water quality will serve to protect fish and fish habitat from being negatively affected by the Pilot Test.

In the light of the preceding, as well as the small scale and short duration of the Pilot Test, no residual impact of the Pilot Test is anticipated on the aquatic environment. In addition, fish attraction associated with the Fish Collection Facility of the Mactaquac Biodiversity Facility will be in operation during the Pilot Test, as per NB Power's current agreement with DFO. As previously indicated, treated effluent from the slurry treatment system will be discharged through the existing MGS sump system and will not affect the operation of the fish-attraction system.

4.3.2 Terrestrial Environment

Migratory birds are the principal component of the terrestrial environment with the potential to be affected by the Pilot Test.



The Migratory Birds Convention Act protects migratory birds as well as their eggs, nests and young. It is prohibited to deposit substances harmful to migratory birds in areas, including waters, that they use. It is also prohibited to disturb, destroy, take a nest or an egg of a migratory bird unless a permit to do so has been issued. The incidental take of migratory birds is not permitted.

Work areas will be limited to disturbed areas and main roadways that generally lack vegetation suitable for nesting/breeding migratory birds, and the Pilot Test is planned for fall 2021, outside the nesting season. Therefore, no impact on nesting birds is expected. If an active nest is encountered, work around it will be halted until an avian biologist assesses the situation and the required measures are applied. This could include creating a buffer zone around the nest to exclude works that would disturb it.

All workers will adhere to the Migratory Birds Convention Act.

Potential impacts to the waters in the study area that might be used by migratory birds will be minimized through the application of the treatment system design and mitigative environmental protection measures relative to the aquatic environment.

In the light of the preceding, as well as the small scale and short duration of the Pilot Test, no residual impact of the Pilot Test is anticipated on the terrestrial environment.

4.3.3 Species at Risk

SAR are protected under the federal SARA and the NB Species at Risk Act, which forbid harm to a listed species or its habitat. The SARA prohibitions involve killing, harming, harassing, capturing, or taking a species listed as extirpated, endangered, or threatened, damaging or destroying its residence and destroying any of its critical habitats. The NB Species at Risk Act prohibits killing, harming, harassing, or taking a species listed as extirpated, endangered, or threatened.

The ACCDC database identified six SAR as potentially occurring within 2 km of the Site centre, as discussed in Section 3.6. Two of them are fish species, two are bird species, one is a butterfly, and another is a terrestrial mammal that avoids the presence of humans.

Three location-sensitive species were identified within 5 km of the Site centre: Snapping turtle (*Chelydra serpentina*) – Special concern; Bald eagle (*Haliaeetus leucocephalus*) – Endangered; bat (*Bat hibernaculum*) – Endangered.

Should any turtles be encountered on-Site during the Pilot Test, the NBDNR will be notified, and the prescribed procedure followed. No Bald eagle nests have been identified near the MGS (Stantec, 2016). Bald eagles occur in the Mactaquac Dam ESA, approximately 1 km downstream of the MGS. As they feed on fish, they may use the river on either side of the MGS as a feeding habitat. Bat hibernacula are sites used for hibernation by bat species, including several endangered species. These sites are generally caves, crevices or abandoned mines. No such sites are found within the Pilot Test footprint.

The design, mitigation and environmental protection measures that will apply to surface water quality and migratory birds will serve to protect SAR from being negatively affected by the Pilot Test. In particular, the operation of the existing Fish Collection Facility at the MGS for collection and re-location of Atlantic salmon will not be adversely affected by the Pilot Test. In addition, Shortnose sturgeon was identified to have the potential to spawn directly downstream of the MGS or even in



the Tailrace area. Shortnose sturgeon spawns in the spring, however, and the Pilot Test will be completed in the fall of 2021 (following approval to proceed from NBDELG); therefore, treated effluent discharging to the Tailrace area will be outside the typical sturgeon spawning window.

The trucks that will transport equipment/material in or out of the Site will travel only on existing roads. All workers will adhere to the federal SARA and the NB Species at Risk Act.

In the light of the preceding, as well as the small scale and short duration of the Pilot Test, a negligible residual impact of the Pilot Test is anticipated on SAR.

5. Monitoring Program

To ensure compliance with specific approvals and regulations, the NB Power EPP and the design/mitigation measures described in Section 4.0 will be monitored by an NB Power representative or designate.

The following sub-sections outline additional monitoring measures to ensure that certain key mitigation measures are performing as planned.

5.1 Surface Water Quality

As described in Section 2.6.1.3, the treated effluent will be tested on-Site once to twice daily for pH and turbidity, in addition to independent laboratory analysis for those parameters as well as suspended solids and metals at least twice a week, with a 24-hour turnaround for sampling results. The effluent being discharged from the temporary treatment system will likely occur on a continuous basis for the duration of the Pilot Test (19 days of slot-cutting and slurry treatment). However, the treatment system has a built-in storage capacity that can accommodate batch discharge to allow for additional testing between batches, if required.

Baseline data on the water quality upstream and downstream of the MGS will be collected daily during effluent discharge for pH and turbidity (hand-held unit) and twice a week for suspended solids and metals (laboratory analysis).

5.2 Other Valued Environmental Features

The monitoring measures foreseen for surface water quality will also serve to protect fish and fish habitat, migratory birds, and SAR. No specific monitoring of other VEFs is considered warranted as part of the Pilot Test.



6. Public Involvement and Aboriginal Engagement

Given the small scale of the Pilot Test, NB Power proposes to conduct public involvement and Aboriginal engagement activities following the completion of the Pilot Test and the LTTSS. The revised EIA Registration document (presenting the results of the Pilot Test and the conclusion of the LTTSS) will describe the proposed involvement and engagement activities.

NB Power has undertaken extensive public involvement and Aboriginal engagement initiatives over the past several years concerning the MGS, particularly in the context of the Mactaquac Project (described in Section 2.3). Those initiatives have involved the Wolastoqiyik First Nations – in particular, the Kingsclear, St. Mary's and Woodstock First Nations, the Assembly of First Nations Chiefs of New Brunswick, the New Brunswick Aboriginal Peoples Council, the Maliseet Nation Conservation Council, and the Union of New Brunswick Indians (Stantec, 2016).

NB Power and the WNNB have been working together under a Consultation and Capacity Funding Agreement since 2016, which provides a framework to ensure that the six Wolastoqey communities are represented and have the capacity and resources required for meaningful engagement on NB Power projects and works. The Agreement provides for studies involving Indigenous Knowledge, Indigenous Monitors, funding for EIA reviews, as well as monthly meetings to discuss NB Power's activities and community concerns through their Resource Development Consultation Coordinators (RDCCs).

A Protocol Agreement between NB Power and DFO foresees any improvements and initiatives required under the Fisheries Act, including fish passage and habitat improvements. The Kingsclear First Nation RDCC and the WNNB Fisheries Biologist attend the meetings held under this agreement.

The Lower Saint John River Community Liaison Committee, which serves to inform rightsholders, stakeholders, and the general public of NB Power's works on the Saint John River, has representation from the Wolastoqey communities downstream of the MGS. The committee issues River Watch updates, as well as updates on projects and events related to NB Power.

7. Project Approval

The permits, licenses, approvals, or authorizations that may be required for the Pilot Test include:

- Determination from NBDELG under the Environmental Impact Assessment Regulation, Clean Environment Act.
- Approval to Operate issued by NBDELG under the Clean Water Act.
- Consultation and potential Authorization from the Federal Department of Fisheries and Oceans under the Fisheries Act.



8. Closure

All of Which is Respectfully Submitted,

GHD

A handwritten signature in blue ink, appearing to read "Brigitte Masella". The signature is fluid and cursive.

Brigitte Masella, M.E.S.

A handwritten signature in blue ink, appearing to read "Troy Small". The signature is fluid and cursive.

Troy Small, M.Sc. CE

A handwritten signature in blue ink, appearing to read "Anthony Chown". The signature is fluid and cursive.

Reviewed by Anthony Chown, P.Eng., PE LEED AP



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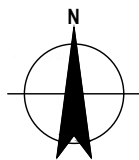
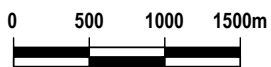
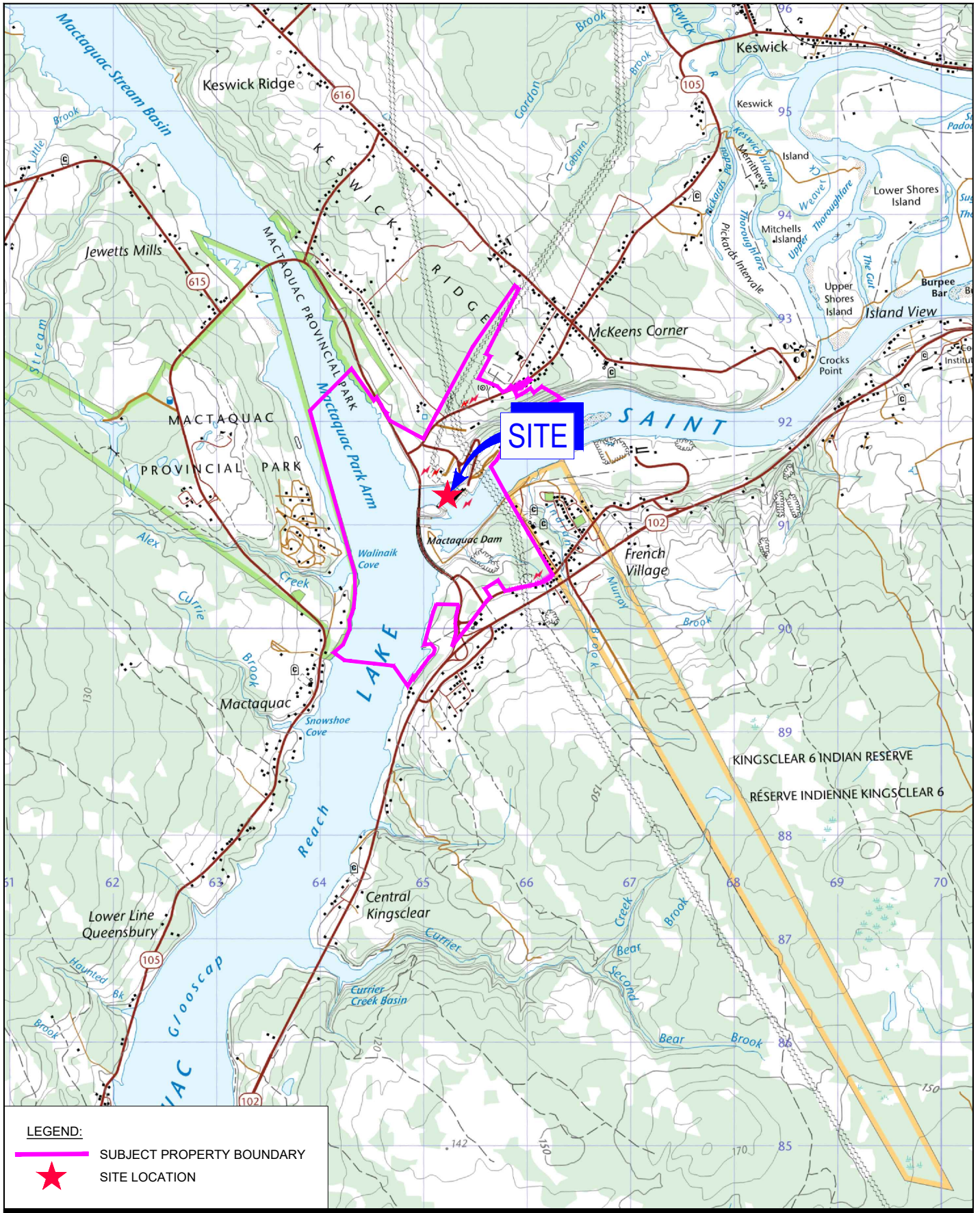
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Figures

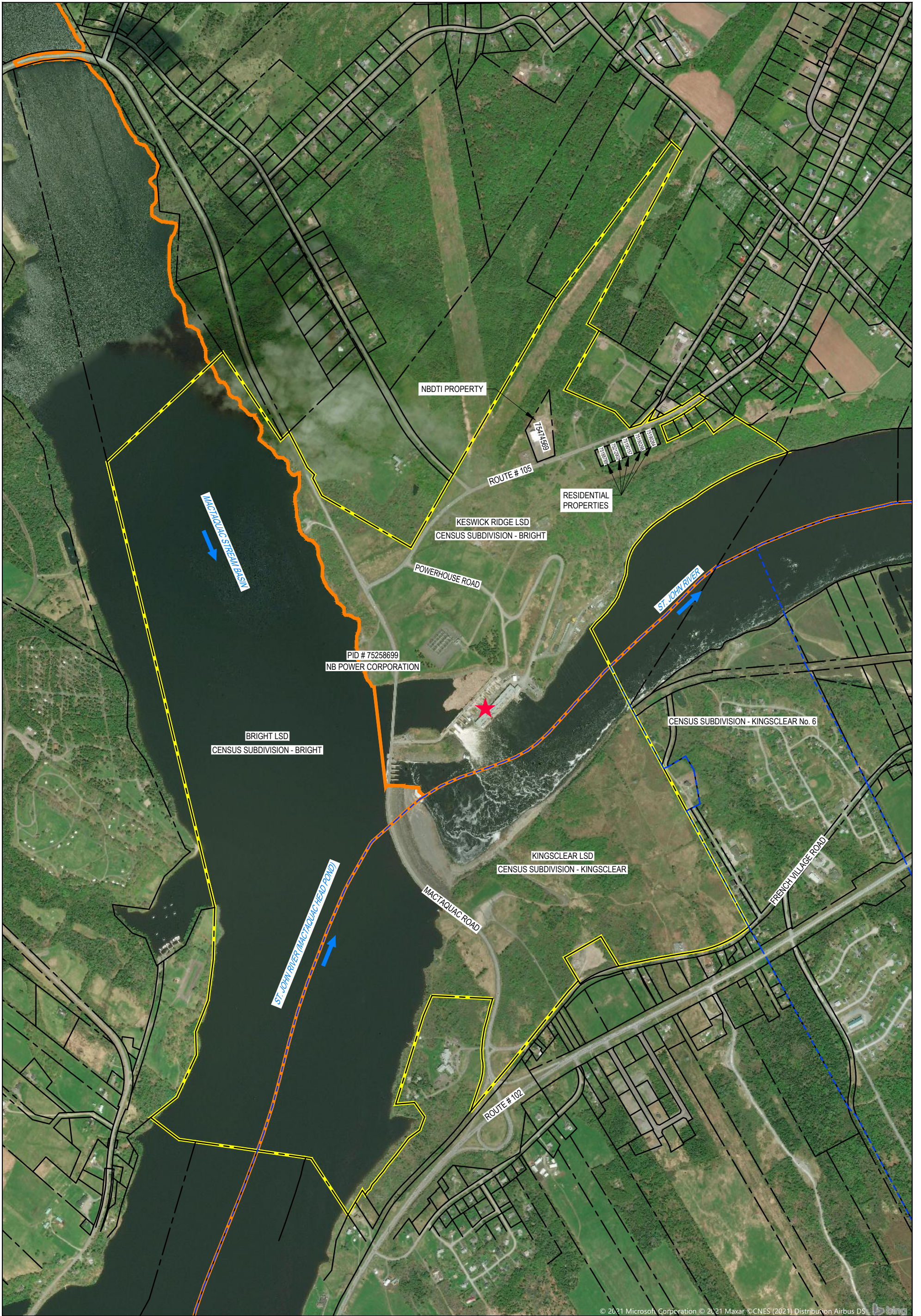


NB POWER
 MACTAQUAC GENERATING STATION
 451 ROUTE 105, KESWICK RIDGE, NEW BRUNSWICK
 STATION AARMO EFFLUENT TREATMENT EIA

Project No. 11223045
 Date May 2021

SITE LOCATION

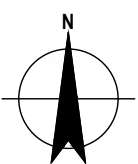
FIGURE 1



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LEGEND:

- - - SUBJECT PROPERTY BOUNDARY
- - - PROPERTY LINES
- - - LOCAL SERVICE DISTRICTS (LSD)
- - - CENSUS SUBDIVISION
- ★ SITE LOCATION

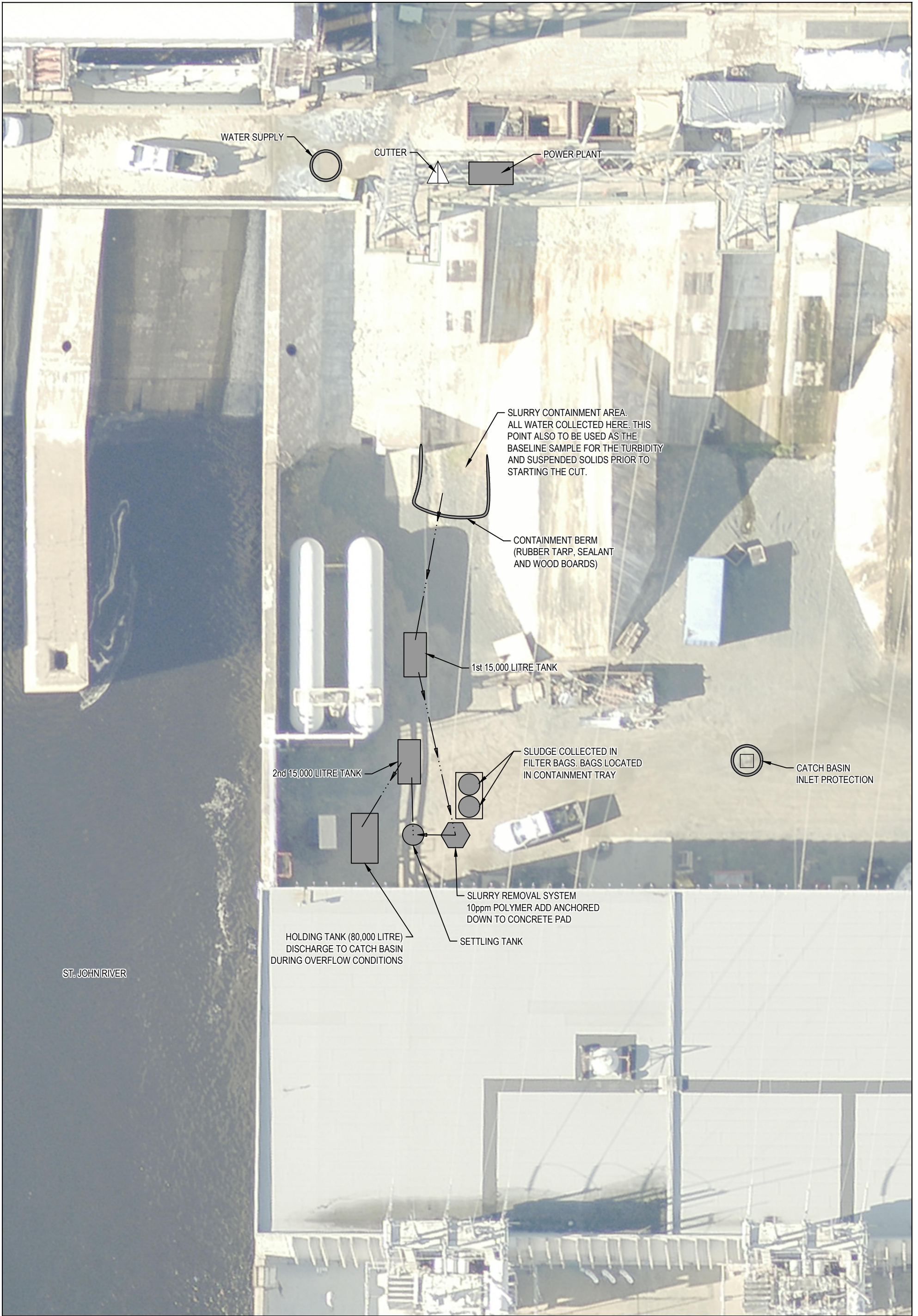


NB POWER
MACTAQUAC GENERATING STATION
 451 ROUTE 105, KESWICK RIDGE, NEW BRUNSWICK
 STATION AARMO EFFLUENT TREATMENT EIA

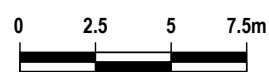
Project No. 11223045
 Date May 2021

PROPERTY PLAN

FIGURE 2



ST. JOHN RIVER

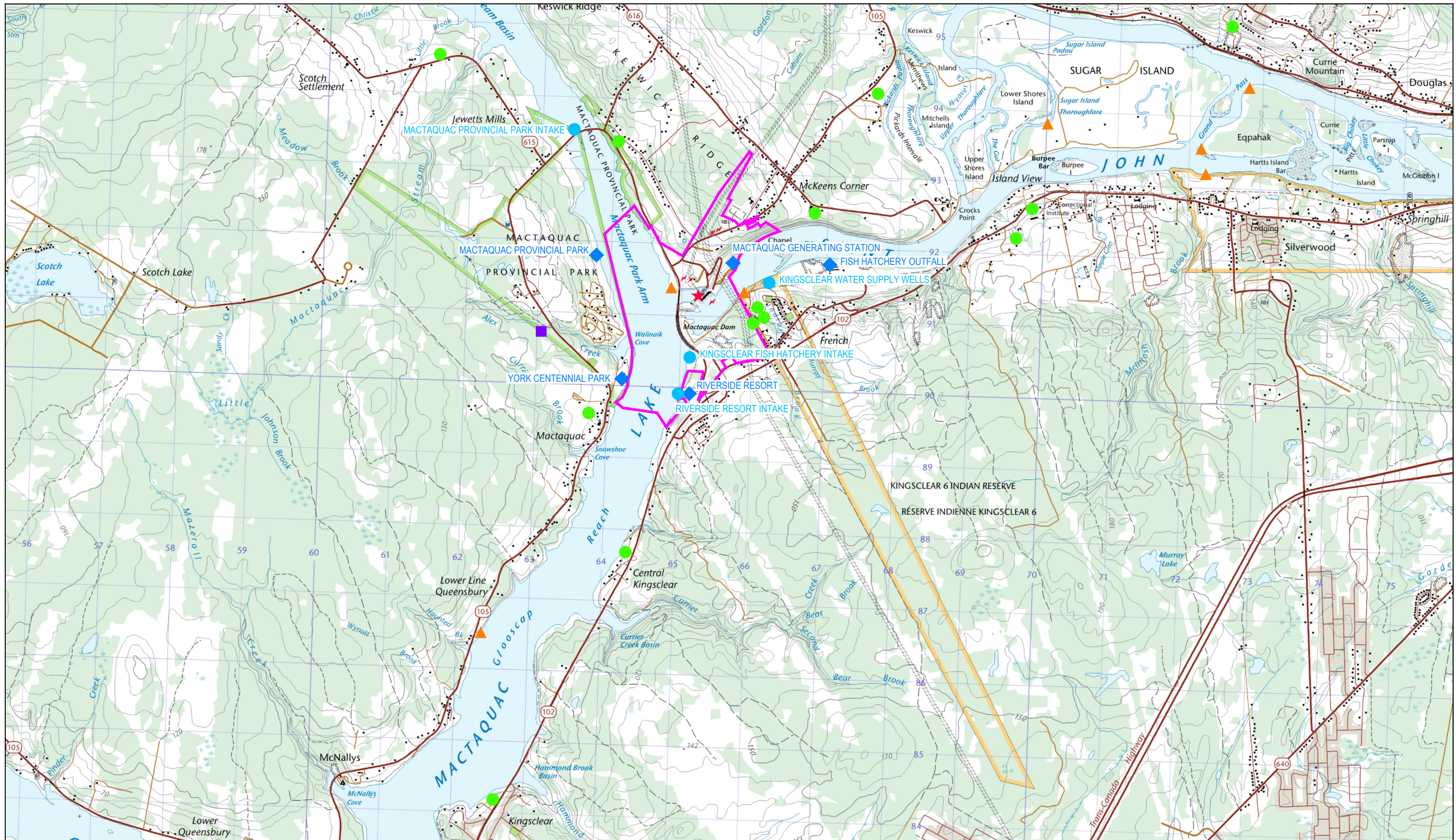


NB POWER
 MACTAQUAC GENERATING STATION
 451 ROUTE 105, KESWICK RIDGE, NEW BRUNSWICK
 STATION AARMO EFFLUENT TREATMENT EIA

Project No. 11223045
 Date May 2021

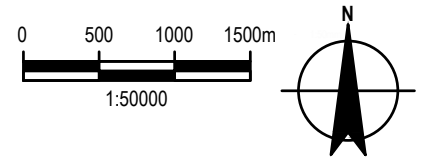
SLOT CUTTING SITE PLAN

FIGURE 3



LEGEND:

- SUBJECT PROPERTY BOUNDARY
- ★ SITE LOCATION
- ▲ ARCHAEOLOGICAL SITES
- CEMETARY LOCATION
- SUSPECTED PLANE CRASH SITE
- APPROXIMATE INTAKE / WATER SUPPLY WELL LOCATION
- ◆ APPROXIMATE OUTFALL LOCATION



NB POWER
MACTAQUAC GENERATING STATION
451 ROUTE 105, KESWICK RIDGE, NEW BRUNSWICK
STATION AARMO EFFLUENT TREATMENT EIA
SELECTED ANTHROPOGENIC COMPONENTS

Project No. 11223045
Date June 2021

FIGURE 4

Tables



Table 1: Environmental Features Not Retained As Valued Environmental Features

Environmental Feature	Considerations	Avoidance/Mitigation by Design
Sound Environment	Data are not available for ambient noise levels at or near the MGS. The MGS has been in operation for over 55 years, and the noise generated by the Pilot Test is not expected to increase in a notable way the noise levels of normal Site operations.	Equipment and vehicles will be compliant with noise-abatement standards.
Air Quality	The air emissions generated during the Pilot Test are not expected to increase compared to emissions generated at the Site during its operation.	Equipment and vehicles will be compliant with emission standards and manufacturers' recommendations and will be turned off when not in active use. Only existing roads for movement of equipment and materials into and out of the Site will be used.
Soils	Considering the Site, the nature of the activities pursuant to the Pilot Test does not have the potential to affect soils.	Not applicable
Wetlands	There are no regulated wetlands within the study area.	Not applicable
Terrestrial Flora	Considering the Site, the nature of the activities pursuant to the Pilot Test does not have the potential to affect terrestrial flora.	Not applicable
Terrestrial Fauna	Any wildlife likely to utilize the Site on a regular basis would be typically associated with developed areas and relatively insensitive to anthropogenic activities. There is no potential to affect wildlife populations.	Pilot Test personnel will dispose of food scraps and waste in the appropriate containers.
Special Areas	There are no ESAs within the study area. The nearest one, namely the Mactaquac Dam ESA, is situated approximately 1 km downstream of the MGS.	Not applicable



Table 1: Environmental Features Not Retained As Valued Environmental Features

Environmental Feature	Considerations	Avoidance/Mitigation by Design
Land Use	The land use of the Site will not be altered as a result of the Pilot Test.	Not applicable
Archaeological, Heritage or Cultural Resources	The potential to affect archaeological, heritage or cultural resources is negligible, since no ground or riverbed disturbance will occur as a result of the Pilot Test and no archaeological sites or cemeteries are known to be in the study area. Also, the Pilot Test is restricted to a small area of the MGS footprint, which has been disturbed for over 55 years, and to the use of existing, often-travelled roads.	Should any suspected archaeological, heritage or cultural features be identified during the Pilot Test, all work nearby will be halted immediately, and the NB Department of Tourism, Heritage and Culture contacted. Work in the area in question will resume only when authorized.
Safety	All work at the Site and the MGS is the object of established and proven safety procedures that include working near water, handling equipment, etc.	NB Power will ensure that all staff and the contractor working on-Site have the required health and safety training and equipment. The health and safety plans of the contractor will be approved by NB Power prior to the conduct of work. NB Power will designate a representative to check and report on the proper implementation of the health and safety plans.

Appendices

Appendix A
Notice of Intent to Issue a Direction Pursuant
to the Fisheries Act (September 6, 2019)



Environment
Canada

Environnement
Canada

**ENFORCEMENT
BRANCH**
Environmental Enforcement



**DIRECTION GÉNÉRALE DE
L'APPLICATION DE LA LOI**
Application de la loi en environnement

**NOTICE OF INTENT TO ISSUE A DIRECTION
PURSUANT TO THE FISHERIES ACT**

FILE NUMBER: 8120-2019-08-16-12423

NAME OF PERSONS TO WHOM THIS NOTICE OF INTENT IS DIRECTED

This notice of intent is directed to the following persons :

NB Power Generation
451 Route 105
Keswick Ridge, NB
E6L 1B2

NB Power Head Office
515 King Street, box 2000
Fredericton, NB
E3B 4X1

c/o Gaëtan Thomas
NB Power President and CEO
NB Power Head Office
515 King Street, box 2000
Fredericton, NB
E3B 4X1

Greg Caroll
Operation Superintendent
451 Route 105
Keswick Ridge, NB
E6L 1B2

Michael Chiasson
Shift Supervisor Mactaquac
451 Route 105
Keswick Ridge, NB
E6L 1B2

Bruce McLean
Engineering Geologist
451 Route 105
Keswick Ridge, NB
E6L 1B2

Anthony Bielecki
Senior Specialist
515 King Street, box 2000
Fredericton, NB
E3B 4X1

The persons listed above are referred to as "you" in this document.

PURPOSE OF NOTICE OF INTENT

The purpose of this notice of intent is to notify you that I, Chantal Thériault, the undersigned Fishery Officer, intend to issue the attached direction to the aforementioned persons.

The authority to issue a direction is found in subsection 38(7.1) of the *Fisheries Act*.

OPPORTUNITY TO MAKE ORAL REPRESENTATIONS

You are being given a reasonable opportunity in the circumstances to make oral representations in relation to the proposed direction.

Participation in and statements given at oral representations are voluntary.

Oral representations enable you to provide information about the alleged contraventions or the contents of the attached direction or both.

Should you choose to make oral representations I, Chantal Thériault the undersigned Fishery Officer, will consider them and will decide whether or not to issue the draft direction, modify or issue as is.

Please contact me by September 19, 2019, to let me know if you intend to take advantage of the opportunity to make oral representations.

If you wish to make oral representations and plans to bring any written documents to my attention at that time, please bring copies of the documents for my records.

This notice of intent is issued on September 6, 2019, at Fredericton, NB by :



Chantal Thériault
Fishery Officer
Environmental Enforcement Directorate
Enforcement Branch
Environment and Climate Change Canada
77 Westmorland, suite 260
Fredericton, New Brunswick, E3B 6Z3

Telephone : 1(506)451-2502
Email : chantal.theriault3@canada.ca



Environment
Canada

Environnement
Canada

**ENFORCEMENT
BRANCH**
Environmental Enforcement



**DIRECTION GÉNÉRALE DE
L'APPLICATION DE LA LOI**
Application de la loi en environnement

**DRAFT
DIRECTION**

**FISHERIES ACT
Subsection 38(7.1)**

File : 8120-2019-08-16-12423

**PROTECTED B
ENFORCEMENT**

September 06, 2019

Registered with acknowledgement of receipt

NB Power Generation
451 Route 105
Keswick Ridge, NB
E6L 1B2

NB Power Head Office
515 King Street, box 2000
Fredericton, NB
E3B 4X1

c/o Gaëtan Thomas
NB Power President and CEO
NB Power Head Office
515 King Street, box 2000
Fredericton, NB
E3B 4X1

Greg Carroll
Operation Superintendent
451 Route 105
Keswick Ridge, NB
E6L 1B2

Michael Chiasson
Shift Supervisor Mactaquac
451 Route 105
Keswick Ridge, NB
E6L 1B2

Canada

Bruce McLean
Engineering Geologist
451 Route 105
Keswick Ridge, NB
E6L 1B2

Anthony Bielecki
Senior Specialist
515 King Street, box 2000
Fredericton, NB
E3B 4X1

RE : FISHERIES ACT DIRECTION

This document constitutes a direction to the persons named above, pursuant to subsection 38(7.1) of the *Fisheries Act* as amended, hereinafter referred to as the *Fisheries Act*.

REASONABLE GROUNDS FOR BELIEF

I, Chantal Theriault, a Fishery Officer designated by the Minister of Environment under the *Fisheries Act*, have reasonable grounds to believe:

1. That there occurs a deposit of a deleterious substance in water frequented by fish that is not authorized under the *Fisheries Act* and there is a serious and imminent danger of a deposit of a deleterious substance in water frequented by fish.
2. That detriment to fish habitat or fish or to the use by humans of fish results or may reasonably be expected to result from the occurrence and that immediate action is necessary in order to take all reasonable measures consistent with the public safety and with the conservation and protection of fish and fish habitat to prevent the occurrence or to counteract, mitigate or remedy any adverse effects that result from the occurrence or might reasonably be expected to result from it.
3. That all reasonable measures consistent with public safety and with the conservation and protection of fish and fish habitat have not been taken as required by subsection 38(6) of the *Fisheries Act*.
4. That on August 1, 2019, Fishery Officer (FO) Stephanie Rheault and I conducted an on-site inspection at NB Power generating station, located at 451 Route 105 in Keswick Ridge, New Brunswick to verify compliance under subsection 36(3) of the *Fisheries Act*. Environment and Climate Change Canada (ECCC) had received a complaint for grout dumping in the Saint John River at the Mactaquac Dam. On site, we met with Michael Chiasson, Shift Supervisor and Bruce McLean, Engineering Geologist.
5. That NB Power operates the Mactaquac generating station and are doing the maintenance and repairs of the hydro station (Mactaquac Dam).
6. That Mr. Chiasson and Mr. McLean explained that the concrete portions of the hydro station have been affected by a chemical reaction called alkali-aggregate reaction. The reaction causes the concrete to crack and they repair the station by drilling and adding new grout.
7. That the repairs of the hydro station started about one month ago and usually last until October or November depending on the weather conditions. They have been doing the repairs of the hydro station for at least 20 years.
8. That on site they have equipment to prepare the mixture of grout, which is used to fill the cracks in the concrete portion of the hydro station. Mr. Chiasson explained that all the unused grout is disposed in a

GFL Environmental Inc. container (green dumpster container). They let the mixture settle for a minimum of at least 12 hrs, which will then separate in two layers. The solid part of the mixture is at the bottom and the liquid part is on the surface. NB Power employees then disposed of the surface layer effluent (clear liquid) in the Saint John River via a hose/pump system. GFL Environmental Inc. is the company responsible for removing the green containers once they are filled with the solid part of the grout mixture.

9. That during the inspection, we observed two GFL Environmental Inc. green containers. One was located at the South end pier and the other one at the North end pier on the bridge of the hydro station. Mr. McLean confirmed that the grout mixture into the GFL Environmental Inc. container located at the South end pier had a settling time of 18 hours. Mr. McLean stated that this settling time period was adequate before they discharge the surface layer effluent in the Saint John River.
10. That we observed a clear-colored top surface layer and a bottom layer of darker color in the GFL Environmental Inc. container located at the South end pier. That FO Rheault collected samples of that clear-colored top surface layer for toxicology and chemical analysis to verify compliance with the *Fisheries Act*. The samples collected were to be analyzed for rainbow trout toxicity, total suspended solids (TSS), pH, and metals.
11. That on August 8, 2019, I received an e-mail from the Atlantic Laboratory for Environmental Testing laboratory (ALET) technician of the Toxicology Laboratory, informing me that the samples taken were acutely lethal to rainbow trout. There was a total mortality in the 100% concentration, in the 50% concentration, and in the 25% concentration. There was a 40% mortality in the 12.5% concentration.
12. That on August 8, 2019, I received an e-mail from the ALET laboratory supervisor of the Toxicology Laboratory, informing me that the samples had a pH of 11.5.
13. That on August 22, 2019, I received an email from ALET with the result of the chemical analysis for the samples taken for the following parameters: TSS: 22.1 mg/L, pH: 11.5, and a list of different metals concentration (available upon request).
14. That the Saint John River is water frequented by fish based upon section 2 and subsection 34(1) of the *Fisheries Act*. Subsection 34(1) gives the definition of "water frequented by fish", which means Canadian fisheries waters. Section 2 gives the definition of "Canadian fisheries waters", which means all waters in the fishing zones of Canada, all waters in the territorial sea of Canada and all internal waters of Canada.
15. That on August 29, 2019, I received an email from Anthony Bielecki, Senior Specialist for NB Power, stating that they had done some independent testing from the effluent and based on the results, NB Power stopped discharging the effluent from SEP tank in the Saint John River. Mr. Bielicki added that they are currently looking into a proper way to dispose of the effluent.
16. That based on an online research on the NB Power website, I found that the Mactaquac life achievement project involves the maintenance and the repairs of the hydro station at the Mactaquac Dam. In one of the paragraphs, NB Power mentioned that the approach would meet all safety and environmental requirements: <https://www.nbpower.com/en/about-us/projects/mactaquac-project>
17. That based on personal conversations with Michael Chiasson and in his capacity as the Shift Supervisor; Bruce McLean and his capacity as the Engineering Geologist; Greg Caroll and his capacity as the Operation Superintendent; and Anthony Bielecki and his capacity as a Senior Specialist for NB Power, I have determined that the aforementioned officials either have management or knowledge of the deleterious substance, namely the clear-colored effluent byproduct of the grout mixture. I have determined that NB Power owns the deleterious substance.

18. That based on my professional experience, I have reasonable grounds to believe that the deposit of a deleterious substance is likely to cause detriment to fish habitat or fish or to the use by humans of fish results.

MEASURES TO BE TAKEN

Under the authority given to me pursuant to subsection 38(7.1) of the *Fisheries Act*, I hereby direct the persons named above to immediately take all reasonable measures consistent with public safety and with the conservation and protection of fish and fish habitat to prevent the above mentioned occurrence or to counteract, mitigate, or remedy, any adverse effects that result from the above-mentioned occurrence or might reasonably be expected to result from it, including :

1. To stop, prevent and mitigate the discharge of the deleterious substance into water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.
2. To provide Environment and Climate Change Canada, to the attention of the undersigned Fishery Officer, a detailed report outlining the actions that will be taken to stop, prevent and mitigate the discharge of the effluent into the Saint John River as soon as possible but no later than September 23, 2019.
3. A written report (including relevant photos of the site) on the completion of these measures must be submitted to the undersigned Fishery Officer on or before September 30, 2019. The report will be signed by Greg Caroli on behalf of NB Power.

THE LAW

Fisheries Act

Deposit of deleterious substance prohibited

36(3) Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Duty to notify – deleterious substance

38(5) If there occurs a deposit of a deleterious substance in water frequented by fish that is not authorized under this Act, or if there is a serious and imminent danger of such an occurrence, and detriment to fish habitat or fish or to the use by humans of fish results or may reasonably be expected to result from the occurrence, then every person shall without delay notify an inspector, a fishery officer or an authority prescribed by the regulations if the person at any material time

- (a) owns or has the charge, management or control of
 - (i) the deleterious substance, or
 - (ii) the work, undertaking or activity that resulted in the deposit or the danger of the deposit; or
- (b) causes or contributes to the occurrence or the danger of the occurrence.

Duty to take corrective measures

38(6) Any person described in paragraph (4)(a) or (b) or 5(a) or (b) shall, as soon as feasible, take all reasonable measures consistent with public safety and with the conservation and protection of

fish and fish habitat to prevent the occurrence or to counteract, mitigate or remedy any adverse effects that result from the occurrence or might reasonably be expected to result from it.

Report

38(7) As soon as feasible after the occurrence or after learning of the danger of the occurrence, the person shall provide an inspector, fishery officer or an authority prescribed by the regulations with a written report on the occurrence or danger of the occurrence.

Corrective measures

38(7.1) If an inspector or fishery officer, whether or not they have been notified under subsection (4) or (5) or provided with a report under subsection (7), is satisfied on reasonable grounds that immediate action is necessary in order to take any measures referred to in subsection (6), the inspector or officer may, subject to subsection (7.2), take any of those measures at the expense of any person described in paragraph (4)(a) or (b) or (5)(a) or (b) or direct such person to take them at that person's expense.

Offence and punishment

40(2) Every person who contravenes subsection 36(1) or (3) is guilty of an offence and liable

(a) on conviction on indictment,

(i) in the case of an individual,

- (A) for a first offence, to a fine of not less than \$15,000 and not more than \$1,000,000, and
- (B) for a second or subsequent offence, to a fine of not less than \$30,000 and not more than \$2,000,000, or to imprisonment for a term not exceeding three years, or to both,

(ii) in the case of a person, other than an individual or a corporation referred to in subparagraph (iii),

- (A) for a first offence, to a fine of not less than \$500,000 and not more than \$6,000,000, and
- (B) for a second or subsequent offence, to a fine of not less than \$1,000,000 and not more than \$12,000,000, and

(iii) in the case of a corporation that the court has determined to be a small revenue corporation,

- (A) for a first offence, to a fine of not less than \$75,000 and not more than \$4,000,000, and
- (B) for a second or subsequent offence, to a fine of not less than \$150,000 and not more than \$8,000,000; or

(b) on summary conviction,

(i) in the case of an individual,

- (A) for a first offence, to a fine of not less than \$5,000 and not more than \$300,000, and
- (B) for a second or subsequent offence, to a fine of not less than \$10,000 and not more than \$600,000, or to imprisonment for a term not exceeding six months, or to both,

(ii) in the case of a person, other than an individual or a corporation referred to in subparagraph (iii),

- (A) for a first offence, to a fine of not less than \$100,000 and not more than \$4,000,000, and
- (B) for a second or subsequent offence, to a fine of not less than \$200,000 and not more than \$8,000,000, and

(iii) in the case of a corporation that the court has determined to be a small revenue corporation,

- (A) for a first offence, to a fine of not less than \$25,000 and not more than \$2,000,000, and
- (B) for a second or subsequent offence, to a fine of not less than \$50,000 and not more than \$4,000,000.

Other offences

40(3) Every person who

...

(g) fails to comply with the whole or any part of a direction of an inspector or a fishery officer under subsection 38(7.1).

is guilty of an offence punishable on summary conviction and liable, for a first offence, to a fine not exceeding two hundred thousand dollars and, for any subsequent offence, to a fine not exceeding two hundred thousand dollars or to imprisonment for a term not exceeding six months, or to both.

Power to recover costs

42(2) All the costs and expenses referred to in subsection (1) are recoverable by Her Majesty in right of Canada or a province with costs in proceedings brought or taken therefor in the name of Her Majesty in any such right in any court of competent jurisdiction.

Continuing offences

78.1 Where any contravention of this Act or the regulations is committed or continued on more than one day, it constitutes a separate offence for each day on which the contravention is committed or continued.

Offences by corporate officers, etc., of the corporation

78.2 Where a corporation commits an offence under this Act, any officer, director or agent of the corporation who directed, authorized, assented to, acquiesced in or participated in the commission of the offence is a party to and guilty of the offence and is liable on conviction to the punishment provided for the offence, whether or not the corporation has been prosecuted.

CONCLUSION

This direction is without prejudice to any further course of action that Environment and Climate Change Canada may take with respect to any violation of the *Fisheries Act*, including an amended Direction, prosecution, or the seeking of an injunction from the court under the *Fisheries Act*, or any other Act.

This direction and the circumstances to which it refers will form part of Environment and Climate Change Canada's records of NB Power and its responsible officials, and will be taken into account in future responses to alleged violations and for internal purposes such as setting the frequency of inspections. Environment and Climate Change Canada will consider taking further action if you do not take all necessary corrective steps to comply.

This direction is issued in accordance with the Compliance and Enforcement Policy for the Habitat Protection and Pollution Prevention Provisions of the *Fisheries Act*. The complete text of this policy is available on Environment Canada's website :

<http://www.ec.gc.ca/alef-ewe/default.asp?lang=En&n=D6B74D58-1>

The complete text of the *Fisheries Act* is available on the Department of Justice website : <http://laws-lois.justice.gc.ca/Search/>

For more information or to respond to the alleged facts contained in this direction, please call or write the undersigned. Your comments will be considered, and where appropriate, a response provided. Any comments you make, as well as Environment and Climate Change Canada's response, will be maintained on file with this direction in Environment and Climate Change Canada's records.

(French version of this document is available upon request)



Chantal Thériault
Fishery Officer
Environmental Enforcement Directorate
Enforcement Branch
Environment and Climate Change Canada
77 Westmorland, Suite 260
Fredericton, NB E3B 6Z3

c.c. Robert Robichaud
Acting Regional Director
Environmental Enforcement Directorate
Atlantic Region
Enforcement Branch
Environment and Climate Change Canada
Moncton, New Brunswick



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada



Chantal Thériault

Enforcement Officer
Environmental Enforcement Directorate
Enforcement Branch

77 Westmorland, Suite 260
Fredericton, NB E3B 6Z3

Tel: (506) 451-2502 / Fax: (506) 452-3173
chantal.theriault3@canada.ca

Environmental Emergencies: 1-800-565-1633

592-0104

Canada



Appendix B
NB Power Letter issued to ECCC
(September 19, 2019)

September 19, 2019



Énergie NB Power

BY ELECTRONIC MAIL to Chantal.theriault3@canada.ca

Ms. Chantal Theriault
Fishery Officer
Environmental Enforcement Directorate
Enforcement Branch, Environment and Climate Change
77 Westmorland, Suite 260
Fredericton, New Brunswick E3B-6Z3

**Subject: New Brunswick Power Corporation (“NB Power”)
Notice of Intent to Issue a Direction Pursuant to the *Fisheries Act*
 (“Notice”) Environment and Climate Change Canada (‘ECCC’) File #
8120-2019-08-16-12423**

Please accept this letter as NB Power’s initial response to the Notice issued to NB Power on September 6, 2019.

As per the correspondence of September 19, 2019 with Anthony Bielecki, we look forward to meeting with you on September 30 to provide oral representation on the specific actions taken to immediately address this situation.

As stated in writing to ECCC, NB Power also sampled the surface layer effluent (clear liquid) held within the settlement containers which is the subject of the Notice. NB Power sent these samples for independent third-party analysis. Upon receipt of the test results on August 26, 2019, personnel at Mactaquac Generating Station immediately ceased emptying of the surface layer effluent from the settlement containers and to hold the effluent until an acceptable solution for handling and disposal was identified. This action is consistent with Item #1, *Measures to Be Taken* contained in the draft Direction.

NB Power provides the following information and steps taken in accordance with the requirement in Item #2, *Measures to Be Taken* contained in the draft Direction:

- Mactaquac Generating Station ceased the emptying of the surface layer effluent (clear liquid) from the settlement containers.
- initiated investigations for third party entities that handle and dispose of this type of effluent.
- identified a local waste management company who holds an approval to operate from the New Brunswick Department of Environment and Local Government. The company was retained to take 3 container loads of effluent from NB Power’s settlement containers at Mactaquac. NB Power continues to work with the local



Énergie NB Power

company to ensure required approvals are in place in order to retain its services long term.

- NB Power has retained an independent third-party expert to perform an audit and analysis to determine root cause and recommend modifications to prevent any future non-compliance. Further, this expert will support NB Power in the creation of the written report to detail the measures taken to stop, prevent and mitigate the discharge of effluent in required to fulfill Item #3, *Measures to Be Taken* contained in the draft Direction.
- reviewed work methods at the generating station to identify required updates.
- notified each station supervisor at each NB Power hydro generating station of this incident and requested each to confirm that this practice is not occurring at any other station.
- confirmed that no similar practice exists at any other hydro station.
- issued operational standing order signed by hydro management to document the directive to hold and not discharge surface layer effluent in settlement containers.
- reported the receipt of this Notice to the New Brunswick Department of Environment and Local Government.
- reported the receipt of this Notice to NB Power's Executive.

NB Power remains committed to meeting all safety and environmental requirements with respect to its operations. If you have any questions or require additional information please do not hesitate to contact the undersigned.

Yours truly,

NEW BRUNSWICK POWER CORPORATION

Phil Landry
Executive Director Generation and Engineering
Energie NB Power
T: 506-458-3560
C: 506-874-0727

cc: G. Thomas
G. Carroll
M. Chiasson
B. McLean

Appendix C

Watercourse and Wetland Alteration Permit



**PERMIT FOR WATERCOURSE AND WETLAND ALTERATION
ALT 43259'18 Original**

(Regulations 90-80 under the Clean Water Act Chapter C-6.1, Act of New Brunswick 1989)

PERMITTEE NB Power **ADDRESS** 515 King St.
(506)458-4323 Fredericton, NB E3B 1E7

LOCATIONS

Easting	Northing	Datum	Zn	Easting	Northing	Datum	Zn
see description below...							
Affected Watercourse/Tributary: Various							
Affected Regions: ENV -		DFO -		DNR -			
1:50.000 Maps - Various		County - Various		Parish - Various			

NB Power
515 King St.
Fredericton, NB E3B 1E7

PERMIT VALID FOR THIS PERIOD FROM 2018/03/01 TO 2022/12/31
(yyyy/mm/dd) (yyyy/mm/dd)

Description of Watercourse/Wetland Alteration(s):

This multiple permit consists of various maintenance work on existing infrastructures within New Brunswick Power's Hydro Facilities (Beechwood, Grand Falls, Long Lake, Mactaquac, Milltown, Serpentine Lake, Sisson, Tobique, Trouser Lake). This maintenance work may include, but is not limited to, any of the following:

- 1) Placement/replacement of rock protection along the banks.
- 2) Cutting vegetation that creates a safety hazard.
- 3) Installing/repairing temperature sensors and level gauges.
- 4) Soil disturbance for the installations of fencing/signs for public safety.
- 5) Repairing concrete on various fishway (a fishway may not be altered otherwise with this permit).
- 6) The construction of an access route to the water's edge (Grand Falls, Milltown, and Mactaquac).
- 7) Trash removal at intakes.
- 8) Removal of gravel and debris from tailrace prior to unit outage (Sisson).
- 9) Removal of debris/driftwood from headponds. Also includes chipping of wood debris.
- 10) Cleaning out unit 5 intake area (Milltown).
- 11) Steaming of spillgates.
- 12) Various cement and brick work on existing infrastructures.
- 13) Cleaning the DFO fish release ramp (Mactaquac).
- 14) Strengthening the tailrace deck/concrete infrastructure and the removal/replacement of existing transformers (Beechwood).

The Permittee may undertake only those Watercourse/Wetland Alteration(s) described above hereby approved by the Minister. Refer to Conditions of Approval stated on the attached Document "A". Responsibility for any action arising from any watercourse/wetland alteration must be borne by the Permittee and no liability shall be incurred by the Minister or the Department. This permit does not exempt or exclude the Permittee from the provisions of any Act of the Legislature of New Brunswick or of Canada to serve as legal defense to any action commenced by landowners who are adversely affected by the alteration.

Number of conditions attached to this permit: 36

Date of Issuance: 2018/03/01
(yyyy/mm/dd)


Minister of Environment

**DOCUMENT "A" Attached to ALT 43259'18 Original
CONDITIONS OF APPROVAL**

(Regulations 90-80 under the Clean Water Act Chapter C-6.1, Act of New Brunswick 1989)

- (1) The permittee is responsible for obtaining permission from the landowners bordering the watercourse at the project site and all landowners listed on the property where the alteration is to take place before commencement of the work.
- (2) The permittee is responsible for contacting the local planning commission or City/Town prior to commencing the project to ensure that all local/municipal by-laws are adhered to. The permittee is responsible for obtaining all additional permissions and permits prior to work commencement.
- (3) Other than the alterations described on this permit, no additional alteration shall be carried out in or within 30 metres of the shoulder of the bank of a watercourse/edge of a regulated wetland.
- (4) A copy of this permit, including the "Conditions of Approval", shall be kept at the alteration site throughout the duration of the project, and such copy shall be produced upon the request of an inspector designated to act on behalf of the Minister of Environment and Local Government, or an employee of Fisheries and Oceans Canada.
- (5) The permittee shall ensure that all persons involved in the project are aware of and comply with the scope, conditions, and environmental constraints of this permit.
- (6) When self-propelled equipment is being used, an appropriate emergency spill kit shall be kept on-site and be readily deployable. Any spill, regardless of quantity, must be reported by contacting the Department of Environment and Local Government during business hours or the Canadian Coast Guard Environmental Emergency number (1-800-565-1633) after hours.
- (7) Any debris and excavated material generated by the project shall be disposed of such that it cannot be washed into a watercourse/regulated wetland by floodwaters or surface runoff.
- (8) All materials and self-propelled equipment used shall be operated, and stored/parked in an area that prevents any deleterious substance (e.g. petroleum products, silt, etc.) from entering a watercourse/regulated wetland.
- (9) The equipment used shall be in good working order and must not be leaking any fuel, lubricants, or hydraulic fluid.
- (10) Self-propelled equipment shall not enter the wetted portion of the watercourse unless it is stationed on a barge or a workboat. In addition, self-propelled equipment shall not enter a regulated wetland.
- (11) Any part of equipment reaching into the water shall be free of fluid leaks and must be externally cleaned/degreased to prevent any deleterious substance from contaminating the stream flow.
- (12) The permittee/agent carrying out the work shall take whatever steps are necessary to prevent noticeable suspended sediment from reaching a watercourse/wetland as a result of the alterations covered by this permit.
- (13) Prior to exposing any soil, siltation prevention devices competent in quantity, design, diversity, and function to adequately prevent the alterations covered by this permit from having a negative impact on the quality of the stream flow under all runoff conditions, shall be installed prior to exposing erodible soil, and added wherever necessary to prevent sedimentation. These devices shall be maintained such that they perform their intended function until vegetation becomes re-established.
- (14) If a siltation prevention device is compromised and/or is not functioning properly, no further work shall take place until the issue is corrected.
- (15) At the first evidence that runoff is starting to occur during a precipitation event, the project shall be shut down and all siltation prevention devices shall be monitored and any necessary repairs made, such that they accomplish their intended function.
- (16) Soil shall not be disturbed and rip-rap/armor stone shall not be placed in a regulated wetland.
- (17) Rip-rap/armor stone shall be clean, durable, non-ore bearing, and non-toxic rock, and must not be obtained from a watercourse nor from within 30 metres of the shoulder of the banks of a watercourse.

P.d.

**DOCUMENT "A" Attached to ALT 43259'18 Original
CONDITIONS OF APPROVAL**

(Regulations 90-80 under the Clean Water Act Chapter C-6.1, Act of New Brunswick 1989)

- (18) Rocks used to stabilize the bank of the watercourse shall be irregular in shape with at least 70% of the material having a smallest dimension of not less than 15 centimetres.
- (19) The minimum thickness of the layer of rip-rap/armor stone shall be 1.33 times the maximum rock size used.
- (20) The full thickness of the rip-rap/armor stone shall be deposited as a dense mass of various sized rock with minimal voids. It shall not be placed in layers.
- (21) The rip-rap/armor stone shall not be dumped or pushed over the shoulder of the bank of a watercourse, but shall be placed into position in a controlled manner.
- (22) No grubbing shall take place within 30 metres of the shoulder of the bank of a watercourse/edge of a regulated wetland.
- (23) Trees/non-merchantable woody vegetation shall not be felled into or across a watercourse/regulated wetland.
- (24) Non-merchantable woody vegetation rooted below the shoulder of the bank of a watercourse shall not be cut.
- (25) Non-merchantable woody vegetation growing within six (6) metres of the shoulder of the bank of a watercourse/edge of a regulated wetland shall not be cut or uprooted, unless it presents a significant safety hazard, is infested with insects, or is infected by disease.
- (26) All repairs/upgrades to the infrastructure and appurtenant control/monitoring equipment of these hydro generating facilities and the dams on the outlet of the lakes used as storage reservoirs, shall be carried out in isolation of the water being impounded by or discharged through the control structure.
- (27) All in-water work requiring dewatering a section of the watercourse and/or a fish rescue shall be carried out strictly between June 1st and September 30th.
- (28) Turbid water from dewatering operations shall be routed through a settling pond, filter bag, or into existing vegetation of sufficient expanse to ensure that there is no visible suspended sediment in the runoff returning to a watercourse/wetland.
- (29) If the stream flow is to be pumped from an area where fish may be present, the intake of the suction hose shall be screened in accordance with Fisheries and Oceans Canada "Freshwater Intake End-of-Pipe Fish Screen Guideline".
- (30) All fish shall be rescued from the isolated work area prior to it being de-watered and immediately released alive upstream/downstream out of harm's way. If the site is flooded during the project, another fish rescue shall be done.
- (31) Prior approval shall be obtained from Fisheries and Oceans Canada before the water level in a storage reservoir or headpond is lowered below the normal operating range for the construction period.
- (32) Prior approval shall be obtained from Fisheries and Oceans Canada before carrying out any repairs to a water level control structure that require a reduction in the downstream maintenance flow, below the current minimum discharge that either they have agreed to or has been voluntarily adopted.
- (33) All slash and woody debris generated during the project shall be disposed of where it cannot be washed into a watercourse/regulated wetland by floodwaters.
- (34) Throughout the project, all exposed erodible soil shall be temporarily stabilized with mulch, erosion control blankets or other products designed to prevent erosion and the runoff of suspended sediment into a watercourse/wetland, prior to each forecasted rain event.

P.M.

**DOCUMENT "A" Attached to ALT 43259'18 Original
CONDITIONS OF APPROVAL**

(Regulations 90-80 under the Clean Water Act Chapter C-6.1, Act of New Brunswick 1989)

- (35) Upon final grades being achieved, all exposed erodible soil shall be permanently stabilized with perennial vegetation native to the area and blanketed with mulch. If final grading takes place outside the growing season when perennial vegetation can become re-established, temporary stabilization shall be upgraded to perform its function throughout winter and snowmelt/spring break-up conditions. Wherever temporary over-winter stabilization is used, it shall be replaced with non-invasive perennial vegetation native to the area early in the next growing season.
- (36) An annual report of the work carried out shall be submitted to the Department of Environment and Local Government (catherine.lambert@gnb.ca) by December 31 of each year that this permit is effective for.

P. de

Appendix D

Safety Data Sheet for Flocculant

PC MEGAFLOC 8629

1 PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: PC MEGAFLOC 8629
Common Name: Mixture
SDS Number: 1080
Revision Date: 5/22/2015
Version: 1
Internal ID: 100B
Product Use: Flocculation aid for water treatment
Supplier Details: Pristine Environmental, LLC
PO Box 610
St. Joseph, MN 56374

Contact: Non-emergency #: 320-224-7445

EMERGENCY RESPONSE: (ChemTel)
US & Canada: 800-255-3924
International: +01-813-248-0585

2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS):

Health, Acute toxicity, 5 Oral
Health, Acute toxicity, 5 Dermal
Health, Serious Eye Damage/Eye Irritation, 2 B
Health, Acute toxicity, 5 Inhalation

GHS Label elements, including precautionary statements

GHS Signal Word: **WARNING**

GHS Hazard Pictograms:

**NO GHS PICTOGRAMS INDICATED FOR
THIS PRODUCT**

GHS Hazard Statements:

H303 - May be harmful if swallowed
H313 - May be harmful in contact with skin
H320 - Causes eye irritation
H333 - May be harmful if inhaled

GHS Precautionary Statements:

P103 - Read label before use.
P281 - Use personal protective equipment as required.
P352 - Wash with soap and water.

Hazards not otherwise classified (HNOC) or not covered by GHS

PC MEGAFLOC 8629

PPE recommendation is advisory only and based on typical use conditions. An industrial hygienist or safety officer familiar with the specific situation of anticipated use must determine actual PPE required when using this product (29 CFR 1910.132)

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

Cas#	%	Chemical Name
12042-91-0	10-40%	Aluminum chloride hydroxide (Al ₂ Cl(OH) ₅)
26062-79-3	10-40%	2-Propen-1-aminium, N,N-dimethyl-N-2-propenyl-, chloride, homopolymer

4 FIRST AID MEASURES

- Inhalation:** Remove from contamination. If person has stopped breathing administer artificial respiration. If symptoms persist, seek medical attention.
- Skin Contact:** Wash off with soap and plenty of water. Remove contaminated garments and wash or destroy. Consult a physician if irritation develops.
- Eye Contact:** Flush eyes with plenty of running water for 15 minutes. Seek medical attention if irritation persists.
- Ingestion:** If discomfort or other symptoms develop, seek medical attention. If conscious, give plenty of water. Do not induce vomiting unless directed to do so by medical personnel.

Most important symptoms & effects (acute & delayed): No data available

Indication of need for immediate medical attention: No data available

Special treatment needs: No data available

5 FIRE FIGHTING MEASURES

- Flammability:** Not flammable
- Flash Point:** None
- Flash Point Method:** Pensky Martens Closed cup
- Burning Rate:** Not applicable
- Autoignition Temp:** Not applicable
- LEL:** Not applicable
- UEL:** Not applicable

Extinguishing Media:

Suitable: Use extinguishing media suitable for surrounding fire.

Unsuitable: No information available

Hazardous combustion products: Thermal decomposition, as under fire conditions, may produce carbon dioxide, carbon monoxide, oxides of nitrogen, hydrogen chloride, and other potentially hazardous compounds

Unusual Fire or Explosion Hazards: None known

Special protective equipment/precautions: Wear self-contained breathing apparatus

PC MEGAFLOC 8629

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective equipment, emergency procedures: Avoid contact with the material. See section 8 of SDS for PPE recommendations

Environmental Precautions: Keep runoff from entering drains or waterways

Spill/Leak procedures: Contain spill or leak. Dike area if necessary to prevent spill from spreading or entering sewers and waterways. Recover as much as possible then absorb remainder with inert material. Place into closed container for disposal.

Regulatory Requirements: Dispose of recovered material in accordance with all applicable state and federal regulations.

7 HANDLING AND STORAGE

Handling Precautions: Avoid contact with eyes, skin, or clothing. Do not taste or swallow. Do not inhale vapor or mist. Use with adequate ventilation. For industrial use only!

Storage Requirements: Store in closed containers away from temperature extremes and incompatible materials. Store in properly labeled containers in accordance with all local, state and federal guidelines.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Provide local exhaust ventilation as needed to control misting.

Personal Protective Equipment: HMIS PP, B | Safety Glasses, Gloves

Respiratory protection: If needed use MSHA/NIOSH approved respirator. Seek professional advice prior to respirator selection and use. Follow all requirements of OSHA respirator regulations (29 CFR 1910.134)

Safety Stations: Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work area.

General Hygiene: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, using the toilet, or applying cosmetics.

PPE recommendation is advisory only and based on typical use conditions. An industrial hygienist or safety officer familiar with the specific situation of anticipated use must determine actual PPE required when using this product (29 CFR 1910.132)

Exposure Limits: **Aluminum Chlorohydrate**
NIOSH REL: 2 mg/m³ as Al

PC MEGAFLOC 8629

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Clear, yellow to amber	Odor:	Slight amine odor
Physical State:	Liquid	Solubility:	Complete in water
Odor Threshold:	Not determined	Freezing/Melting Pt.:	28°F
Spec Grav./Density:	9.65 lb/gal	Flash Point:	None
Viscosity:	Not determined	Vapor Density:	Not determined
Boiling Point:	Similar to water	Auto-Ignition Temp:	Not determined
Partition Coefficient:	Not determined	UFL/LFL:	Not determined
Vapor Pressure:	Not determined		
pH:	4		
Evap. Rate:	Not determined		
Decomp Temp:	Not determined		

10 STABILITY AND REACTIVITY

Stability:	Product is stable under normal storage and use conditions.
Conditions to Avoid:	Avoid temperature extremes. Protect from freezing
Materials to Avoid:	Strong bases. Reacts with some metals (including zinc and aluminum) to form flammable hydrogen gas.
Hazardous Decomposition:	Thermal decomposition may produce carbon oxides and other toxic compounds.

11 TOXICOLOGICAL INFORMATION

Acute Toxicity:	No data available
Skin Corrosion/Irritation:	No data available
Serious eye damage/irritation:	No data available
Respiratory or skin sensitization:	No data available
Specific target organ toxicity (single exposure):	No data available
Specific target organ toxicity (repeated exposure):	No data available
Aspiration hazard:	No data available
Carcinogenicity:	No carcinogenic effects are known for the components of this product
Germ Cell Mutagenicity:	No mutagenic effects are known for the components of this product
Teratogenicity:	No teratogenic effects are known for the components of this product

12 ECOLOGICAL INFORMATION

Aquatic Toxicity	No data available
Elimination (persistence & degradability):	No data available
Bioaccumulative potential:	No data available
Mobility in soil:	No data available
Other adverse effects:	No data available

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13 DISPOSAL CONSIDERATIONS

Dispose of in accordance with local regulations.

This material should be fully characterized for toxicity and possible reactivity prior to disposal (40 CFR 261). Use which results in chemical or physical change or contamination may subject it to regulation as a hazardous waste. Along with properly characterizing all waste materials, consult state and local regulations regarding the proper disposal of this material.

Container contents should be completely used and containers should be emptied prior to discard. Container rinsate could be considered a RCRA hazardous waste and must be disposed of with care and in full compliance with federal, state and local regulations. Larger empty containers, such as drums, should be returned to the distributor or to a drum reconditioner. To assure proper disposal of smaller empty containers, consult with state and local regulations and disposal authorities.

14 TRANSPORT INFORMATION

Proper Shipping Name: Non-regulated

DOT Transportation data (49 CFR 172.101)

15 REGULATORY INFORMATION

Component (CAS#) [%] - CODES

Aluminum chloride hydroxide (Al₂Cl(OH)₅) (12042-91-0) [20-30] TSCA

2-Propen-1-aminium, N,N-dimethyl-N-2-propenyl-, chloride, homopolymer (26062-79-3) [20-30] TSCA

Regulatory CODE Descriptions

TSCA = Toxic Substances Control Act

TSCA: All components of this product are listed (or are not required to be listed) in the TSCA inventory

EPA / CERCLA / SARA TITLE III:

CERCLA List: This product does not contain any CERCLA listed hazardous substances.

Toxic Chemical List (SARA 313): This product does not contain any chemicals subject to routine annual toxic chemical release reporting.

Extremely Hazardous Substance (SARA 302/304): This product does not contain any extremely hazardous substances subject to emergency planning requirements.

SARA 312: No data available

RCRA: No data available

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16 OTHER INFORMATION

HMIS III: Health = 1, Fire = 0, Physical Hazard = 0
 HMIS PPE: B - Safety Glasses, Gloves

HMIS	
HEALTH	1
FLAMMABILITY	0
PHYSICAL HAZARD	0
PERSONAL PROTECTION	B

Author: Pristine Environmental, LLC

Revision Notes: Updated to GHS format

Disclaimer:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s). The above information is not claiming characteristics of the product in term of legal claims of performance / guarantee. This information only describes safety measures and no liability may arise from the use or application of the product described herein. This information is given in good faith and based on our current knowledge of the product.

Appendix E
Atlantic Canada Conservation
Data Centre (2021)

DATA REPORT 6790: Mactaquac Generating Station, NB

Prepared 22 February 2021
by C. Robicheau, Data Manager

CONTENTS OF REPORT

1.0 Preface

- 1.1 Data List
- 1.2 Restrictions
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- 2.1 Flora
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- 3.2 Significant Areas
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4.0 Rare Species Lists

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- 4.3 Location Sensitive Species
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5.0 Rare Species within 100 km

- 5.1 Source Bibliography



Map 1. A 100 km buffer around the study area

1.0 PREFACE

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

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

1.1 DATA LIST

Included datasets:

<u>Filename</u>	<u>Contents</u>
MactaquacGenNB_6790ob.xls	Rare or legally-protected Flora and Fauna in your study area
MactaquacGenNB_6790ob100km.xls	A list of Rare and legally protected Flora and Fauna within 100 km of your study area
MactaquacGenNB_6790msa.xls	Managed and Biologically Significant Areas in your study area
MactaquacGenNB_6790ff_py.xls	Rare Freshwater Fish in your study area (DFO database)

1.2 RESTRICTIONS

The AC CDC makes a strong effort to verify the accuracy of all the data that it manages, but it shall not be held responsible for any inaccuracies in data that it provides. By accepting AC CDC data, recipients assent to the following limits of use:

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

1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

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

Plants, Lichens, Ranking Methods, All other Inquiries

Sean Blaney, Senior Scientist, Executive Director

Tel: (506) 364-2658

sean.blaney@accdc.ca

Animals (Fauna)

John Klymko, Zoologist

Tel: (506) 364-2660

john.klymko@accdc.ca

Plant Communities

Sarah Robinson, Community Ecologist

Tel: (506) 364-2664

sarah.robinson@accdc.ca

Data Management, GIS

James Churchill, Data Manager

Tel: (902) 679-6146

james.churchill@accdc.ca

Billing

Jean Breau

Tel: (506) 364-2657

jean.breau@accdc.ca

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

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

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

Western: Emma Vost

(902) 670-8187

Emma.Vost@novascotia.ca

Western: Sarah Spencer

(902) 541-0081

Sarah.Spencer@novascotia.ca

Central: Shavonne Meyer

(902) 893-0816

Shavonne.Meyer@novascotia.ca

Central: Kimberly George

(902) 890-1046

Kimberly.George@novascotia.ca

Eastern: Harrison Moore

(902) 497-4119

Harrison.Moore@novascotia.ca

Eastern: Maureen Cameron-MacMillan

(902) 295-2554

Maureen.Cameron-MacMillan@novascotia.ca

Eastern: Elizabeth Walsh

(902) 563-3370

Elizabeth.Walsh@novascotia.ca

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

2.0 RARE AND ENDANGERED SPECIES

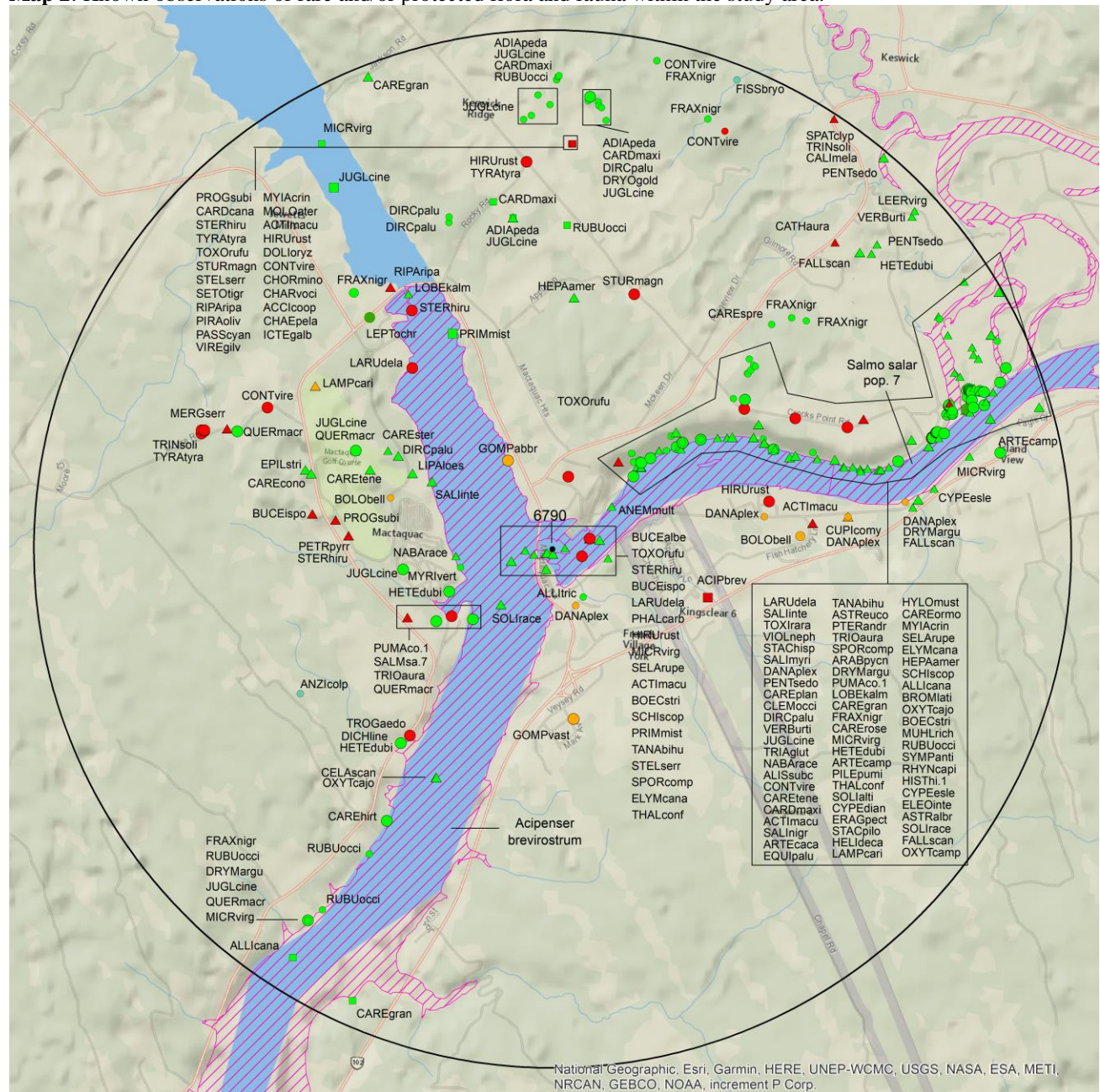
2.1 FLORA

The study area contains 331 records of 75 vascular and 2 records of 2 nonvascular flora (Map 2 and attached: *ob.xls).

2.2 FAUNA

The study area contains 101 records of 39 vertebrate and 15 records of 7 invertebrate fauna (Map 2 and attached data files - see 1.1 Data List). Please see section 4.3 to determine if “location-sensitive” species occur near your study site.

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



National Geographic, Esri, Garmin, HERE, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, increment P Corp.

3.0 SPECIAL AREAS

3.1 MANAGED AREAS

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

3.2 SIGNIFICANT AREAS

The GIS scan identified 5 biologically significant sites in the vicinity of the study area (Map 3 and attached file: *msa.xls).

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



 Managed Area  Significant Area

4.0 RARE SPECIES LISTS

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

4.1 FLORA

Scientific Name	Common Name	Conservation Status	Global Status	Provincial Prot	Provincial Rank	Obs	Distance (km)
<i>Anzia colpodes</i>	Black Foam Lichen	Threatened	Threatened		S1S2	1	2.0 ± 0.0
<i>Fissidens bryoides</i>	Lesser Pocket Moss				S3S4	1	4.0 ± 0.0
<i>Juglans cinerea</i>	Butternut	Endangered	Endangered	Endangered	S1	27	1.5 ± 0.0
<i>Fraxinus nigra</i>	Black Ash	Threatened			S4S5	0	2.3 ± 1.0
<i>Symphotrichum anticostense</i>	Anticosti Aster	Special Concern	Special Concern	Endangered	S2S3	4	1.5 ± 0.0
<i>Pterospora andromedea</i>	Woodland Pinedrops			Endangered	S1	5	1.4 ± 0.0
<i>Helianthus decapetalus</i>	Ten-rayed Sunflower				S1	7	3.6 ± 1.0
<i>Alisma subcordatum</i>	Southern Water Plantain				S1	1	3.2 ± 0.0
<i>Carex sterilis</i>	Sterile Sedge				S1	1	1.0 ± 0.0
<i>Cyperus diandrus</i>	Loosestraw				S1	2	4.2 ± 0.0
<i>Rhynchospora capillacea</i>	Slender Beakrush				S1	3	2.4 ± 0.0
<i>Allium canadense</i>	Canada Garlic				S1	10	1.6 ± 0.0
<i>Sporobolus compositus</i>	Rock Dropseed				S1	16	0.2 ± 0.0
<i>Micranthes virginiensis</i>	Earl Saxifrage				S1S2	13	0.5 ± 1.0
<i>Selaginella rupestris</i>	Rock Spinemoss				S1S2	7	0.1 ± 0.0
<i>Solidago racemosa</i>	Racemose Goldenrod				S2	10	0.7 ± 1.0
<i>Boechera stricta</i>	Brummond's Rockress				S2	4	0.3 ± 0.0
<i>Triosteum aurantiacum</i>	Orange-rooted Wintergreen				S2	5	1.0 ± 0.0
<i>Astragalus eucosmus</i>	Elegant Milkweeth				S2	6	1.6 ± 0.0
<i>Oxytropis campestris</i>	Field Lotusweed				S2	1	4.3 ± 0.0
<i>Oxytropis campestris var. johannensis</i>	Field Lotusweed				S2	5	2.3 ± 1.0
<i>Quercus macrocarpa</i>	Big Oak				S2	4	1.3 ± 0.0
<i>Anemone multifida</i>	Cleft-leaved Anemone				S2	1	0.7 ± 0.0
<i>Hepatica americana</i>	Round-lobed Hepatica				S2	0	1.6 ± 1.0
<i>Dirca palustris</i>	Eastern Leatherwood				S2	6	1.7 ± 1.0
<i>Verbena urticifolia</i>	White Vervain				S2	7	3.0 ± 0.0
<i>Carex granularis</i>	Limestone Meadow Sedge				S2	5	1.2 ± 0.0
<i>Carex hirtifolia</i>	Persistent Sedge				S2	1	3.1 ± 0.0
<i>Carex plantaginea</i>	Plantain-Leaved Sedge				S2	1	2.6 ± 0.0
<i>Carex sprengei</i>	Longleaf Sedge				S2	1	3.0 ± 0.0
<i>Allium tricoccum</i>	Wild Leek				S2	1	0.5 ± 0.0
<i>Dichanthelium linearifolium</i>	Narrow-leaved Panicgrass				S2	1	2.4 ± 0.0
<i>Elymus canadensis</i>	Canada Wild Rice				S2	0	0.2 ± 1.0
<i>Leersia virginica</i>	White Cuckoo Grass				S2	5	4.0 ± 0.0
<i>Schizachyrium scoparium</i>	Little Bluestem				S2	0	0.1 ± 1.0
<i>Toxicodendron radicans var. radicans</i>	Eastern Poison Ivy				S2	2	5.0 ± 1.0
<i>Salix myricoides</i>	Bayberry				S2	4	4.2 ± 0.0
<i>Solidago altissima</i>	Common Goldenrod				S2S3	1	4.3 ± 0.0
<i>Eragrostis pectinacea</i>	Spiked Love Grass				S2S3	1	4.0 ± 1.0
<i>Artemisia campestris ssp. caudata</i>	Common Wormwood				S3	2	4.3 ± 0.0
<i>Artemisia campestris</i>	Field Wormwood				S3	3	4.3 ± 0.0
<i>Nabalus racemosus</i>	Black Rattlesnake Root				S3	3	0.0 ± 0.0
<i>Tanacetum bipinnatum ssp. huronense</i>	Lace Ironweed				S3	7	0.0 ± 1.0
<i>Arabis pycnocarpa</i>	Cream-lobed Rockress				S3	4	1.2 ± 1.0
<i>Cardamine maxima</i>	Lace Woodwort				S3	4	2.3 ± 0.0

Scientific Name	Common Name	CEC	Prov Legal Prot	Prov Priority Rank	Refs	Instance
<i>Penthorum sedoides</i>	Witch Stonecrop			S3	3	40
<i>Astragalus alpinus var. brunetianus</i>	Alpine Milkweeth			S3	1	47
<i>Myriophyllum verticillatum</i>	Horled Water Milfoil			S3	1	0
<i>Stachys hispida</i>	Smooth Bedstraw-Nettle			S3	5	10
<i>Epilobium strictum</i>	Common Willowherb			S3	4	25
<i>Fallopia scandens</i>	Climbing False Broomrape			S3	3	36
<i>Primula mistassinica</i>	Mistassini Primrose			S3	2	01
<i>Clematis occidentalis</i>	Purple Clematis			S3	2	2
<i>Thalictrum confine</i>	Northern Meadow-rue			S3	2	04
<i>Rubus occidentalis</i>	Black Rasperry			S3	12	11
<i>Salix nigra</i>	Black Willow			S3	1	44
<i>Salix interior</i>	Sandbar Willow			S3	12	13
<i>Pilea pumila</i>	Clearweed			S3	1	44
<i>Viola nephrophylla</i>	Northern Bloodroot			S3	4	20
<i>Carex conoidea</i>	Field Sedge			S3	1	24
<i>Carex ormostachya</i>	Neotoma Spike Sedge			S3	1	23
<i>Carex rosea</i>	Rosy Sedge			S3	1	12
<i>Carex tenera</i>	Tender Sedge			S3	3	1
<i>Cyperus esculentus var. leptostachyus</i>	Perennial Yellow Nut-sedge			S3	3	37
<i>Eleocharis intermedia</i>	Matted Spikerush			S3	1	47
<i>Triantha glutinosa</i>	Sticky False-Opshodel			S3	4	23
<i>Liparis loeselii</i>	Loesel's Orchid			S3	1	15
<i>Bromus latiglumis</i>	Broad-leaved Brome			S3	1	15
<i>Muhlenbergia richardsonis</i>	Mat Muhl			S3		16
<i>Heteranthera dubia</i>	Water Star-grass			S3	4	11
<i>Adiantum pedatum</i>	Northern Maidenhair Fern			S3		32
<i>Dryopteris goldiana</i>	Oldies Woodfern			S3	1	43
<i>Equisetum palustre</i>	Marsh Horsetail			S3	1	44
<i>Lobelia kalmii</i>	Brook Lobelia			S3S4	5	11
<i>Stachys pilosa</i>	Hairbedstraw-Nettle			S3S4	1	43
<i>Drymocallis arguta</i>	Wall Wood Beauty			S3S4		11
<i>Celastrus scandens</i>	Climbing Bittersweet			S3	1	25

4.2 FAUNA

Scientific Name	Common Name	CEC	Prov Legal Prot	Prov Priority Rank	Refs	Instance	
<i>Salmo salar pop. 7</i>	Atlantic Salmon - Outer Basin End-pop	Endangered	Endangered	SNR	1	12	
<i>Sturnella magna</i>	Eastern Meadowlark	Threatened	Threatened	S1B,S1M	2	26	
<i>Hylocichla mustelina</i>	Wood Thrush	Threatened	Threatened	S1S2B,S1S2M	1	33	
<i>Hirundo rustica</i>	Barn Swallow	Threatened	Threatened	S2B,S2M	7	04	
<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened	S2S3B,S2M	1	3	
<i>Riparia riparia</i>	Barn Swallow	Threatened	Threatened	S2S3B,S2S3M	3	30	
<i>Cardellina canadensis</i>	Canada Warbler	Threatened	Threatened	S3B,S3M	1	3	
<i>Dolichonyx oryzivorus</i>	Boobin	Threatened	Threatened	S3B,S3M	3	3	
<i>Histrionicus histrionicus pop. 1</i>	Carle In - Eastern pop	Special Concern	Special Concern	Endangered	S1B,S1S2N,S2M	1	41
<i>Bucephala islandica (Eastern pop.)</i>	Barrows Goldeneye - Eastern pop	Special Concern	Special Concern	Special Concern	S2M,S2N	7	04
<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	Special Concern	Special Concern	Special Concern	S3	1	
<i>Chordeiles minor</i>	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	1	3
<i>Contopus virens</i>	Eastern Wood-Pee	Special Concern	Special Concern	Special Concern	S4B,S4M	10	23
<i>Accipiter cooperii</i>	Cooper's Hawk	Not at Risk			S1S2B,S1S2M	1	3
<i>Sterna hirundo</i>	Common Tern	Not at Risk			S3B,S3M		04
<i>Puma concolor pop. 1</i>	Eastern Cougar	Data Deficient	Endangered	SN	2	11	
<i>Progne subis</i>	Purple Martin			S1B,S1M	2	21	

Scientific Name	Common Name	Conservation Status	Prov Legal Prot	Prov Distribution	Res	Instance	
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow			S1S2B,S1S2M	2	03 000	
<i>Troglodytes aedon</i>	House Wren			S1S2B,S1S2M	3	23 000	
<i>Toxostoma rufum</i>	Brown Thrasher			S2B,S2M	3	04 000	
<i>Tringa solitaria</i>	Solitary Sandpiper			S2B,S5M	3	35 000	
<i>Phalacrocorax carbo</i>	Great Cormorant			S2N,S2M	1	04 000	
<i>Spatula clypeata</i>	Northern Shoveler			S2S3B,S2S3M	1	50 000	
<i>Myiarchus crinitus</i>	Great Crested Flycatcher			S2S3B,S2S3M	3	27 000	
<i>Petrochelidon pyrrhonota</i>	Chimney Swallow			S2S3B,S2S3M	1	20 020	
<i>Cathartes aura</i>	Oriente Osprey			S3B,S3M	1	40 000	
<i>Charadrius vociferus</i>	Killdeer			S3B,S3M	2	30 070	
<i>Vireo gilvus</i>	Warbling Vireo			S3B,S3M	1	30 070	
<i>Piranga olivacea</i>	Scarlet Tanager			S3B,S3M	1	30 070	
<i>Passerina cyanea</i>	Indigo Bunting			S3B,S3M	1	30 070	
<i>Molothrus ater</i>	Brown-headed Cowbird			S3B,S3M	1	30 070	
<i>Icterus galbula</i>	Baltimore Oriole			S3B,S3M	2	30 070	
<i>Setophaga tigrina</i>	Cape May Warbler			S3B,S4S5M	1	30 070	
<i>Mergus serrator</i>	Red-breasted Merganser			S3B,S5M,S4S5N	1	33 010	
<i>Bucephala albeola</i>	Belted Kingfisher			S3M,S2N	2	04 000	
<i>Tyrannus tyrannus</i>	Eastern Kingbird			S3S4B,S3S4M	7	35 000	
<i>Actitis macularia</i>	Spotted Sandpiper			S3S4B,S5M	4	04 000	
<i>Larus delawarensis</i>	Ring-billed Gull			S3S4B,S5M	5	04 000	
<i>Calidris melanotos</i>	Pectoral Sandpiper			S3S4M	2	50 000	
<i>Danaus plexippus</i>	Monarch	Endangered	Special Concern	Special Concern	S3B,S3M	5	06 000
<i>Lampsilis cariosa</i>	Yellow Lampshell	Special Concern	Special Concern	Special Concern	S2	3 000 10	
<i>Boloria bellona</i>	Meadow Butterfly				S3	2 16 000	
<i>Gomphus vastus</i>	Copper Dragonfly				S3	1 17 000	
<i>Gomphus abbreviatus</i>	Spine-tipped Dragonfly				S3	1 10 000	
<i>Leptodea ochracea</i>	Water Boatman				S3	2 20 000	
<i>Cupido comyntas</i>	Eastern Tailed Blue				S3S4	1 20 010	

4.3 LOCATION SENSITIVE SPECIES

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

New Brunswick

Scientific Name	Common Name	Conservation Status	Prov Legal Prot	Location Sensitive
<i>Chrysemys picta picta</i>	Eastern Painted Turtle			No
<i>Chelydra serpentina</i>	Snapping Turtle	Special Concern	Special Concern	Yes
<i>Glyptemys insculpta</i>	Wood Turtle	Threatened	Threatened	No
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Endangered	Endangered	Yes
<i>Falco peregrinus pop. 1</i>	Peregrine Falcon - Atlantic/Northern population	Special Concern	Endangered	No
<i>Cicindela marginipennis</i>	Cobblestone Tiger Beetle	Endangered	Endangered	No
<i>Coenonympha nipsisquit</i>	Maritime Ringlet	Endangered	Endangered	No
Bat hibernaculum or bat species occurrence		Endangered	Endangered	Yes

1 *Myotis lucifugus* (Little Brown Myotis), *Myotis septentrionalis* (Long-eared Myotis), and *Perimyotis subflavus* (Tricolored Bat or Eastern Pipistrelle) are all Endangered under the Federal Species at Risk Act and the NB Species at Risk Act.

4.4 SOURCE BIBLIOGRAPHY

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

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5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 23,277 records of 150 vertebrate and 1969 records of 90 invertebrate fauna; 13,886 records of 383 vascular and 540 records of 159 nonvascular flora (attached: *ob100km.xls).

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

Scientific Name	Common Name	COSEWIC	Species	Prov Legal Prot	Priority	Res	Disturbance	Prov
<i>Myotis lucifugus</i>	Little Brown Myotis	Endangered	Endangered	Endangered	S1	62	17.1 ± 1.0	NB
<i>Myotis septentrionalis</i>	Northern Long-eared Myotis	Endangered	Endangered	Endangered	S1	15	17.1 ± 1.0	NB
<i>Perimyotis subflavus</i>	Eastern Pipistrelle	Endangered	Endangered	Endangered	S1	3	4.5 ± 0.0	NB
<i>Osmerus mordax pop. 2</i>	Lake St. Pierre Smelt larval - modied pop.	Endangered	Threatened	Threatened	S1	2	6.4 ± 10.0	NB
<i>Sterna dougallii</i>	Roseate Tern	Endangered	Endangered	Endangered	S1B,S1M	2	7 ± 5.0	NB
<i>Charadrius melodus melodus</i>	Piping Plover melodus ssp	Endangered	Endangered	Endangered	S1B,S1M	5	0 ± 0.0	NB
<i>Salmo salar pop. 1</i>	Atlantic Salmon - Inner Basin modied pop.	Endangered	Endangered	Endangered	S2	437	24 ± 0.0	NB
<i>Calidris canutus rufa</i>	Red Knot ssp	Endangered	Endangered	Endangered	S2M	1	6.3 ± 0.0	NB
<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	Endangered	Threatened		SN	1	6 ± 7.0	NB
<i>Empidonax virescens</i>	Acadian Chat	Endangered	Endangered		SN	2	15.1 ± 0.0	NB
<i>Protonotaria citrea</i>	Prothonotary Warbler	Endangered	Endangered		SN	1	4 ± 2.0	NB
<i>Icteria virens</i>	Yellow-breasted Chat	Endangered	Endangered		SN	4	6 ± 7.0	NB
<i>Salmo salar pop. 7</i>	Atlantic Salmon - Outer Basin modied pop.	Endangered		Endangered	SNR	45	1.2 ± 0.0	NB
<i>Rangifer tarandus pop. 2</i>	Woodland Caribou (Atlantic- Gaspésie pop.)	Endangered	Endangered	Extirpated	S	4	45 ± 1.0	NB
<i>Colinus virginianus</i>	Northern Bobwhite	Endangered	Endangered			4	74.1 ± 0.0	NB
<i>Sturnella magna</i>	Eastern Meadowlark	Threatened	Threatened	Threatened	S1B,S1M	44	2.6 ± 0.0	NB
<i>Ixobrychus exilis</i>	Least Bittern	Threatened	Threatened	Threatened	S1S2B,S1S2M	31	10.7 ± 7.0	NB
<i>Hyalocichla mustelina</i>	Wood Thrush	Threatened	Threatened	Threatened	S1S2B,S1S2M	234	3.3 ± 1.0	NB
<i>Antrostomus vociferus</i>	Eastern Whip-poor-will	Threatened	Threatened	Threatened	S2B,S2M		11.6 ± 7.0	NB
<i>Hirundo rustica</i>	Barn Swallow	Threatened	Threatened	Threatened	S2B,S2M	107	0.4 ± 0.0	NB
<i>Catharus bicknelli</i>	Black-throated Blue Warbler	Threatened	Threatened	Threatened	S2B,S2M	3	76.7 ± 7.0	NB
<i>Glyptemys insculpta</i>	Wood Turtle	Threatened	Threatened	Threatened	S2S3	105	5.4 ± 1.0	NB
<i>Chaetura pelagica</i>	Chimney Swift	Threatened	Threatened	Threatened	S2S3B,S2M	424	3 ± 7.0	NB
<i>Riparia riparia</i>	Barn Swallow	Threatened	Threatened		S2S3B,S2S3M	4	3.0 ± 1.0	NB
<i>Acipenser oxyrinchus</i>	Atlantic Sturgeon	Threatened		Threatened	S3	2	4 ± 1.0	NB
<i>Cardellina canadensis</i>	Canada Warbler	Threatened	Threatened	Threatened	S3B,S3M	1367	3 ± 7.0	NB
<i>Dolichonyx oryzivorus</i>	Bobolink	Threatened	Threatened	Threatened	S3B,S3M	36	3 ± 7.0	NB
<i>Limosa haemastica</i>	udsonian Woodcock	Threatened			S3S4M	25	4 ± 0.0	NB
<i>Anguilla rostrata</i>	American Eel	Threatened		Threatened	S4	12	± 1.0	NB
<i>Coturnicops noveboracensis</i>	Yellow Rail	Special Concern	Special Concern	Special Concern	S1B,S1M	3	4 ± 7.0	NB
<i>Histrionicus histrionicus pop. 1</i>	Carolinian - Eastern pop.	Special Concern	Special Concern	Endangered	S1B,S1S2N,S2M	5	4 ± 0.0	NB
<i>Asio flammeus</i>	Short-eared Owl	Special Concern	Special Concern	Special Concern	S2B,S2M	15	53.0 ± 0.0	NB
<i>Bucephala islandica (Eastern pop.)</i>	Barrow's Goldeneye - Eastern pop.	Special Concern	Special Concern	Special Concern	S2M,S2N	53	0.4 ± 0.0	NB
<i>Salmo salar pop. 12</i>	Atlantic Salmon - Aspect - Southern Basin St. Lawrence pop.	Special Concern		Special Concern	S2S3	456	4 ± 0.0	NB
<i>Balaenoptera physalus</i>	Fin Whale	Special Concern	Special Concern		S2S3	3	± 0.0	NB
<i>Acipenser brevirostrum</i>	Shortnose Sturgeon	Special Concern	Special Concern	Special Concern	S3	11	1.6 ± 10.0	NB
<i>Chelydra serpentina</i>	Snapping Turtle	Special Concern	Special Concern	Special Concern	S3	73	1.2 ± 0.0	NB
<i>Euphagus carolinus</i>	Rusty Blackbird	Special Concern	Special Concern	Special Concern	S3B,S3M	237	10.7 ± 7.0	NB
<i>Contopus cooperi</i>	Olive-sided Chat	Special Concern	Threatened		S3B,S3M	713	6.1 ± 7.0	NB
<i>Coccothraustes vespertinus</i>	Evening Grosbeak	Special Concern	Special Concern		S3B,S3S4N,S4M	30	6.1 ± 7.0	NB
<i>Chordeiles minor</i>	Common Nighthawk	Special Concern	Threatened	Threatened	S3B,S4M	51	3 ± 7.0	NB
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Special Concern	Special Concern		S3M	5	0.7 ± 0.0	NB
<i>Phocoena phocoena pop. 1</i>	Northwest Atlantic Poppy - Northwest Atlantic pop.	Special Concern		Special Concern	S4	2	76.5 ± 100.0	NB
<i>Chrysemys picta picta</i>	Eastern Painted Turtle	Special Concern			S4	73	15.6 ± 0.0	NB
<i>Contopus virens</i>	Eastern Wood-Peepee	Special Concern	Special Concern	Special Concern	S4B,S4M	16	2.3 ± 0.0	NB
<i>Podiceps auritus</i>	Common Grebe	Special Concern	Special Concern	Special Concern	S4N,S4M	41	33.1 ± 0.0	NB
<i>Calidris subruficollis</i>	Black-bellied Sandpiper	Special Concern	Special Concern		SN	14	± 1.0	NB

Scientific Name	Common Name	Conservation Status	Special Concern	Provincial Prot	Provincial	Res	Distance	Prov
<i>Falco peregrinus pop. 1</i>	Peregrine Falcon - Anatimundris	Not at Risk	Special Concern	Endangered	S1B,S3M	125	17 0.0	NB
<i>Bubo scandiacus</i>	Snow Owl	Not at Risk			S1N,S2S3M	11	21 1.0	NB
<i>Accipiter cooperii</i>	Cooper's Hawk	Not at Risk			S1S2B,S1S2M	1	3 7.0	NB
<i>Fulica americana</i>	American Coot	Not at Risk			S1S2B,S1S2M	11	61.6 7.0	NB
<i>Sorex dispar</i>	Long-tailed Shrew	Not at Risk			S2	7	70 5.0	NB
<i>Buteo lineatus</i>	Red-shouldered Hawk	Not at Risk			S2B,S2M	64	6.1 7.0	NB
<i>Chlidonias niger</i>	Black Tern	Not at Risk			S2B,S2M	347	17.6 5.0	NB
<i>Globicephala melas</i>	Long-billed Pilot Whale	Not at Risk			S2S3	1	4 1.0	NB
<i>Lynx canadensis</i>	Canadian Lynx	Not at Risk		Endangered	S3	34	20.6 0.0	NB
<i>Desmognathus fuscus</i> (Quebec/New Brunswick pop.)	Northern Hellbender Salamander	Not at Risk			S3	6	6 1.0	NB
<i>Megaptera novaeangliae</i>	Common Noddy	Not at Risk			S3	1	1.0	NB
<i>Sterna hirundo</i>	Common Tern	Not at Risk			S3B,S3M	224	0.4 0.0	NB
<i>Podiceps grisegena</i>	Red-necked Grebe	Not at Risk			S3M,S2N	2	1 0.0	NB
<i>Haliaeetus leucocephalus</i>	Bald Eagle	Not at Risk		Endangered	S4	72	0.4 0.0	NB
<i>Canis lupus</i>	Gray Wolf	Not at Risk		Extirpated	S	3	26.5 1.0	NB
<i>Puma concolor pop. 1</i>	Eastern Cougar	Data deficient		Endangered	SN	60	1.1 1.0	NB
<i>Morone saxatilis</i>	Striped Bass	E,SC			S3	12	1.0	NB
<i>Thryothorus ludovicianus</i>	Carolina Wren				S1	3	10.7 7.0	NB
<i>Salvelinus alpinus</i>	Arctic Char				S1	1	6.2 1.0	NB
<i>Vireo flavifrons</i>	Yellow-throated Vireo				S1B,S1M	10	20.3 7.0	NB
<i>Tringa melanoleuca</i>	Greater Yellowlegs				S1B,S5M	36	5.4 0.0	NB
<i>Aythya americana</i>	Redhead				S1B,S1M		70.0 7.0	NB
<i>Gallinula galeata</i>	Common Gallinule				S1B,S1M	2	15.1 0.0	NB
<i>Antigone canadensis</i>	Sandhill Crane				S1B,S1M		51.7 0.0	NB
<i>Bartramia longicauda</i>	Wetland Sandpiper				S1B,S1M	3	30.5 7.0	NB
<i>Phalaropus tricolor</i>	Wilson's Phalarope				S1B,S1M	40	20 7.0	NB
<i>Leucophaeus atricilla</i>	Laughing Gull				S1B,S1M	4	1.4 1.0	NB
<i>Progne subis</i>	Purple Martin				S1B,S1M	25	2.1 1.0	NB
<i>Oxyura jamaicensis</i>	Ruddy Duck				S1B,S2S3M	41	17.6 5.0	NB
<i>Uria aalge</i>	Common Murre				S1B,S3N,S3M	1	3 0.0	NB
<i>Aythya affinis</i>	Lesser Scaup				S1B,S4M	1	17.0 0.0	NB
<i>Aythya marila</i>	Greater Scaup				S1B,S4M,S2N	32	40.4 7.0	NB
<i>Eremophila alpestris</i>	Wormed Larva				S1B,S4N,S5M	32	7.7 7.0	NB
<i>Sterna paradisaea</i>	Arctic Tern				S1B,S3M	4	7 5.0	NB
<i>Fratercula arctica</i>	Atlantic Puffin				S1B,S3N,S3M	1	3 0.0	NB
<i>Chroicocephalus ridibundus</i>	Black-headed Gull				S1N,S2M	4	1.4 1.0	NB
<i>Branta bernicla</i>	Brant				S1N,S2S3M	17	33.1 0.0	NB
<i>Butorides virescens</i>	Green Heron				S1S2B,S1S2M	21	14.6 0.0	NB
<i>Nycticorax nycticorax</i>	Black-crowned Night-heron				S1S2B,S1S2M		50 0.0	NB
<i>Empidonax traillii</i>	Willow Warbler				S1S2B,S1S2M		6.4 1.0	NB
<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow				S1S2B,S1S2M	26	0.3 0.0	NB
<i>Troglodytes aedon</i>	House Wren				S1S2B,S1S2M	33	2.3 0.0	NB
<i>Rissa tridactyla</i>	Black-leaved Kittiwake				S1S2B,S4N,S5M	1	0.0	NB
<i>Calidris bairdii</i>	Baird's Sandpiper				S1S2M	21	6.2 0.0	NB
<i>Microtus chrotorrhinus</i>	Rock vole				S2	5	2.5 1.0	NB
<i>Cistothorus palustris</i>	Marsh Wren				S2B,S2M	30	15.1 0.0	NB
<i>Mimus polyglottos</i>	Northern Mockingbird				S2B,S2M	112	6.1 7.0	NB
<i>Toxostoma rufum</i>	Brown Thrasher				S2B,S2M	10	0.4 0.0	NB
<i>Poocetes gramineus</i>	Wesper Sparrow				S2B,S2M	0	27.1 7.0	NB
<i>Mareca strepera</i>	Wadwall				S2B,S3M	6	17 30.0	NB
<i>Alca torda</i>	Razorbill				S2B,S3N,S3M	1	0.0	NB
<i>Pinicola enucleator</i>	Pine Grosbeak				S2B,S4S5N,S4	6	17.6 0.0	NB

Scientific Name	Common Name	CEC	Prov Legal Prot	Prov Parity	Res	Distance (m)	Prov
<i>Tringa solitaria</i>	Solitary Sandpiper			S5M			
<i>Oceanodroma leucorhoa</i>	Leach's Storm-Petrel			S2B,S5M	120	3.5 ± 0.0	NB
<i>Anser caerulescens</i>	Snow Goose			S2B,S3M	1	3 ± 0.0	NB
<i>Phalacrocorax carbo</i>	Great Cormorant			S2M	6	7.2 ± 0.0	NB
<i>Somateria spectabilis</i>	King Eider			S2N,S2M		0.4 ± 0.0	NB
<i>Larus hyperboreus</i>	Black-throated Loon			S2N,S2M	1	2 ± 0.0	NB
<i>Asio otus</i>	Long-eared Owl			S2N,S2M		11.0 ± 50.0	NB
<i>Picoides dorsalis</i>	American Three-toed Woodpecker			S2S3	16	7 ± 0.0	NB
<i>Spatula clypeata</i>	Northern Shoveler			S2S3	26	10.3 ± 7.0	NB
<i>Myiarchus crinitus</i>	Great Crested Flycatcher			S2S3B,S2S3M	1	5.0 ± 0.0	NB
<i>Petrochelidon pyrrhonota</i>	Chimney Swift			S2S3B,S2S3M	3	2.7 ± 0.0	NB
<i>Pluvialis dominica</i>	American Golden-Plover			S2S3B,S2S3M	516	2.0 ± 2.0	NB
<i>Calcarius lapponicus</i>	Lapland Longspur			S2S3M	44	20.7 ± 0.0	NB
<i>Cephus grylle</i>	Black-billed Cuckoo			S2S3N,S3M	12	20.3 ± 0.0	NB
<i>Loxia curvirostra</i>	Red Crossbill			S3	3	6 ± 7.0	NB
<i>Spinus pinus</i>	Pine Siskin			S3	124	10.7 ± 7.0	NB
<i>Prosopium cylindraceum</i>	Rounded Tit			S3	250	6.1 ± 7.0	NB
<i>Salvelinus namaycush</i>	Late October			S3	3	45.5 ± 0.0	NB
<i>Sorex maritimensis</i>	Maritime Shrew			S3	7	45.4 ± 0.0	NB
<i>Eptesicus fuscus</i>	Big Brown Bat			S3	1	1 ± 1.0	NB
<i>Cathartes aura</i>	Belted Kingfisher			S3	47	0.5 ± 1.0	NB
<i>Rallus limicola</i>	Virginia Rail			S3B,S3M	313	4.0 ± 0.0	NB
<i>Charadrius vociferus</i>	Killdeer			S3B,S3M	2.5	15.1 ± 0.0	NB
<i>Tringa semipalmata</i>	Willet			S3B,S3M	647	3 ± 7.0	NB
<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo			S3B,S3M	16	27 ± 0.0	NB
<i>Vireo gilvus</i>	Warbling Vireo			S3B,S3M	117	10.7 ± 7.0	NB
<i>Piranga olivacea</i>	Scarlet Tanager			S3B,S3M	2.5	3 ± 7.0	NB
<i>Passerina cyanea</i>	Indigo Bunting			S3B,S3M	345	3 ± 7.0	NB
<i>Molothrus ater</i>	Brown-headed Cowbird			S3B,S3M	132	3 ± 7.0	NB
<i>Icterus galbula</i>	Baltimore Oriole			S3B,S3M	271	3 ± 7.0	NB
<i>Somateria mollissima</i>	Common Eider			S3B,S3M	245	3 ± 7.0	NB
<i>Setophaga tigrina</i>	Cape May Warbler			S3B,S4M,S3N	241	11.0 ± 1 ± 0	NB
<i>Anas acuta</i>	Northern Pintail			S3B,S4S5M	166	3 ± 7.0	NB
<i>Mergus serrator</i>	Red-breasted Merganser			S3B,S5M	51	10.7 ± 7.0	NB
<i>Arenaria interpres</i>	Red-throated Diver			S3B,S5M,S4S5N	54	3.3 ± 1.0	NB
<i>Phalaropus fulicarius</i>	Red Phalarope			N			
<i>Melanitta americana</i>	Black Scoter			S3M	1	61 ± 0.0	NB
<i>Bucephala albeola</i>	Bluehead			S3M	2	5.5 ± 0.0	NB
<i>Calidris maritima</i>	Purple Sandpiper			S3M,S1S2N	7	11.0 ± 1 ± 0	NB
<i>Uria lomvia</i>	Thick-billed Murre			S3M,S2N	515	0.4 ± 0.0	NB
<i>Synaptomys cooperi</i>	Southern Bobwhite			S3M,S3N	41	5 ± 0.0	NB
<i>Tyrannus tyrannus</i>	Eastern Kingbird			S3N,S3M	1	100.0 ± 0.0	NB
<i>Actitis macularia</i>	Spotted Sandpiper			S3S4	1	14.7 ± 1.0	NB
<i>Gallinago delicata</i>	Wilson's Snipe			S3S4B,S3S4M	724	3.5 ± 0.0	NB
<i>Larus delawarensis</i>	Ring-billed Gull			S3S4B,S5M	73	0.4 ± 0.0	NB
<i>Setophaga striata</i>	Blackpoll Warbler			S3S4B,S5M	46	5.3 ± 12.0	NB
<i>Pluvialis squatarola</i>	Black-bellied Plover			S3S4B,S5M	22	0.4 ± 0.0	NB
<i>Calidris pusilla</i>	Semipalmated Sandpiper			S3S4B,S5M	50	10.7 ± 7.0	NB
<i>Calidris melanotos</i>	Pectoral Sandpiper			S3S4M	211	27 ± 0.0	NB
<i>Calidris alba</i>	Sanderling			S3S4M	217	5.3 ± 12.0	NB
<i>Morus bassanus</i>	Northern Annulet			S3S4M	116	5.0 ± 0.0	NB
<i>Quercus macrocarpa</i> - <i>Acer rubrum</i> / <i>Onoclea sensibilis</i> - <i>Carex arcta</i> Forest	Box-Old-Red Maple			S3S4M,S1N	112	1 ± 0.0	NB
<i>Carex arcta</i> Forest	Clustered Sedge Forest			S3B,S5M		57 ± 0.0	NB
<i>Acer saccharinum</i> / <i>Onoclea</i>	Silver Maple Sensitive Forest			S2	1	54.1 ± 0.0	NB
				S3	1	3 ± 3 ± 0.0	NB

Scientific Name	Common Name	Conservation Status	Province	Priority	Count	Distance (m)	Province	
<i>sensibilis</i> - <i>Lysimachia terrestris</i> Forest	- Swamp Yellow Loosestrife Forest							
<i>Acer saccharum</i> - <i>Fraxinus americana</i> / <i>Gymnocarpium dryopteris</i> - <i>Deparia acrostichoides</i> Forest	Scarlet Maple - White Birch Common Oak Forest - Silver Maple Forest			S3	2	7000.0	NB	
<i>Acer saccharum</i> - <i>Fraxinus americana</i> / <i>Polystichum acrostichoides</i> Forest	Scarlet Maple - White Birch Christmas Oak Forest			S3S4	2	6120.0	NB	
<i>Cicindela marginipennis</i>	Coalstone Miner Beetle	Endangered	Endangered	Endangered	S1	215	5000.0	NB
<i>Gomphus ventricosus</i>	Spillet Caddisfly	Endangered	Endangered	Endangered	S1S2	5	15.500.0	NB
<i>Danaus plexippus</i>	Monarch	Endangered	Special Concern	Special Concern	S3B,S3M	136	0.600.0	NB
<i>Bombus affinis</i>	Rust-patched Bumble Bee	Endangered	Endangered		S	1	17.605.0	NB
<i>Ophiogomphus howei</i>	Pink Snouttail	Special Concern	Special Concern	Special Concern	S2	20	30500.0	NB
<i>Alasmidonta varicosa</i>	Brook Loater	Special Concern	Special Concern	Special Concern	S2	12	30500.0	NB
<i>Lampsilis cariosa</i>	Yellow Lampshell	Special Concern	Special Concern	Special Concern	S2	104	2001.0	NB
<i>Bombus terricola</i>	Yellow-banded Bumblebee	Special Concern	Special Concern		S3	55	0500.0	NB
<i>Coccinella transversoguttata richardsoni</i>	Transverse Lady Beetle	Special Concern			S	1	07100.0	NB
<i>Appalachina sayana</i>	Spine-lip Crater	Not at Risk			S3	3	0500.0	NB
<i>Conotrachelus juglandis</i>	Acorn Weevil				S1	3	10700.0	NB
<i>Haematopota rara</i>	Shoreline				S1	1	14.701.0	NB
<i>Lycaena dorcas</i>	Dorcas Copper				S1	20	56.100.0	NB
<i>Erora laeta</i>	Earl Cairnstream				S1	11	11007.0	NB
<i>Somatochlora septentrionalis</i>	Mourning Emerald				S1	1	21.401.0	NB
<i>Arigomphus furcifer</i>	Lilypad Caddisfly				S1	23	33000.0	NB
<i>Polites origenes</i>	Crossline Skipper				S1	0	5000.0	NB
<i>Plebejus saepiolus</i>	Greenish Blue				S1S2	3	17.102.0	NB
<i>Ophiogomphus colubrinus</i>	Boreal Snouttail				S1S2	3	14.300.0	NB
<i>Cicindela ancociscenensis</i>	Appalachian Miner Beetle				S2	4	64.300.0	NB
<i>Encyclops caerulea</i>	Blue Horned Beetle				S2	3	15.700.0	NB
<i>Scaphinotus viduus</i>	Blue Round Beetle				S2	2	37.4013.0	NB
<i>Brachyleptura circumdata</i>	Blue Horned Beetle				S2	6	34000.0	NB
<i>Satyrium calanus</i>	Banded Cairnstream				S2	2	5.000.0	NB
<i>Satyrium calanus falacer</i>	Banded Cairnstream				S2	1	20.201.0	NB
<i>Strymon melinus</i>	Green Cairnstream				S2	4	30.402.0	NB
<i>Aeshna clepsydra</i>	Mottled Darner				S2	1	57.500.0	NB
<i>Somatochlora brevicincta</i>	Green Emerald				S2	1	00600.0	NB
<i>Somatochlora tenebrosa</i>	Clamp-tipped Emerald				S2	11	15000.0	NB
<i>Ladona exusta</i>	White Corporal				S2	10	32.200.0	NB
<i>Hetaerina americana</i>	American Ringlet				S2	36	35.200.0	NB
<i>Coenagrion interrogatum</i>	Scarlet Bluet				S2	1	50.200.0	NB
<i>Ischnura posita</i>	Blue Darter				S2	14	16.600.0	NB
<i>Hybomitra frosti</i>	Acorn Weevil				S2S3	1	55.500.0	NB
<i>Tabanus vivax</i>	Acorn Weevil				S2S3	1	63.300.0	NB
<i>Callophrys henrici</i>	Green Elfin				S2S3	16	12.400.0	NB
<i>Celithemis martha</i>	Martha's Pennant				S2S3	0	7000.0	NB
<i>Sphaeroderus nitidicollis</i>	Blue Round Beetle				S3	1	46000.0	NB
<i>Orthosoma brunneum</i>	Blue Horned Beetle				S3	1	56.205.0	NB
<i>Elaphrus americanus</i>	Blue Round Beetle				S3	1	35.000.0	NB
<i>Semanotus terminatus</i>	Blue Horned Beetle				S3	1	17.600.0	NB
<i>Desmocerus palliatus</i>	Elderberry Borer				S3	3	16.000.0	NB
<i>Agonum excavatum</i>	Blue Round Beetle				S3	1	35.000.0	NB
<i>Clivina americana</i>	Blue Round Beetle				S3	1	35.000.0	NB
<i>Olisthopus parmatus</i>	Blue Round Beetle				S3	1	46000.0	NB
<i>Paratachys scitulus</i>	Blue Round Beetle				S3	1	35.000.0	NB
<i>Carabus serratus</i>	Blue Round Beetle				S3	1	64.300.0	NB
<i>Hippodamia parenthesis</i>	Parenthesis Lady Beetle				S3	3	17.600.0	NB

Scientific Name	Common Name	Conservation Status	Province	Legal Protection	Abundance	Frequency	Province
<i>Stenocorus vittiger</i>	Longhorned Beetle			S3	1	35.1	NB
<i>Badister neopulchellus</i>	Round Beetle			S3	1	35.0	NB
<i>Gonotropis dorsalis</i>	Greenish weevil			S3	1	17.6	NB
<i>Naemia seriata</i>	Large Ground Beetle			S3	1	13.3	NB
<i>Ceruchus piceus</i>	Star Beetle			S3	1	34.0	NB
<i>Saperda lateralis</i>	Longhorned Beetle			S3	2	3.4	NB
<i>Hesperia sassacus</i>	Indian Skipper			S3	22	10.7	NB
<i>Euphyes bimacula</i>	Black-spotted Skipper			S3	25	12.3	NB
<i>Lycaena hyllus</i>	Bronze Copper			S3	26	17.0	NB
<i>Satyrium acadica</i>	Canadian Hairstreak			S3	1	7.0	NB
<i>Callophrys polios</i>	Scarlet Elfin			S3	21	11.0	NB
<i>Callophrys eryphon</i>	Western Pine Elfin			S3	2	7.0	NB
<i>Plebejus idas</i>	Northern Blue			S3	1	6.4	NB
<i>Plebejus idas empetri</i>	Crozier Blue			S3	1	0.4	NB
<i>Speyeria aphrodite</i>	Aphrodite Tortillaro			S3	23	10.7	NB
<i>Boloria eunomia</i>	Black Tortillaro			S3	6	46.4	NB
<i>Boloria bellona</i>	Meadow Tortillaro			S3	0	1.6	NB
<i>Boloria chariclea</i>	White Tortillaro			S3	1	4.4	NB
<i>Polygonia satyrus</i>	Satyr Comma			S3	22	17.1	NB
<i>Polygonia gracilis</i>	Scarlet Comma			S3	12	17.1	NB
<i>Nymphalis l-album</i>	Compton Tortoiseshell			S3	12	7.5	NB
<i>Gomphus vastus</i>	Common Caddisfly			S3	7	1.7	NB
<i>Gomphus abbreviatus</i>	Spine-tipped Caddisfly			S3	56	1.0	NB
<i>Gomphaeschna turcillata</i>	Scarlet Hammer			S3	1	15.2	NB
<i>Dorocordulia lepida</i>	Petite Emerald			S3	2	6.1	NB
<i>Somatochlora albicincta</i>	Ringed Emerald			S3	6	70.2	NB
<i>Somatochlora cingulata</i>	Large Emerald			S3	12	6.1	NB
<i>Somatochlora forcipata</i>	Forcipate Emerald			S3	21	6.1	NB
<i>Williamsonia fletcheri</i>	Eastern Borehammer			S3	1	15.5	NB
<i>Lestes eurinus</i>	Common Inlet Spreadwing			S3	15	16.1	NB
<i>Lestes vigilax</i>	Scamp Spreadwing			S3	43	22.1	NB
<i>Enallagma geminatum</i>	Summer Bluelet			S3	32	27.7	NB
<i>Enallagma signatum</i>	Orange Bluelet			S3	41	2.0	NB
<i>Stylurus scudderi</i>	Large Caddisfly			S3	70	5.4	NB
<i>Alasmidonta undulata</i>	Scarlet Loater			S3	45	35.0	NB
<i>Leptodea ochracea</i>	White-tailed Mallet			S3	167	2.0	NB
<i>Striatura ferrea</i>	Black Striate			S3	1	15.0	NB
<i>Neohelix albolabris</i>	Whiteline			S3	3	15.0	NB
<i>Spurwinkia salsa</i>	Saltmarsh Meadow			S3	34	56.0	NB
<i>Pantala hymenaea</i>	Spot-tailed Libeller			S3B,S3M	5	17.6	NB
<i>Satyrium liparops</i>	Striped Hairstreak			S3S4	21	10.7	NB
<i>Cupido comyntas</i>	Eastern Tailed Blue			S3S4	55	2.0	NB
<i>Pannaria lurida</i>	Ringed Shingle Lichen	Threatened	Threatened	S1	5	3.3	NB
<i>Anzia colpodes</i>	Black Foam Lichen	Threatened	Threatened	S1S2	3	2.0	NB
<i>Fuscopannaria leucosticta</i>	White-rimmed Shingle Lichen	Threatened		S2	7	5.0	NB
<i>Pseudevernia cladonia</i>	Host Outlier Lichen	Not at Risk		S2S3	0	67.6	NB
<i>Aphanorhagma serratum</i>	Moss			S1	1	3.6	NB
<i>Bryum muehlenbeckii</i>	Muehlenbecks Broom Moss			S1	1	1.1	NB
<i>Sphagnum macrophyllum</i>	Sphagnum			S1	4	6.5	NB
<i>Coscinodon cribrus</i>	Sieve-toothed Moss			S1	1	6.0	NB
<i>Atrichum angustatum</i>	Lesser Smoothcap Moss			S1	1	5.4	NB
<i>Calliergon trifarium</i>	Three-ranked Moss			S1	1	2.0	NB
<i>Catoclopium nigratum</i>	Black-rolled Moss			S1	1	7.3	NB
<i>Dichelyma falcatum</i>	Moss			S1	2	17.4	NB
<i>Dicranum bonjeanii</i>	Bonjeans Broom Moss			S1	1	17.1	NB
<i>Entodon brevisetus</i>	Moss			S1	1	6.0	NB
<i>Eurhynchium hians</i>	Light Bearded Moss			S1	2	17.1	NB

Scientific Name	Common Name	CEC	Prov Legal Prot	Priority	Pres	Dist	Prov
<i>Racomitrium ericoides</i>	a Moss			S1	1	33.4 ± 3.0	NB
<i>Splachnum pennsylvanicum</i>	Southern Rock Moss			S1	2	20.3 ± 0.0	NB
<i>Platylomella lescurii</i>	a Moss			S1	1	76.4 ± 1.0	NB
<i>Heterodermia squamulosa</i>	Scalloped Lichen			S1	1	7.6 ± 0.0	NB
<i>Peltigera venosa</i>	Man Pelt Lichen			S1	1	50.0 ± 0.0	NB
<i>Jungermannia obovata</i>	Earlapwort			S1S2	1	10.2 ± 0.0	NB
<i>Pallavicinia lyellii</i>	Lellis Ribbonwort			S1S2	1	55.1 ± 0.0	NB
<i>Reboulia hemisphaerica</i>	Purple-marined Liverwort			S1S2	1	13.5 ± 1.0	NB
<i>Brachythecium acuminatum</i>	Acuminate Rafted Moss			S1S2	3	17.1 ± 10.0	NB
<i>Bryum salinum</i>	a Moss			S1S2	1	16.4 ± 1.0	NB
<i>Campyllum radicale</i>	Long-stalked Fine Wet Moss			S1S2	1	17.1 ± 1.0	NB
<i>Ditrichum pallidum</i>	Pale Cow-hair Moss			S1S2	3	17.1 ± 1.0	NB
<i>Drummondia prorepens</i>	a Moss			S1S2	1	70.0 ± 1.0	NB
<i>Fissidens taxifolius</i>	Wide-leaved Pocket Moss			S1S2	4	5.10 ± 0.0	NB
<i>Seligeria brevifolia</i>	a Moss			S1S2	1	62.5 ± 1.0	NB
<i>Sphagnum platyphyllum</i>	Flat-leaved Peat Moss			S1S2	3	17.1 ± 1.0	NB
<i>Tomentypnum falcifolium</i>	Sickle-leaved Olden Moss			S1S2	1	11.3 ± 1.0	NB
<i>Pseudotaxiphyllum distichaceum</i>	a Moss			S1S2	2	15.0 ± 1.0	NB
<i>Bryohaplocladium microphyllum</i>	Thin-leaved Haplocladium Moss			S1S2	1	15.4 ± 1.0	NB
<i>Cystocoleus ebeneus</i>	Rocky Mossamer Lichen			S1S2	1	76.7 ± 0.0	NB
<i>Calypogeia neesiana</i>	Nees Pocketwort			S1S3	1	15.1 ± 1.0	NB
<i>Cephalozia connivens</i>	Corrupted Pinwort			S1S3	1	14.1 ± 0.0	NB
<i>Cephalozia elachista</i>	Spurred Threadwort			S1S3	1	13.2 ± 5.0	NB
<i>Porella pinnata</i>	Pinnate Scalewort			S1S3	2	65.1 ± 1.0	NB
<i>Amphidium mougeotii</i>	a Moss			S2	2	10.0 ± 0.0	NB
<i>Anomodon viticulosus</i>	a Moss			S2	6	13.4 ± 0.0	NB
<i>Cirriphyllum piliferum</i>	Fair-pointed Moss			S2	1	64.6 ± 1.0	NB
<i>Cynodontium strumiferum</i>	Strawmose Tooth Moss			S2	1	10.0 ± 0.0	NB
<i>Dicranella palustris</i>	Hoopin-leaved Horn Moss			S2	2	72.5 ± 100.0	NB
<i>Didymodon ferrugineus</i>	a moss			S2	3	61.7 ± 0.0	NB
<i>Ditrichum flexicaule</i>	Flexible Cow-hair Moss			S2	1	11.7 ± 1.0	NB
<i>Anomodon tristis</i>	a Moss			S2	1	37.4 ± 1.0	NB
<i>Hypnum pratense</i>	Meadow Plait Moss			S2	3	72.0 ± 1.0	NB
<i>Isopterygiopsis pulchella</i>	Neat Sil Moss			S2	1	71.1 ± 1.0	NB
<i>Isothecium myosuroides</i>	Slender Mouse-tail Moss			S2	2	11.7 ± 1.0	NB
<i>Meesia triquetra</i>	Three-ranked Cold Moss			S2	2	57.2 ± 0.0	NB
<i>Physcomitrium immersum</i>	a Moss			S2	7	5.1 ± 0.0	NB
<i>Platydictya jungermanniioides</i>	False Sil Moss			S2	1	16.3 ± 0.0	NB
<i>Seligeria calcarea</i>	Chalk Brittle Moss			S2	1	11.7 ± 1.0	NB
<i>Sphagnum centrale</i>	Central Peat Moss			S2	1	10.2 ± 0.0	NB
<i>Sphagnum lindbergii</i>	Lindbergs Peat Moss			S2	3	11.3 ± 1.0	NB
<i>Tetraplodon mnioides</i>	Entire-leaved Nitrogen Moss			S2	3	12.0 ± 0.0	NB
<i>Tortula mucronifolia</i>	Mucronate Star Moss			S2	1	11.5 ± 0.0	NB
<i>Ulota phyllantha</i>	a Moss			S2	2	16.3 ± 0.0	NB
<i>Anomobryum filiforme</i>	a moss			S2	1	17.1 ± 1.0	NB
<i>Leptogium corticola</i>	Blistered Jellys Lichen			S2	2	11.5 ± 1.0	NB
<i>Leptogium milligranum</i>	Stretched Jellys Lichen			S2	2	75.6 ± 0.0	NB
<i>Nephroma laevigatum</i>	Mustard Bed Lichen			S2	1	75.0 ± 0.0	NB
<i>Peltigera lepidophora</i>	Scalloped Pelt Lichen			S2	2	51.0 ± 0.0	NB
<i>Anomodon minor</i>	Bent-leaved Anomodon Moss			S2	1	71.0 ± 1.0	NB
<i>Brachythecium digastrum</i>	a Moss			S2	2	17.1 ± 1.0	NB
<i>Bryum pallescens</i>	Pale Brown Moss			S2	2	54.4 ± 1.0	NB
<i>Dichelyma capillaceum</i>	Hairy Thelma Moss			S2	2	32.4 ± 4.0	NB
<i>Dicranum spurium</i>	Spurred Broom Moss			S2	3	11.0 ± 2.0	NB

Scientific Name	Common Name	Code	Prov Legal Prot	Priority	Reps	Distance (m)	Prov
<i>Schistostega pennata</i>	Laminos Moss	S2			5	17.1 ± 1.0	NB
<i>Seligeria campylopoda</i>	a Moss	S2			1	61.7 ± 0.0	NB
<i>Seligeria diversifolia</i>	a Moss	S2			1	60.0 ± 0.0	NB
<i>Sphagnum angermanicum</i>	a Peatmoss	S2			2	66.4 ± 1.0	NB
<i>Plagiomnium rostratum</i>	Long-leaved Leaf Moss	S2			1	11.1 ± 1.0	NB
<i>Collema leptaleum</i>	Crumpled Bat's Ear Lichen	S2			5	5.6 ± 0.0	NB
<i>Physcia subtilis</i>	Slender Rosette Lichen	S2			1	51.3 ± 0.0	NB
<i>Buxbaumia aphylla</i>	Brown Shield Moss	S2S3			2	10.0 ± 15.0	NB
<i>Calliergonella cuspidata</i>	Common Larrea Wetland Moss	S2S3			4	5.1 ± 0.0	NB
<i>Campyllum polygamum</i>	a Moss	S2S3			1	56.7 ± 1.0	NB
<i>Palustriella falcata</i>	a Moss	S2S3			1	11.7 ± 1.0	NB
<i>Didymodon rigidulus</i>	Rigid Star Moss	S2S3			3	1.3 ± 0.0	NB
<i>Ephemerum serratum</i>	a Moss	S2S3			1	5.2 ± 0.0	NB
<i>Fissidens bushii</i>	Bush's Pocket Moss	S2S3			6	62.4 ± 1.0	NB
<i>Neckera complanata</i>	a Moss	S2S3			3	11.7 ± 1.0	NB
<i>Orthotrichum speciosum</i>	Shoestring Bristle Moss	S2S3			6	5.7 ± 0.0	NB
<i>Racomitrium fasciculare</i>	a Moss	S2S3			1	11.3 ± 0.0	NB
<i>Scorpidium scorpioides</i>	Spotted Scorpion Moss	S2S3			5	75.0 ± 1.0	NB
<i>Sphagnum subfulvum</i>	a Peatmoss	S2S3			4	13.0 ± 0.0	NB
<i>Taxiphyllum deplanatum</i>	Imbricate Leaf-leaved Moss	S2S3			2	61.7 ± 0.0	NB
<i>Zygodon viridissimus</i>	a Moss	S2S3			2	12.4 ± 5.0	NB
<i>Schistidium agassizii</i>	Elbow Bloom Moss	S2S3			2	12.0 ± 2.0	NB
<i>Loeskeobryum brevirostre</i>	a Moss	S2S3			1	11.7 ± 1.0	NB
<i>Dendriscoaulon umhausense</i>	a lichen	S2S3			1	11.0 ± 0.0	NB
<i>Punctelia caseana</i>		S2S3			3	74.2 ± 0.0	NB
<i>Cynodontium tenellum</i>	Delicate Tooth Moss	S3			1	16.4 ± 1.0	NB
<i>Hypnum curvifolium</i>	Curved-leaved Plait Moss	S3			2	75.6 ± 0.0	NB
<i>Tortella fragilis</i>	Fragile Spotted Moss	S3			1	37.6 ± 0.0	NB
<i>Schistidium maritimum</i>	a Moss	S3			2	16.3 ± 0.0	NB
<i>Collema nigrescens</i>	Blistered Earpaper Lichen	S3			1	75.2 ± 0.0	NB
<i>Solorina saccata</i>	Woodland Owl Lichen	S3			1	51.0 ± 0.0	NB
<i>Cladonia strepsilis</i>	Olive Cladonia Lichen	S3			2	11.0 ± 2.0	NB
<i>Hypotrachyna catawbiensis</i>	Powder-tipped Antler Lichen	S3			1	11.0 ± 2.0	NB
<i>Leptogium lichenoides</i>	Scattered Jellyskin Lichen	S3			1	50.0 ± 0.0	NB
<i>Nephroma resupinatum</i>	a lichen	S3			3	75.3 ± 0.0	NB
<i>Usnea strigosa</i>	Bush Beard Lichen	S3			3	76.1 ± 0.0	NB
<i>Leptogium laceroides</i>	Short-eared Jellyskin Lichen	S3			2	75.2 ± 0.0	NB
<i>Peltigera membranacea</i>	Membrane Pelt Lichen	S3			6	11.6 ± 0.0	NB
<i>Cladonia deformis</i>	Lesser Spherp Lichen	S3			1	11.0 ± 2.0	NB
<i>Aulacomnium androgynum</i>	Little Groove Moss	S3			6	10.4 ± 1.0	NB
<i>Dicranella rufescens</i>	Red Forelet Moss	S3			2	17.3 ± 4.0	NB
<i>Sphagnum lescurii</i>	a Peatmoss	S3			2	10.3 ± 1.0	NB
<i>Sphagnum inundatum</i>	a Sphagnum	S3			2	46.0 ± 0.0	NB
<i>Leptogium subtile</i>	Compressed Jellyskin Lichen	S3			6	5.0 ± 0.0	NB
<i>Rostania occultata</i>	Crested Earpaper Lichen	S3			1	5.6 ± 0.0	NB
<i>Anomodon rugelii</i>	Rugel's Anomodon Moss	S3S4			1	72.0 ± 0.0	NB
<i>Barbula convoluta</i>	Lesser Bird's-foot Beard Moss	S3S4			1	11.3 ± 0.0	NB
<i>Brachythecium velutinum</i>	Velvet Rafted Moss	S3S4			6	11.0 ± 4.0	NB
<i>Dicranella cerviculata</i>	a Moss	S3S4			3	16.4 ± 1.0	NB
<i>Dicranella varia</i>	a Moss	S3S4			3	11.7 ± 2.0	NB
<i>Dicranum majus</i>	Greater Broom Moss	S3S4			4	10.0 ± 15.0	NB
<i>Fissidens bryoides</i>	Lesser Pocket Moss	S3S4			4	4.0 ± 0.0	NB
<i>Helodium blandowii</i>	Wetland-plume Moss	S3S4			3	71.1 ± 1.0	NB
<i>Heterocladium dimorphum</i>	Dimorphic Fan Moss	S3S4			1	12.0 ± 2.0	NB

Scientific Name	Common Name	Conservation Status	Endangered	Threatened	Special Concern	Provincial Prot	Rank	Area	Prov
<i>Isopterygopsis muelleriana</i>	a Moss					S3S4	7	1000 4.0	NB
<i>Myurella julacea</i>	Small Moose-tail Moss					S3S4	2	1000 4.0	NB
<i>Physcomitrium pyriforme</i>	Pear-shaped Fern Moss					S3S4	7	51 0.0	NB
<i>Pogonatum dentatum</i>	Mountain Hair Moss					S3S4	1	64 1.0	NB
<i>Sphagnum quinquefarium</i>	Five-ranked Peat Moss					S3S4	1	17 1.0	NB
<i>Sphagnum torreyanum</i>	a Peatmoss					S3S4	4	06 1.0	NB
<i>Sphagnum austinii</i>	Stinis Peat Moss					S3S4	1	73 1.0	NB
<i>Sphagnum contortum</i>	Listed Peat Moss					S3S4	1	50 0.0	NB
<i>Tetraphis geniculata</i>	Eniculate Hair-tooth Moss					S3S4	5	20 0.0	NB
<i>Tetraplodon angustatus</i>	Moss					S3S4	1	64 1.0	NB
<i>Tomentypnum nitens</i>	Olden Green Moss					S3S4	1	51 3.0	NB
<i>Weissia controversa</i>	Green-Cushioned Weissia					S3S4	2	52 0.0	NB
<i>Abietinella abietina</i>	Irish Fern Moss					S3S4	1	5 0.0	NB
<i>Trichostomum tenuirostre</i>	Mid-Soil Moss					S3S4	5	617 0.0	NB
<i>Limprichtia revolvens</i>	a Moss					S3S4	2	626 0.0	NB
<i>Rauvella scita</i>	Smaller Fern Moss					S3S4	6	65 3.0	NB
<i>Pannaria rubiginosa</i>	Brown-Redded Shingle Lichen					S3S4	15	15 0.0	NB
<i>Pseudocyphellaria holarctica</i>	Yellow Spotted Lichen					S3S4	42	3 0.0	NB
<i>Leptogium teretiusculum</i>	Beaded Jelly Lichen					S3S4	1	53 0.0	NB
<i>Cladonia terrae-novae</i>	Neotropical Reindeer Lichen					S3S4	2	10 2.0	NB
<i>Cladonia floerkeana</i>	Brit British Soldiers Lichen					S3S4	1	05 0.0	NB
<i>Vahlia leucophaea</i>	Shelter Shingle Lichen					S3S4	1	15.5 0.0	NB
<i>Montanelia panniformis</i>	Shingled Camouflage Lichen					S3S4	1	76.7 0.0	NB
<i>Nephroma parile</i>	Powdered Lichen					S3S4	5	5.5 0.0	NB
<i>Protopannaria pezizoides</i>	Brown-Fram Moss-shingle Lichen					S3S4	6	62 0.0	NB
<i>Usnea subrubicunda</i>	Reddish Beard Lichen					S3S4	1	10 2.0	NB
<i>Fuscopannaria soledata</i>	a Lichen					S3S4	5	15 1.0	NB
<i>Pannaria conoplea</i>	Meal-Crusted Shingle Lichen					S3S4	17	47 0.0	NB
<i>Anaptychia palmulata</i>	Shagreened Lichen					S3S4	3	76.6 0.0	NB
<i>Peltigera neopolydactyla</i>	Ind Latin Pelt Lichen					S3S4	1	10 2.0	NB
<i>Dermatocarpon luridum</i>	Brookside Stipple Lichen					S3S4	14	31 0.0	NB
<i>Grimmia anodon</i>	Toothless Grimmiid Moss					S1	2	1 10.0	NB
<i>Leucodon brachypus</i>	a Moss					S1	3	2 10.0	NB
<i>Orthotrichum gymnostomum</i>	a Moss					S1	1	31.6 10.0	NB
<i>Thelia hirtella</i>	a Moss					S1	1	72.5 100.0	NB
<i>Cyrto-hypnum minutulum</i>	in Cedar Moss					S1	3	7.6 10.0	NB
<i>Juglans cinerea</i>	Bitternut	Endangered	Endangered	Endangered		S1	724	1.5 0.0	NB
<i>Polemonium vanbruntiae</i>	Blue Bonts Jacons-ladder	Threatened	Threatened	Threatened		S1	72	5 1.0	NB
<i>Fraxinus nigra</i>	Black Ash	Threatened				S4S5	7	2.3 1.0	NB
<i>Symphyotrichum praealtum</i>	Willow-leaved Aster	Threatened	Threatened			SN1	1	5 1.0	NB
<i>Isoetes prototypus</i>	Prototype Illort	Special Concern	Special Concern	Endangered		S2	23	12.4 0.0	NB
<i>Symphyotrichum anticostense</i>	Anticosti Aster	Special Concern	Special Concern	Endangered		S2S3	65	1.5 0.0	NB
<i>Pterospora andromedea</i>	Woodland Pinedrops			Endangered		S1	33	1.4 0.0	NB
<i>Cryptotaenia canadensis</i>	Canada Boneort					S1	4	55 1.0	NB
<i>Sanicula trifoliata</i>	Larva-Fluted Sanicle					S1	26	4.1 0.0	NB
<i>Antennaria parlinii ssp. fallax</i>	Parlin's Puss-toes					S1	7	66.7 0.0	NB
<i>Antennaria howellii ssp. petaloidea</i>	Puss-toes					S1	1	6.5 1.0	NB
<i>Bidens discoidea</i>	Samp Bearties					S1	4	45 0.0	NB
<i>Pseudognaphalium obtusifolium</i>	Eastern Cideed					S1	2	67 0.0	NB
<i>Helianthus decapetalus</i>	Ten-raided Sunflower					S1	21	3.6 1.0	NB

Scientific Name	Common Name	CEC	Prov Legal Prot	Priority	Reqs	Instance	Prov
<i>Hieracium paniculatum</i>	Panicled Yellowweed		S1		4	100.00	NB
<i>Hieracium robinsonii</i>	Robinson's Yellowweed		S1		1	63.00	NB
<i>Symphytotrichum laeve</i>	Smooth Aster		S1		6	47.10	NB
<i>Canadanthus modestus</i>	Great Northern Aster		S1		12	74.30	NB
<i>Andersonglossum boreale</i>	Northern Wild Comfrey		S1		14	64.00	NB
<i>Cardamine parviflora</i>	Small-lobed Bitterress		S1		3	16.00	NB
<i>Cardamine concatenata</i>	Cleft-leaved Toothwort		S1		15	17.10	NB
<i>Draba arabisans</i>	Rock hitlow-rass		S1		3	0.50	NB
<i>Draba cana</i>	Lance-leaved Draba		S1		10	15.50	NB
<i>Draba glabella</i>	Rock hitlow-rass		S1			4.10	NB
<i>Mononeuria groenlandica</i>	Greenland Stitchwort		S1		2	7.70	NB
<i>Chenopodium simplex</i>	Maple-leaved Goosefoot		S1		7	6.10	NB
<i>Blitum capitatum</i>	Strawberry-leaved Goosefoot		S1		5	16.50	NB
<i>Callitriche terrestris</i>	Terrestrial Water-Starwort		S1		1	3.70	NB
<i>Hypericum virginicum</i>	Virginia St. John's-wort		S1		7	36.10	NB
<i>Viburnum acerifolium</i>	Maple-leaved Viburnum		S1		11	5.00	NB
<i>Drosera anglica</i>	English Sundew		S1		1	57.20	NB
<i>Drosera linearis</i>	Slender-Leaved Sundew		S1		1	57.20	NB
<i>Corema conradii</i>	Broom Crowberry		S1		1	6.10	NB
<i>Vaccinium boreale</i>	Northern Blueberry		S1		1	1.60	NB
<i>Vaccinium corymbosum</i>	Highbush Blueberry		S1			65.00	NB
<i>Hylodesmum glutinosum</i>	Larrea Pitcher-plant		S1			5.20	NB
<i>Lespedeza capitata</i>	Round-headed Bush-clover		S1		11	5.20	NB
<i>Gentiana rubricaulis</i>	Purple-stemmed Gentian		S1		15	60.70	NB
<i>Ribes cynosbati</i>	Purple Gooseberry		S1		1	6.13	NB
<i>Proserpinaca pectinata</i>	Combed-leaved Mermaidweed		S1		1	4.30	NB
<i>Pycnanthemum virginianum</i>	Virginia Mountain Mint		S1		4	1.70	NB
<i>Decodon verticillatus</i>	Samp Loosestrife		S1		4	35.30	NB
<i>Polygala verticillata</i>	Whorled Milkwort		S1		2	64.40	NB
<i>Lysimachia hybrida</i>	Lowland Yellow Loosestrife		S1		16	0.60	NB
<i>Lysimachia quadrifolia</i>	Whorled Yellow Loosestrife		S1		14	7.50	NB
<i>Hepatica acutiloba</i>	Sharp-lobed Liverwort		S1		11	77.20	NB
<i>Coptidium lapponicum</i>	Lapland Bitterwort		S1		1	7.30	NB
<i>Ranunculus sceleratus</i>	Cursed Buttercup		S1			17.20	NB
<i>Crataegus jonesiae</i>	Jones Hawthorn		S1		6	15.50	NB
<i>Potentilla canadensis</i>	Canada Cinquefoil		S1		1	7.70	NB
<i>Geum fragarioides</i>	Barren Strawberry		S1		27	4.10	NB
<i>Galium brevipes</i>	Limestone Samp Bedstraw		S1		5	50.40	NB
<i>Saxifraga paniculata ssp. laestadii</i>	Laestadius Saxifrage		S1			7.10	NB
<i>Agalinis tenuifolia</i>	Slender Galinopsis		S1			15.30	NB
<i>Agalinis purpurea var. parviflora</i>	Small-lobed Purple Galinopsis		S1		10	13.60	NB
<i>Gratiola lutea</i>	Golden Bedstraw		S1		2	4.50	NB
<i>Pedicularis canadensis</i>	Canada Loosewort		S1		23	4.00	NB
<i>Viola canadensis</i>	Canada Violet		S1		6	62.00	NB
<i>Viola sagittata var. ovata</i>	Arrow-leaved Violet		S1		15	14.30	NB
<i>Alisma subcordatum</i>	Southern Water Plantain		S1			3.20	NB
<i>Carex annectens</i>	Yellow-flowered Sedge		S1		1	62.30	NB
<i>Carex backii</i>	Rock Mountain Sedge		S1		5	15.40	NB
<i>Carex blanda</i>	Eastern Woodland Sedge		S1		1	62.10	NB
<i>Carex cephaloidea</i>	Thin-leaved Sedge		S1		31	12.00	NB
<i>Carex merritt-feraldii</i>	Merritt Fernald's Sedge		S1		2	3.70	NB
<i>Carex sterilis</i>	Sterile Sedge		S1		12	1.00	NB
<i>Carex grisea</i>	Inflated Narrow-leaved Sedge		S1		15	3.10	NB
<i>Carex saxatilis</i>	Russet Sedge		S1		14	0.00	NB
<i>Cyperus diandrus</i>	Lowland Sedge		S1		7	4.20	NB

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<i>Cyperus lupulinus</i>	Top Matsedge		S1		30	46.6 ± 0.0	NB
<i>Cyperus lupulinus ssp. macilentus</i>	Top Matsedge		S1		31	51.6 ± 0.0	NB
<i>Eleocharis flavescens var. olivacea</i>	Bright-green Spikerush		S1		3	5.7 ± 1.0	NB
<i>Rhynchospora capillacea</i>	Slender Beakrush		S1		3	2.4 ± 0.0	NB
<i>Scirpus pendulus</i>	Canadian Bikerush		S1		1	5.1 ± 0.0	NB
<i>Sisyrinchium angustifolium</i>	Narrow-leaved Blue-eyed-grass		S1		6	35.3 ± 0.0	NB
<i>Juncus greenii</i>	Greens Rush		S1		1	3 ± 0.0	NB
<i>Juncus subtilis</i>	Creeping Rush		S1		1	66.0 ± 5.0	NB
<i>Allium canadense</i>	Canada Garlic		S1		11	1.6 ± 0.0	NB
<i>Goodyera pubescens</i>	Orange Rattlesnake-Plantain		S1		3	15 ± 0.0	NB
<i>Malaxis monophyllus var. brachypoda</i>	North American Whiteadder's-mouth		S1		12	3 ± 0.0	NB
<i>Platanthera flava</i>	Southern Rein-Orchid		S1		1	5 ± 1.0	NB
<i>Platanthera flava var. herbiola</i>	Pale Green Orchid		S1		13	2 ± 10.0	NB
<i>Platanthera macrophylla</i>	Large Round-Leaved Orchid		S1		4	15.5 ± 1.0	NB
<i>Spiranthes casei</i>	Case's Ladies-tresses		S1		6	3 ± 0.0	NB
<i>Bromus pubescens</i>	Hairy Wood Bromegrass		S1		6	53.6 ± 0.0	NB
<i>Cinna arundinacea</i>	Sweet Wood Reed Grass		S1		23	53.0 ± 0.0	NB
<i>Danthonia compressa</i>	Flattened Oat Grass		S1		4	35.7 ± 0.0	NB
<i>Dichanthelium xanthophyllum</i>	Slender Panicgrass		S1		6	70.6 ± 0.0	NB
<i>Dichanthelium dichotomum</i>	Wood Panicgrass		S1		20	5.7 ± 1.0	NB
<i>Elymus hystrix</i>	Spreading Wild Rice		S1		51	47.6 ± 1.0	NB
<i>Festuca subverticillata</i>	Nodding Fescue		S1		32	72.0 ± 0.0	NB
<i>Glyceria obtusa</i>	Atlantianna Grass		S1		6	6.4 ± 0.0	NB
<i>Sporobolus compositus</i>	Roundtopseed		S1		17	0.2 ± 0.0	NB
<i>Potamogeton friesii</i>	Fries Pondweed		S1		6	13.7 ± 5.0	NB
<i>Potamogeton nodosus</i>	Long-leaved Pondweed		S1		1	22 ± 1.0	NB
<i>Potamogeton strictifolius</i>	Straight-leaved Pondweed		S1		2	6 ± 0.0	NB
<i>Xyris difformis</i>	Bobble-eyed-grass		S1		3	2.3 ± 0.0	NB
<i>Asplenium ruta-muraria var. cryptolepis</i>	White Splenwort		S1		4	7 ± 1.0	NB
<i>Dryopteris clintoniana</i>	Clinton's Wood Fern		S1		13	5.5 ± 0.0	NB
<i>Sceptridium oneidense</i>	White-leaved Moonwort		S1			32.2 ± 0.0	NB
<i>Sceptridium rugulosum</i>	Rough-leaved Fern		S1		5	4.3 ± 0.0	NB
<i>Schizaea pusilla</i>	Little Chaingrass Fern		S1		22	7.4 ± 0.0	NB
<i>Cuscuta campestris</i>	Field Dodder		S1		3	61.7 ± 10.0	NB
<i>Polygonum aviculare ssp. neglectum</i>	Narrow-leaved Knotweed		S1		7	17.1 ± 5.0	NB
<i>Galium trifidum ssp. subbiflorum</i>	Three-petaled Bedstraw		S1		1	6.7 ± 1.0	NB
<i>Carex laxiflora</i>	Loose-flowered Sedge		S1		2	6.5 ± 0.0	NB
<i>Carex appalachica</i>	Appalachian Sedge		S1		1	6.2 ± 0.0	NB
<i>Sisyrinchium mucronatum</i>	Michaux's Blue-eyed-grass		S1		3	65.5 ± 0.0	NB
<i>Wolffia columbiana</i>	Colombian Watermeal		S1		6	15.3 ± 0.0	NB
<i>Micranthes virginiana</i>	Earl Saxifrage		S1S2		14	0.5 ± 1.0	NB
<i>Potamogeton bicupulatus</i>	Snailseed Pondweed		S1S2		5	5.7 ± 0.0	NB
<i>Selaginella rupestris</i>	Rock Spinemoss		S1S2		7	0.1 ± 0.0	NB
<i>Coryphopteris simulata</i>	Bob Fern		S1S2		20	45.0 ± 0.0	NB
<i>Cuscuta cephalanthi</i>	Buttonish Dodder		S1S3		2	0 ± 0.0	NB
<i>Spiranthes arcisepala</i>	Appalachian Ladies-tresses		S1S3		5	22.0 ± 0.0	NB
<i>Neottia bifolia</i>	Southern White-lily		S2	Endangered	16	25.0 ± 0.0	NB
<i>Osmorhiza longistylis</i>	Smooth Sweet Cicely		S2		10	5.4 ± 5.0	NB
<i>Sanicula odorata</i>	Clustered Sanicle		S2		2	5.7 ± 0.0	NB

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<i>Solidago racemosa</i>	Racemose Goldenrod		S2		23	0.7 ± 1.0	NB
<i>Ionactis linariifolia</i>	Narrow-leaved Aster		S2		20	14.3 ± 0.0	NB
<i>Symphotrichum racemosum</i>	Small White Aster		S2		13	32.1 ± 0.0	NB
<i>Pseudognaphalium macounii</i>	Macoun's Chickweed		S2		13	0.3 ± 0.0	NB
<i>Impatiens pallida</i>	Pale Jewelweed		S2		6	16.1 ± 0.0	NB
<i>Alnus serrulata</i>	Smooth Alder		S2		62	4.2 ± 1.0	NB
<i>Betula minor</i>	Narrow-leaved Birch		S2		1	10.0 ± 0.0	NB
<i>Boechnera stricta</i>	Common's Rock-rose		S2		12	0.3 ± 0.0	NB
<i>Sagina nodosa</i>	Spotted Pearlwort		S2		1	5.4 ± 1.0	NB
<i>Stellaria longifolia</i>	Long-leaved Starwort		S2		13	17.1 ± 10.0	NB
<i>Atriplex glabruscula</i> var. <i>franktonii</i>	Frankton's Salt-tash		S2		1	5.0 ± 1.0	NB
<i>Oxybasis rubra</i>	Red Goosefoot		S2		4	0.6 ± 1.0	NB
<i>Hypericum x dissimulatum</i>	Spotted St. John's-wort		S2		2	31.6 ± 0.0	NB
<i>Triosteum aurantiacum</i>	Orange-tinted Wintergreen		S2		1	1.0 ± 0.0	NB
<i>Viburnum lentago</i>	Nannyberry		S2		133	42.3 ± 0.0	NB
<i>Viburnum recognitum</i>	Northern Arrow-wood		S2		1.5	47.1 ± 0.0	NB
<i>Astragalus eucosmus</i>	Elegant Milk-vetch		S2		12	1.6 ± 0.0	NB
<i>Oxytropis campestris</i>	Field Lotusweed		S2		2	4.3 ± 0.0	NB
<i>Oxytropis campestris</i> var. <i>johannensis</i>	Field Lotusweed		S2		14	2.3 ± 1.0	NB
<i>Quercus macrocarpa</i>	Black Oak		S2		100	1.3 ± 0.0	NB
<i>Gentiana linearis</i>	Narrow-leaved Gentian		S2		1	17.4 ± 1.0	NB
<i>Myriophyllum humile</i>	Low Water Milfoil		S2		16	31.6 ± 1.0	NB
<i>Proserpinaca palustris</i>	Marsh Mermaidweed		S2		50	31.2 ± 0.0	NB
<i>Hedeoma pulegioides</i>	American False Pennyroyal		S2		13	12.3 ± 0.0	NB
<i>Nuphar x rubrodisca</i>	Red-discoloured Pond-lily		S2		16	22.0 ± 0.0	NB
<i>Aphyllon uniflorum</i>	One-flowered Broomrape		S2		14	47.0 ± 1.0	NB
<i>Polygaloides paucifolia</i>	Spotted Milkwort		S2		21	20.1 ± 0.0	NB
<i>Polygala senega</i>	Senega Snakeroot		S2		34	12.2 ± 1.0	NB
<i>Persicaria amphibia</i> var. <i>emersa</i>	Long-root Smartweed		S2		54	1.3 ± 1.0	NB
<i>Persicaria careyi</i>	Carey's Smartweed		S2		17	17.2 ± 1.0	NB
<i>Podostemum ceratophyllum</i>	Long-leaved Riverweed		S2		4	34.4 ± 0.0	NB
<i>Anemone multifida</i>	Clay-leaved Anemone		S2		5	0.7 ± 0.0	NB
<i>Hepatica americana</i>	Round-leaved Hepatica		S2		6	1.6 ± 1.0	NB
<i>Ranunculus flabellaris</i>	Yellow-flowered Buttercup		S2		24	20.0 ± 0.0	NB
<i>Crataegus scabrifolia</i>	Rough Hawthorn		S2		0	57.0 ± 1.0	NB
<i>Crataegus succulenta</i>	Fleshy Hawthorn		S2		1	17.1 ± 5.0	NB
<i>Rosa acicularis</i> ssp. <i>sayi</i>	Prickly Rose		S2		35	67.1 ± 0.0	NB
<i>Cephalanthus occidentalis</i>	Common Buttonbush		S2		6	35.7 ± 0.0	NB
<i>Galium kamtschaticum</i>	Northern Wild Lioripe		S2		2	51.4 ± 0.0	NB
<i>Salix candida</i>	White Willow		S2		12	14.7 ± 1.0	NB
<i>Agalinis neoscotica</i>	Nova Scotia Galinias		S2		1	14.6 ± 0.0	NB
<i>Castilleja septentrionalis</i>	Northeastern Paintbrush		S2		0	63.4 ± 0.0	NB
<i>Euphrasia randii</i>	Rand's Eyebright		S2		2	5.0 ± 0.0	NB
<i>Scrophularia lanceolata</i>	Long-leavedwort		S2		12	10.6 ± 100.0	NB
<i>Dirca palustris</i>	Eastern Leatherwood		S2		105	1.7 ± 1.0	NB
<i>Phryma leptostachya</i>	American Lopseed		S2		107	5.4 ± 0.0	NB
<i>Verbena urticifolia</i>	White Wervain		S2		35	3.0 ± 0.0	NB
<i>Viola novae-angliae</i>	New England Violet		S2		16	53.6 ± 10.0	NB
<i>Symplocarpus foetidus</i>	Eastern Spicebush		S2		7	30.1 ± 0.0	NB
<i>Carex comosa</i>	Bearded Sedge		S2		0	72.0 ± 0.0	NB
<i>Carex granularis</i>	Limestone Meadow Sedge		S2		0	1.2 ± 0.0	NB
<i>Carex gynocrates</i>	Northern Bog Sedge		S2		47	57.2 ± 0.0	NB
<i>Carex hirtifolia</i>	Present Sedge		S2		7	3.1 ± 0.0	NB

Scientific Name	Common Name	CEC	Prov Legal Prot	Priority	Area	Distance	Prov
<i>Carex livida</i>	Livid Sedge		S2		7	74.0 ± 0.0	NB
<i>Carex plantaginea</i>	Plantain-Leaved Sedge		S2		176	2.6 ± 0.0	NB
<i>Carex prairea</i>	Prairie Sedge		S2		35	70 ± 0.0	NB
<i>Carex rostrata</i>	Narrow-leaved Beaked Sedge		S2		10	6.4 ± 0.0	NB
<i>Carex salina</i>	Saltmarsh Sedge		S2		2	0.7 ± 1.0	NB
<i>Carex sprengelii</i>	Long-leaved Sedge		S2		52	3.0 ± 0.0	NB
<i>Carex tenuiflora</i>	Sparse-flowered Sedge		S2		33	55.0 ± 0.0	NB
<i>Carex albicans</i>	White-tined Sedge		S2		1	63 ± 1.0	NB
<i>Carex albicans</i> var. <i>emmonsii</i>	White-tined Sedge		S2		4	4.6 ± 0.0	NB
<i>Cyperus squarrosus</i>	Spined Sedge		S2		46	1.4 ± 0.0	NB
<i>Eriophorum gracile</i>	Slender Cottongrass		S2		14	4 ± 0.0	NB
<i>Elodea nuttallii</i>	Nuttall's Waterweed		S2		12	17.4 ± 5.0	NB
<i>Juncus vaseyi</i>	Case Rush		S2		11	67.0 ± 0.0	NB
<i>Allium tricoccum</i>	Wild Leek		S2		22	0.5 ± 0.0	NB
<i>Najas gracillima</i>	Thread-Like Naiad		S2		11	45 ± 0.0	NB
<i>Calypso bulbosa</i>	Calypso		S2		1	50.2 ± 0.0	NB
<i>Calypso bulbosa</i> var. <i>americana</i>	Calypso		S2		3	15.5 ± 1.0	NB
<i>Coeloglossum viride</i>	Long-fringed Frog Orchid		S2		7	1 ± 5.0	NB
<i>Cypripedium parviflorum</i> var. <i>makasin</i>	Small Yellow Ladyslipper		S2		15	17.2 ± 1.0	NB
<i>Galearis spectabilis</i>	Shoestring Orchid		S2		74	4.2 ± 0.0	NB
<i>Goodyera oblongifolia</i>	Menjies Rattlesnake-plantain		S2		1	45.3 ± 0.0	NB
<i>Spiranthes lucida</i>	Shining Ladies Tresses		S2		25	24.7 ± 50.0	NB
<i>Spiranthes ochroleuca</i>	Yellow Ladies Tresses		S2		3	4.1 ± 0.0	NB
<i>Agrostis mertensii</i>	Northern Bent Grass		S2		2	20 ± 0.0	NB
<i>Dichanthelium linearifolium</i>	Narrow-leaved Panicgrass		S2		14	2.4 ± 0.0	NB
<i>Elymus canadensis</i>	Canada Wild Rice		S2		25	0.2 ± 1.0	NB
<i>Leersia virginica</i>	White Cut Grass		S2		42	4 ± 1.0	NB
<i>Piptatheropsis canadensis</i>	Canada Ricegrass		S2		6	3.4 ± 1.0	NB
<i>Puccinellia phryganodes</i> ssp. <i>neoarctica</i>	Creeping Cali Grass		S2		7	6.5 ± 0.0	NB
<i>Poa glauca</i>	Bluish Blue Grass		S2		1	0.5 ± 2.0	NB
<i>Schizachyrium scoparium</i>	Little Bluestem		S2		63	0.1 ± 1.0	NB
<i>Zizania aquatica</i> var. <i>aquatica</i>	Eastern Wild Rice		S2		6	17.1 ± 5.0	NB
<i>Piptatheropsis pungens</i>	Slender Ricegrass		S2		5	6 ± 0.0	NB
<i>Potamogeton vaseyi</i>	Case Pondweed		S2		12	13.0 ± 0.0	NB
<i>Asplenium trichomanes</i>	Maidenhair Spleenwort		S2			12.1 ± 0.0	NB
<i>Anchistea virginica</i>	Virginia Chain Fern		S2		42	12.2 ± 0.0	NB
<i>Woodsia alpina</i>	Alpine Cliff Fern		S2		6	0.7 ± 1.0	NB
<i>Botrychium minganense</i>	Minan Moonwort		S2		1	0.7 ± 0.0	NB
<i>Selaginella selaginoides</i>	Log Spleenmoss		S2		4	0 ± 6.0	NB
<i>Toxicodendron radicans</i> var. <i>radicans</i>	Eastern Poison Ivy		S2		15	5.0 ± 1.0	NB
<i>Symphyotrichum novi-belgii</i> var. <i>crenifolium</i>	New York Aster		S2		3	15.0 ± 1.0	NB
<i>Humulus lupulus</i> var. <i>lupuloides</i>	Common Hop		S2		5	14.7 ± 5.0	NB
<i>Rubus x recurvicaulis</i>	Archinberry		S2		5	4.5 ± 1.0	NB
<i>Galium obtusum</i>	Blunt-leaved Bedstraw		S2		6	6.1 ± 0.0	NB
<i>Salix myricoides</i>	Berry Willow		S2		16	4.2 ± 0.0	NB
<i>Carex vacillans</i>	Estuarine Sedge		S2		2	0 ± 1.0	NB
<i>Platanthera huronensis</i>	Franklin Green Orchid		S2		3	3 ± 0.0	NB
<i>Solidago altissima</i>	Goldenrod		S2S3		4	4.3 ± 0.0	NB

Scientific Name	Common Name	CEC	Prov Legal Prot	Priority	Res	Distance (m)	Prov
<i>Callitriche hermaphroditica</i>	Northern Water-starwort			S2S3	7	64.1 ± 0.0	NB
<i>Lonicera oblongifolia</i>	Shampone's Helle			S2S3	145	45.6 ± 0.0	NB
<i>Elatine americana</i>	American Waterwort			S2S3		46.6 ± 1.0	NB
<i>Bartonia paniculata</i> ssp. <i>iodandra</i>	Branched Bartonia			S2S3	15	6.3 ± 0.0	NB
<i>Geranium robertianum</i>	Herb Robert			S2S3	22	7.7 ± 1.0	NB
<i>Myriophyllum quitense</i>	Indian Water Milfoil			S2S3	71	7.0 ± 0.0	NB
<i>Epilobium coloratum</i>	Purple-veined Willowherb			S2S3	15	2.2 ± 0.0	NB
<i>Rumex pallidus</i>	Sea-leech			S2S3	3	60.0 ± 1.0	NB
<i>Rumex occidentalis</i>	Western Dock			S2S3	1	16.5 ± 1.0	NB
<i>Amelanchier gaspensis</i>	Gasp. Serviceberry			S2S3	1	61.0 ± 0.0	NB
<i>Rubus pensilvanicus</i>	Pennsylvania Blackberry			S2S3	14	16.5 ± 0.0	NB
<i>Galium labradoricum</i>	Labrador Bedstraw			S2S3	120	51.4 ± 0.0	NB
<i>Valeriana uliginosa</i>	Shampone's Valerian			S2S3	57	45.6 ± 0.0	NB
<i>Carex adusta</i>	Lesser Brown Sedge			S2S3	6	42.7 ± 10.0	NB
<i>Juncus brachycephalus</i>	Small-head Rush			S2S3	7	50.7 ± 0.0	NB
<i>Corallorhiza maculata</i> var. <i>occidentalis</i>	Spotted Coralroot			S2S3	12	15.2 ± 1.0	NB
<i>Corallorhiza maculata</i> var. <i>maculata</i>	Spotted Coralroot			S2S3	6	15.5 ± 1.0	NB
<i>Neottia auriculata</i>	Spotted Orchid			S2S3		1.1 ± 0.0	NB
<i>Spiranthes cernua</i>	Nodding Ladies-tresses			S2S3	16	3.3 ± 0.0	NB
<i>Eragrostis pectinacea</i>	Spotted Love Grass			S2S3	14	4.0 ± 1.0	NB
<i>Stuckenia filiformis</i>	Thread-leaved Pondweed			S2S3	12	65.5 ± 0.0	NB
<i>Potamogeton praelongus</i>	White-stemmed Pondweed			S2S3	24	3.3 ± 0.0	NB
<i>Isoetes tuckermanii</i> ssp. <i>acadiensis</i>	Acadian Clubmoss			S2S3	10	1.2 ± 1.0	NB
<i>Botrychium tenebrosum</i>	Shampone's Moonwort			S2S3	1	77.1 ± 0.0	NB
<i>Ophioglossum pusillum</i>	Northernadder's-tongue			S2S3		46.1 ± 1.0	NB
<i>Panax trifolius</i>	Wild Ginseng			S3	16	14.3 ± 0.0	NB
<i>Arnica lanceolata</i>	Lance-leaved Arnica			S3	27	36.5 ± 0.0	NB
<i>Artemisia campestris</i> ssp. <i>caudata</i>	Ball Wormwood			S3	121	4.3 ± 0.0	NB
<i>Artemisia campestris</i>	Field Wormwood			S3	20	4.3 ± 0.0	NB
<i>Erigeron hyssopifolius</i>	Hyssop-leaved Fleabane			S3	27	4.2 ± 1.0	NB
<i>Nabalus racemosus</i>	Lance-leaved Rattlesnake-root			S3	72	0.0 ± 0.0	NB
<i>Tanacetum bipinnatum</i> ssp. <i>huronense</i>	Lance-leaved Tanacetum			S3	42	0.0 ± 1.0	NB
<i>Tanacetum bipinnatum</i>	Lance-leaved Tanacetum			S3	1	64.0 ± 0.0	NB
<i>Symphotrichum boreale</i>	Boreal Aster			S3	165	5.4 ± 10.0	NB
<i>Betula pumila</i>	Bois-Brieh			S3	44	30.6 ± 0.0	NB
<i>Turritis glabra</i>	Coastal Mustard			S3	13	54.2 ± 0.0	NB
<i>Arabis pycnocarpa</i>	Cream-colored Rock-ress			S3	1	1.2 ± 1.0	NB
<i>Cardamine maxima</i>	Lance-leaved Rock-ress			S3	131	2.3 ± 0.0	NB
<i>Subularia aquatica</i> ssp. <i>americana</i>	American Water Footwort			S3	1	27.6 ± 0.0	NB
<i>Lobelia cardinalis</i>	Cardinal Flower			S3	407	20.5 ± 1.0	NB
<i>Stellaria humifusa</i>	Saltmarsh Starwort			S3	5	6.5 ± 0.0	NB
<i>Ceratophyllum echinatum</i>	Spotted Hornwort			S3	23	31.4 ± 1.0	NB
<i>Hudsonia tomentosa</i>	Woolly Beach-heath			S3	3	0.1 ± 0.0	NB
<i>Cornus obliqua</i>	Silky Dogwood			S3	272	50.2 ± 1.0	NB
<i>Crassula aquatica</i>	Water Plantain			S3	3	46.4 ± 1.0	NB
<i>Rhodiola rosea</i>	Roseroot			S3		0.0 ± 5.0	NB
<i>Penthorum sedoides</i>	Witch Stonecrop			S3	7	4.0 ± 0.0	NB
<i>Elatine minima</i>	Small Waterwort			S3	6	22.4 ± 0.0	NB
<i>Astragalus alpinus</i>	Alpine Milk-vetch			S3	2	5.7 ± 0.0	NB
<i>Astragalus alpinus</i> var. <i>brunetianus</i>	Alpine Milk-vetch			S3	14	4.7 ± 1.0	NB

Scientific Name	Common Name	CEC	Prov Legal Prot	Priority	Reps	Distance (m)	Prov
<i>Hedysarum americanum</i>	Worm Parsnip		S3		35	614 ± 0.0	NB
<i>Gentianella amarella</i> ssp. <i>acuta</i>	Northern Gentian		S3		11	32.6 ± 0.0	NB
<i>Geranium bicknellii</i>	Bicknell's Crane's-bill		S3		16	41.4 ± 5.0	NB
<i>Myriophyllum farwellii</i>	Farwell's Water Milfoil		S3		34	1 ± 0 ± 5.0	NB
<i>Myriophyllum heterophyllum</i>	Variable-leaved Water Milfoil		S3		2	42 ± 0.0	NB
<i>Myriophyllum verticillatum</i>	Whorled Water Milfoil		S3		26	0 ± 0.0	NB
<i>Stachys hispida</i>	Smooth Bed-Nettle		S3		17	1.0 ± 0.0	NB
<i>Utricularia radiata</i>	Little Floating Bladderwort		S3		6	46 ± 0.0	NB
<i>Nuphar microphylla</i>	Small Yellow Pond-lily		S3		35	5 ± 5.0	NB
<i>Epilobium hornemannii</i>	Hornemann's Yellowwort		S3		4	4.7 ± 1.0	NB
<i>Epilobium strictum</i>	Common Yellowwort		S3		6	2.5 ± 1.0	NB
<i>Polygala sanguinea</i>	Blood Milwort		S3		52	1 ± 1.0	NB
<i>Persicaria arifolia</i>	Winged-leaved Smartweed		S3		30	4.2 ± 0.0	NB
<i>Persicaria punctata</i>	Dotted Smartweed		S3		14	17.1 ± 5.0	NB
<i>Fallopia scandens</i>	Climbing False Broomrape		S3		40	3.6 ± 1.0	NB
<i>Littorella americana</i>	American Shoreweed		S3		41	2 ± 0.0	NB
<i>Primula mistassinica</i>	Mistassini Primrose		S3		21	0.1 ± 1.0	NB
<i>Pyrola minor</i>	Lesser Pyrola		S3		2	63.0 ± 0.0	NB
<i>Clematis occidentalis</i>	Purple Clematis		S3		36	2 ± 1.0	NB
<i>Ranunculus gmelinii</i>	Gmelin's Water Buttercup		S3		47	20.0 ± 0.0	NB
<i>Thalictrum confine</i>	Northern Meadow-rue		S3		10	0.4 ± 1.0	NB
<i>Amelanchier canadensis</i>	Canada Serviceberry		S3		1	17.0 ± 0.0	NB
<i>Rosa palustris</i>	Samp Rose		S3		17	2 ± 1.0	NB
<i>Rubus occidentalis</i>	Black Raspberry		S3		153	1 ± 0.0	NB
<i>Galium boreale</i>	Northern Bedstraw		S3		16	2 ± 0.0	NB
<i>Salix nigra</i>	Black Willow		S3		171	4.4 ± 1.0	NB
<i>Salix pedicellaris</i>	Box Willow		S3		1	30 ± 3.0	NB
<i>Salix interior</i>	Sandbar Willow		S3		47	1.3 ± 1.0	NB
<i>Comandra umbellata</i>	Bastard's Boadilax		S3		1	62.0 ± 10.0	NB
<i>Parnassia glauca</i>	Green Grass-leaf Parnassia		S3		12	2 ± 10.0	NB
<i>Limosella australis</i>	Southern Meadow-poorwill		S3		1	0 ± 5.0	NB
<i>Boehmeria cylindrica</i>	Small-spice False-nettle		S3		166	5 ± 0.0	NB
<i>Pilea pumila</i>	Wax Clearweed		S3		64	4.4 ± 0.0	NB
<i>Viola adunca</i>	Wooded Violet		S3		10	44.5 ± 1.0	NB
<i>Viola nephrophylla</i>	Northern Blue Violet		S3		0	2.0 ± 0.0	NB
<i>Carex arcta</i>	Northern Clustered Sedge		S3		62	2 ± 7.0	NB
<i>Carex capillaris</i>	Hair-like Sedge		S3		13	6 ± 7.0	NB
<i>Carex chordorrhiza</i>	Creeping Sedge		S3		5	27.4 ± 0.0	NB
<i>Carex conoidea</i>	Field Sedge		S3		23	2.4 ± 1.0	NB
<i>Carex eburnea</i>	Bristle-leaved Sedge		S3		10	63 ± 1.0	NB
<i>Carex exilis</i>	Coastal Sedge		S3		110	51.1 ± 0.0	NB
<i>Carex garberi</i>	Garber's Sedge		S3		14	37 ± 0.0	NB
<i>Carex haydenii</i>	Hayden's Sedge		S3		3	5.4 ± 0.0	NB
<i>Carex lupulina</i>	Wool Sedge		S3		133	5.4 ± 0.0	NB
<i>Carex michauxiana</i>	Mitchaux's Sedge		S3		60	61.4 ± 0.0	NB
<i>Carex ormostachya</i>	Needle-like Spike Sedge		S3		2	2.3 ± 1.0	NB
<i>Carex rosea</i>	Rosy Sedge		S3		264	1.2 ± 0.0	NB
<i>Carex tenera</i>	Tender Sedge		S3		72	1 ± 1.0	NB
<i>Carex tuckermanii</i>	Tuckerman's Sedge		S3		1	5.5 ± 0.0	NB
<i>Carex vaginata</i>	Sheathed Sedge		S3		1	45.6 ± 0.0	NB
<i>Carex wiegandii</i>	Wiegand's Sedge		S3		65	37.4 ± 0.0	NB
<i>Carex recta</i>	Star Sedge		S3		4	5 ± 2.0	NB
<i>Carex atratifomis</i>	Star-shaped Bladder Sedge		S3		4	74.3 ± 0.0	NB
<i>Cyperus dentatus</i>	Winged Fat-sedge		S3		23	5.5 ± 0.0	NB
<i>Cyperus esculentus</i>	Perennial Yellow Nutsedge		S3		11	47 ± 0.0	NB
<i>Cyperus esculentus</i> var. <i>leptostachyus</i>	Perennial Yellow Nutsedge		S3		75	3.7 ± 0.0	NB

Scientific Name	Common Name	CEC	Prov Legal Prot	Priority	Res	Dist	Prov
<i>Eleocharis intermedia</i>	Matted Spikerush		S3		11	4.7	NB
<i>Eleocharis quinqueflora</i>	Five-flowered Spikerush		S3		35	5	NB
<i>Rhynchospora capitellata</i>	Small-headed Beakrush		S3		53	34	NB
<i>Rhynchospora fusca</i>	Brown Beakrush		S3		71	3	NB
<i>Trichophorum clintonii</i>	Clinton's Clamrush		S3		113	3.4	NB
<i>Bolboschoenus fluviatilis</i>	River Beakrush		S3		5	35	NB
<i>Schoenoplectus torreyi</i>	Coronis Beakrush		S3		44	3	NB
<i>Lemna trisulca</i>	Star Duckweed		S3		22	66.1	NB
<i>Triantha glutinosa</i>	Stink False-Sphodel		S3			2.3	NB
<i>Cypripedium reginae</i>	Shoeladle-Slipper		S3		135	45.6	NB
<i>Liparis loeselii</i>	Loesel's Orchid		S3		2	1.5	NB
<i>Platanthera blephariglottis</i>	White-lined Orchid		S3		6	15.4	NB
<i>Platanthera grandiflora</i>	Large Purple-lined Orchid		S3		54	4	NB
<i>Bromus latiglumis</i>	Broad-leaved Brome		S3		31	1.5	NB
<i>Calamagrostis pickeringii</i>	Pickering's Reed Grass		S3		102	65.3	NB
<i>Dichanthelium depauperatum</i>	Starved Panicgrass		S3		35	46.4	NB
<i>Dichanthelium depauperatum var. 1</i>	Starved Panicgrass		S3		1	67.2	NB
<i>Muhlenbergia richardsonis</i>	Mat Milk		S3		34	1.6	NB
<i>Heteranthera dubia</i>	Water Stargrass		S3		62	1.1	NB
<i>Potamogeton obtusifolius</i>	Blunt-leaved Pondweed		S3		44	27	NB
<i>Potamogeton richardsonii</i>	Richardson's Pondweed		S3		42	17	NB
<i>Xyris montana</i>	Northern Yellow-eyed Grass		S3		26	35.0	NB
<i>Zannichellia palustris</i>	Wormed Pondweed		S3		4	7.5	NB
<i>Adiantum pedatum</i>	Northern Maidenhair Fern		S3		471	3.2	NB
<i>Asplenium viride</i>	Green Spleenwort		S3		15	7.5	NB
<i>Dryopteris fragrans</i>	Fraxant Wood Fern		S3		20	3.6	NB
<i>Dryopteris goldiana</i>	Oldie's Wood Fern		S3		307	4.3	NB
<i>Equisetum palustre</i>	Marsh Horsetail		S3		12	4.4	NB
<i>Isoetes tuckermanii ssp. tuckermanii</i>	Tuckerman's Sporewort		S3		20	24.3	NB
<i>Isoetes tuckermanii</i>	Tuckerman's Sporewort		S3		1	50.4	NB
<i>Diphasiastrum x sabinifolium</i>	Savin-leaved Round-leaved		S3		13	20.1	NB
<i>Huperzia appressa</i>	Mountain Fern		S3		1	6	NB
<i>Sceptridium dissectum</i>	Dissected Moonwort		S3		54	14.3	NB
<i>Botrychium lanceolatum</i>	Orianthe Moonwort		S3		2	0.0	NB
<i>Botrychium lanceolatum ssp. angustisegmentum</i>	Narrow Orianthe Moonwort		S3		23	5	NB
<i>Botrychium simplex</i>	Least Moonwort		S3		15	5	NB
<i>Polypodium appalachianum</i>	Appalachian Polypod		S3		4	11.7	NB
<i>Utricularia resupinata</i>	Inverted Bladderwort		S3		16	51.1	NB
<i>Crataegus submollis</i>	Smooth Hawthorn		S3		1	5.3	NB
<i>Mertensia maritima</i>	Sea Lonchit		S3S4			3.5	NB
<i>Lobelia kalmii</i>	Brook Lobelia		S3S4		50	1.1	NB
<i>Suaeda calceoliformis</i>	Wormed Sea-lite		S3S4		3	17.5	NB
<i>Myriophyllum sibiricum</i>	Siberian Water Milfoil		S3S4		3	3.3	NB
<i>Stachys pilosa</i>	Hairy-leaved Nettle		S3S4		6	4.3	NB
<i>Utricularia gibba</i>	Winged Bladderwort		S3S4		40	20.2	NB
<i>Drymocallis arguta</i>	Ball Wood Beak		S3S4		51	1.1	NB
<i>Rubus chamaemorus</i>	Clodier		S3S4		52	0.7	NB
<i>Geocaulon lividum</i>	Northern Comandra		S3S4		7	62	NB
<i>Cladium mariscoides</i>	Smooth Clamrush		S3S4		125	5	NB
<i>Eriophorum russeolum</i>	Russet Cotton Grass		S3S4		12	46.2	NB
<i>Triglochin gaspensis</i>	Gasp Arrowgrass		S3S4		10		NB
<i>Spirodela polyrhiza</i>	Great Duckweed		S3S4		46	22	NB
<i>Corallorhiza maculata</i>	Spotted Coralroot		S3S4		1	12.1	NB
<i>Calamagrostis stricta</i>	Slim-stemmed Reed Grass		S3S4		3	77.6	NB

Scientific Name	Common Name	CEC	Prov Legal Prot	Priority	Refs	Distance (km)	Prov
<i>Potamogeton oakesianus</i>	Oakes Pondweed			S3S4	37	231 ± 0.0	NB
<i>Solidago caesia</i>	Blue-stemmed Goldenrod			S	2	17 ± 1.0	NB
<i>Solidago ptarmicoides</i>	White Goldenrod			S	3	5 ± 1.0	NB
<i>Celastrus scandens</i>	Climbing Bittersweet			S	4	2.5 ± 1.0	NB

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Troy Small
troy.small@ghd.com
506.462.7631

www.ghd.com