# Environmental Impact Assessment

## Point Lepreau Nuclear Generating Station Domestic Sewage Treatment Plant Phased Replacement

New Brunswick Power Corporation

20 December 2022

→ The Power of Commitment

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# Glossary of Terms, Abbreviations and Units

| | |
|---|---|
| ACCDC | Atlantic Canada Conservation Data Centre |
| bgs | Below Ground Surface |
| $BOD_5$ | Five-day Biochemical Oxygen Demand |
| °C | Degrees Celsius |
| CBCL | CBCL Limited |
| $CBOD_5$ | Five-day Carbonaceous Biochemical Oxygen Demand |
| CNSC | Canadian Nuclear Safety Commission |
| CO | Carbon monoxide |
| $CO_2$ | Carbon Dioxide |
| COSEWIC | Committee on the Status of Endangered Wildlife in Canada |
| DFO | Fisheries and Oceans Canada |
| ECCC | Environment and Climate Change Canada |
| EIA | Environmental Impact Assessment |
| EMO | Emergency Measures Organization |
| EMP | Environmental Management Plan |
| ERA | Environmental Risk Assessment |
| ESA | Environmentally Sensitive Area |
| FAA | Fisheries Act Authorization |
| GEMTEC | GEMTEC Consulting Engineers and Scientists Limited |
| GHD | GHD Limited |
| GHG | Greenhouse Gas |
| GNB | Government of New Brunswick |
| Ha | Hectare |
| HP | Horsepower |
| IBA | Important Bird Area |
| Kg | Kilogram |
| Km | Kilometre |
| L | Litre |
| M | Metre |
| $m^3$ | Cubic metre |
| MBR | Membrane Bioreactor |
| MCC | Motor Control Center |
| mm | Millimetre |
| MTI | Mi’gmawe’l Tplu’taqnn Incorporated |

# Glossary of Terms, Abbreviations and Units

| | |
|---|---|
| N | Nitrogen |
| NBDAA | New Brunswick Department of Aboriginal Affairs |
| NBDELG | New Brunswick Department of Environment and Local Government |
| NBDNRED | New Brunswick Department of Natural Resources and Energy Development |
| NBDTHC | New Brunswick Department of Tourism, Heritage and Culture |
| NB Power | New Brunswick Power Corporation |
| $NH_3$ | Ammonia |
| $NH_4$ | Ammonium |
| $NO_x$ | Nitrogen oxides |
| OWLS | Online Well Log System |
| PID | Parcel Identifier |
| PM | Particulate Matter |
| PNA | Protected Natural Area |
| PLBO | Point Lepreau Bird Observatory |
| PLNGS | Point Lepreau Nuclear Generating Station |
| PSEMP | Project Specific Environmental Management Plan |
| SAR | Species at Risk |
| SARA | Species at Risk Act |
| SNB | Service New Brunswick |
| $SO_2$ | Sulphur dioxide |
| STP | Sewage Treatment Plant |
| TSS | Total Suspended Solids |
| VEC | Valued Environmental Component |
| VOC | Volatile Organic Compound |
| WAWA | Watercourse and Wetland Alteration |
| WNNB | Wolastoqey Nation in New Brunswick |

# 1. Introduction

GHD Limited (GHD) was retained by New Brunswick Power Corporation (NB Power) to prepare an Environmental Impact Assessment (EIA) Registration document for the phased replacement of the domestic sewage treatment plant (STP) at the Point Lepreau Nuclear Generating Station (PLNGS), located at 122 County Line Road, Maces Bay, New Brunswick. A site location map is provided on Figure 1.

## 1.1 Proponent Information

The Proponent is NB Power, who owns and operates the PLNGS.

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## 1.2 Property Ownership

The proposed Project will be located on property associated with the operation of the PLNGS, which has been commercially operational since 1983. Specifically, the proposed Project will be located directly south of the generation station next to the industrial wastewater treatment plant on property identified by Service New Brunswick (SNB) as Parcel Identifier (PID) #00471136, which is owned by NB Power and covers a total area of 138 hectares (ha). NB Power also owns adjacent PID #s 55189237, 55062665, 55010086, 55062657, 55062640, and 00427138. These properties are undeveloped, forested land or they contain infrastructure associated with the operation of the PLNGS (see Figure 2).

# 2. The Undertaking

The proposed project consists of the **Phased Replacement of the Domestic Sewage Treatment Plant at the Point Lepreau Nuclear Generating Station**.

## 2.1 Background

The domestic sanitary sewer system currently in operation at the PLNGS collects domestic wastewater from onsite sources and operations. Treatment of collected wastewater occurs via the existing extended aeration STP originally installed in 1979. The STP is located near the existing industrial wastewater treatment plant on the southern portion of the PLNGS property. The existing industrial wastewater treatment plant will not be modified or altered as part of the proposed phased replacement STP Project. An overview of the existing PLNGS domestic wastewater system and surrounding infrastructure is provided as Figure 3.

The original domestic wastewater treatment system comprised of a comminutor, a 90,000 US gallon aeration basin, two 15 Horsepower (HP) blowers, two air lift sludge pumps, two parallel secondary clarifiers, and a chlorine contact chamber. The following modifications have been completed since the installation of the original extended aeration facility:

– A baffle wall was installed in the aeration tank in 2003 to create a 23,000 US gallon sludge holding tank reducing the working volume of the aeration tank to 67,000 US gallons and reducing the capacity to 67,000 US gallons per day.
– The influent water and return active sludge lines were relocated in 2003 to accommodate the addition of the sludge holding tank while a waste activated sludge line was added for the conveyance of sludge to the sludge holding tank.
– Following a 2007 study, a flow meter was installed on the raw influent line and a dissolved oxygen probe was installed in the aeration tank to allow for feedback control to the newly installed variable frequency drives on the blowers.
– Following the establishment of more stringent effluent permit limits for the five-day biochemical oxygen demand ($BOD_5$) and total suspended solids (TSS) in 2008, the treatment facility was modified with the addition of a containerized membrane bioreactor (MBR) skid in 2009. The sludge holding tank was modified to be a trash tank, which removes large debris and rocks from the incoming flow to protect the membranes from damage.

This STP regularly achieved the original effluent permit requirements of 50 mg/L for $BOD_5$ and TSS, however the facility could not consistently achieve the more stringent effluent permit limits of 25 mg/L for $BOD_5$ and TSS established in 2008 until after the temporary MBR was installed in 2009. While the current MBR is operating well and meeting the more stringent effluent requirements, this installation was only meant to operate temporarily and will require significant modifications for long term utilization. PLNGS has therefore decided to take a phased approach for designing and installing a permanent MBR treatment system with equalization capacity which will provide reliable treatment of average and peak flows based on their effluent objectives for the next 25 years.

## 2.2 Project Overview

NB Power had previously retained the services of CBCL Limited (CBCL) from Saint John, NB to develop a conceptual design for the replacement STP which will form the basis of this EIA registration document (see Appendix A). For the purposes of this EIA document, the “Project Area” consists of the assumed laydown area, existing STP and proposed upgraded STP infrastructure. The “Assessment Area” consists of the area evaluated for Project related impacts and includes the Project Area and immediate surroundings (such as the cobble shoreline/beach, coastal wetland and drainage channel). The Project Area and Assessment Area are outlined in Figure 3.

### 2.2.1 Proposed Facility Layout

The proposed Phase 1 of the Project consists of replacing the existing steel tank (which is in poor condition) with a concrete bioreactor tank, as well as installing below grade connections to the existing containerized MBR system. The existing or similar comminutor, bioreactor blowers, membrane feed pumps, and process instruments will be relocated to the new concrete tank. It is anticipated that Phase 1 of the Project will take approximately 6-8 months to complete and would commence in 2023 following completion of the EIA review and issuance of an EIA *Certificate of Determination*. The existing STP will remain operational during this time and once completed, the new system will be commissioned. Please refer to Figure 3 for an overview of the proposed Phase 1 infrastructure. Conceptual layout plans for Phase 1 infrastructure are also provided in Figures 2 and 4 in Appendix A.

Following Phase 1, raw wastewater will flow into the in-ground concrete aerated bioreactor tank for biological treatment, after passing through the preceding trash tank for debris removal. From there, all flow will be pumped to the existing membrane tank. Return flow will return by gravity, and membrane permeate will be pumped to the existing unused chlorine contact chamber, from where it will flow through the existing effluent outfall pipe to the watercourse adjacent to the upgraded STP infrastructure which subsequently discharges to a wetland and the Bay of Fundy (see

Figure 3). Waste sludge from the MBR will be stored in the new sludge tank and periodically removed from site and disposed of at an approved disposal facility, using an approved waste hauler.

Once Phase 1 is complete, it is anticipated that Phase 2 of the Project will take approximately 6-8 months and would commence in 2026 following budgetary approval. During Phase 2, the existing containerized MBR system will be replaced with a skid-mounted MBR system housed in a new Process Building. The Process Building will also contain a fine screen for preliminary treatment before influent enters the trash tank, a motor control center (MCC) room, and operator lab/office and washroom to replace the existing Operations building on site. This building will be further developed during Phase 2 design and is shown as a conceptual layout in Figures 2 and 4 of Appendix A.

### 2.2.2 Project Design Criteria

The quality of effluent discharged from the upgraded facility will meet the conditions set out in the existing *Approval to Operate* (S-3271), provided in Table 1. The existing treatment facility's *Approval to Operate* is valid until June 26, 2024 and a copy is provided in Appendix B.

***Table 1 Effluent Quality Requirements Outlined in the Approval to Operate (S-3271)***

| Parameter | Limit | Units |
|---|---|---|
| Five-day Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) | 25 | mg/L (average) |
| Suspended Solids, TSS | 25 | mg/L (average) |
| Un-ionized Ammonia (expressed as N, everything except $NH_4^+$) | 1.25 | mg/L (every sample less than) |
| Total Chlorine Residue | 0.02 | mg/L (average less than) |

In 2018, CBCL developed preliminary design parameters for the hydraulic loading of the proposed MBR based on recorded flow data. In 2022, CBCL updated the design parameters of the MBR based on record flow and concentration data. The updated parameters are presented in the following Table 2.

***Table 2 Proposed STP Design Parameters***

| Parameter | Value | Units |
|---|---|---|
| Design Population | 1600 | persons |
| Average Flow | 140 | cubic metre ($m^3$)/day |
| Peak Flow | 480 | $m^3$/day |
| Average CBOD Load | 30 | kilogram (kg)/day |
| Peak CBOD Load | 80 | kg/day |
| Average TSS Load | 40 | kg/day |
| Peak TSS Load | 135 | kg/day |
| Average TKN Load | 5 | kg/day |
| Peak TKN Load | 15 | kg/day |
| Effluent $CBOD_5$ | 25 | mg/L |
| Effluent TSS | 25 | mg/L |
| Effluent Un-ionized Ammonia (as $NH_3$-N) | 1.25 | mg/L |

### 2.2.3 Treatment Capacity and Equalization Strategy

The Phase 1 treatment capacity will be the same as the existing STP, with no additional redundancy. The trash tank and bioreactor tank contain approximately 80 m³ of equalization volume, in addition to 240 m³ of biological treatment

volume. The equalization and treatment capacity of the tank are unchanged from the existing capacity to allow reuse of existing equipment to the greatest extent possible.

In Phase 2, the replacement membrane equipment package will contain two trains of membrane modules, each of which can treat the maximum daily flow with the second train out of service, for limited periods of time. The biological process can be isolated from one membrane tank using an automated valve arrangement. This allows the system to independently backwash each membrane or complete routine maintenance and cleaning with only one of the two membranes in operation. The equalization volume is based on the membrane capacity of approximately 480 $m^3$/day, and will allow treatment of estimated flows without overflows, based on historical data. The site has not had any known overflow events since the site power was upgraded to Class IV power which allows power to be supplied via the existing electrical grid or directly from the Point Lepreau generation facility. Furthermore, the existing STP has generator backup which is anticipated to remain in place during the upgrade.

## 2.3 Project Rationale

The Project involves the construction and operation of an upgraded STP designed to replace the existing extended aeration treatment facility originally installed in 1979. The existing facility and MBR, installed in 2009, are currently meeting the effluent quality requirements under the facility's *Approval to Operate* (S-3271); the MBR, however, was only intended to operate on a short-term basis and will require significant modifications for long-term use and sustainable function. PLNGS has decided to take a phased approach to the design and installation of a permanent MBR treatment system with equalization capacity which will provide reliable treatment of average and peak flows based on their effluent objectives for the next 25 years.

## 2.4 Project Location

The Project is located at the PLNGS, Maces Bay, New Brunswick, approximately 40 kilometres (km) west of the City of Saint John (Figure 1). As noted in Section 1.2, the proposed replacement STP will be located south of the generating station, to the west of the existing industrial wastewater treatment plant on PID 00471136. The centroid of the proposed upgraded STP infrastructure is georeferenced as 45°03'57" N, 66°27'25" W.

The proposed replacement STP will be constructed adjacent to the existing industrial wastewater treatment plant, with only minor modification of the existing footprint in this area. The general site location, site plans, and existing conditions are provided on Figures 2 and 3 and in Appendix A. Preliminary designs for the upgraded treatment facility are also provided in Appendix A.

Treated effluent from the existing treatment facility discharges into a small watercourse south of the generating station which flows through a degraded wetland and subsequently the Bay of Fundy. The outfall for the replacement treatment facility will not be altered. The current sanitary sewage inflows, treatment processes, effluent parameters and discharge location will remain the same after the completion of the STP replacement Project. The Project therefore represents an overall improvement in reliability and extends the design capacity of the STP providing treatment of sanitary sewage at the PLNGS.

## 2.5 Siting Considerations

The proposed Project will be located within the PLNGS property, in an area approximately 1.5 km from the nearest residence. Other existing sensitive land uses in the area include the Fundy Shores School, located approximately 3.3 km north of the Project Area, and the Seaside and Mace's Bay Trinity Baptist Churches, located approximately 4 km to the north. By constructing the Project within the PLNGS property and utilizing the existing STP footprint, negative Project related impacts to the nearest sensitive receptors are not anticipated.

In 2020, CBCL had prepared a summary of the proposed Project, which was submitted to the New Brunswick Department of Environment and Local Government (NBDELG) for review. Since that time, the Project has been further refined to include the following changes:

– The existing outfall will no longer be altered.
– The small watercourse that receives outfall discharge will no longer be infilled.
– All flow to the STP will be conveyed by gravity.
– Most of the proposed work will take place within the existing STP footprint boundaries.

By constructing the new STP infrastructure within the existing STP site footprint, impacts to vegetation will be minimal. This partially developed portion of the south side of the PLNGS property consists of the existing STP and other existing industrial water treatment infrastructure including a pickling building, settling lagoons, and access roads. Furthermore, the updated design is no longer considering altering the outfall structure or infilling a portion of the small watercourse, which will minimize potential impacts to the downstream wetland and fish and fish habitat.

It should also be noted that the proposed Project (by design) will mitigate adverse interactions with the receiving environment by improving reliability of the STP for treating sanitary sewage at the PLNGS.

# 2.6 Construction Details

## 2.6.1 Pre-Construction Preparation

### 2.6.1.1 Public Involvement and Aboriginal Engagement

To ensure an opportunity for meaningful involvement and satisfy the requirements of the EIA Registration and review process, Aboriginal engagement and public and stakeholder consultation activities must be implemented as part of the project planning process, and the results submitted in a report to NBDELG prior to the completion of the EIA review process.

Aboriginal engagement and public and stakeholder consultation activities to be conducted for the proposed phased domestic sewage upgrade project, will include notification via an information flyer mailed to the nearest landowners, the Local Service District and the NB Department of Aboriginal Affairs (NBDAA), with the latter communicating directly with applicable First Nations/Aboriginal groups as part of the Duty to Consult process. In addition, NB Power holds regular, routine meetings with Mi'gmawe'l Tplu'taqnn Incorporated (MTI), Wolastoqey Nation in New Brunswick (WNNB), and Peskotomuhkati Nation at Skutik through the various Consultation and Capacity funding agreements in place, to update and inform First Nations on current and future projects. Additional discussions or meetings would be arranged if requested. These meetings are supplemented with opportunities to have Indigenous field monitors present for all phases of project planning through execution to support identification and mitigation of Indigenous Rights potentially impacted as a result of the proposed undertaking.

The EIA Registration document and project-related information will be provided directly to the First Nation consultative bodies identified above, will be posted publicly on the NB Power web page, and copies will be made available to any interested member of the public or Aboriginal group for comment. All consultation and engagement activities, including input received and resultant actions and/or project modifications will be summarized in a report and submitted to NBDELG as part of the EIA review process.

Section 5.0 provides additional details regarding the public involvement and Aboriginal engagement process.

### 2.6.1.2 Regulatory Approvals Planning

Should the project receive EIA approval and a *Certificate of Determination* be issued, it is anticipated that several permits/approvals will be required prior to Project commencement. As such, federal and provincial officials will be engaged as needed to determine potential project approval requirements in addition to conditions outlined in the EIA Determination. The regulatory approvals likely to be required over the duration of the Project are discussed in Section 6.0. Amendments to the current *Approval to Operate* (S-3271) will likely also be required and is anticipated to be a Condition of the EIA Determination.

#### 2.6.1.3 Detailed Design and Tender Document Preparation

Detailed design of the STP is required, including preparation of public tender documents such that NB Power may obtain competitive quotes. The tender documents may include instructions to bidders, general and technical specifications and detailed design drawings. Detailed design and tender package documents can be provided to NBDELG for review and comment prior to public release.

### 2.6.2 Project Activities

While the Project is currently undergoing the detailed design process, the following Project activities have been identified and will be undertaken upon commencement of construction of the upgraded STP. The final sequencing will be determined during construction, including:

– **Site preparation, including but not necessarily limited to the following:**
  - Installation of sediment and erosion control measures to prevent run-off and sedimentation of the drainage channel and downstream wetland;
  - Minimal clearing of the Project Area in preparation of construction activities. Vegetation to be cleared includes a section of mowed grass and a small area of alders along the top of the eastern bank of the watercourse. Although anticipated to be completed during the winter, if clearing is required during the bird nesting season (mid-April to late August), it will be conducted in accordance with NB Power's Avian Protection Plan, and guidance from Environment and Climate Change Canada (ECCC);
  - Rerouting any existing infrastructure in the area of the proposed treatment facility including the realignment of the nearby access road and overhead power lines; and
  - Level and grade the Project site.

– **Phase I (Tank Installation):**
  - Excavate foundations for the replacement bioreactor tank and sludge tank. Excavated materials will be stockpiled at least 30 metres (m) from the adjacent watercourse and wetland, and will be used as backfill in the Project Area or will be used elsewhere at the PLNGS;
  - Excavate trenches for the underground piping;
  - Infill and regrade the excavated trenches following the installation of the underground piping;
  - Construct all proposed infrastructure including in-ground trash tank, bioreactor tank, and sludge holding tank;
  - Relocate all necessary process equipment and instrumentation including comminutor, blowers, pumps, and instruments;
  - Reinstate the site including cleaning out and cutting the existing tank down below grade, backfilling, and removing construction debris and waste generated during the construction phase of the Project; and
  - Commission and operate the upgraded STP.

– **Phase II (Process Building and MBR System):**
  - Construct Phase II infrastructure (Process Building);
  - Replace the containerized MBR system with a skid-mounted MBR system housed in the Process Building;
  - Remove construction debris and waste generated during the construction phase of the Project; and
  - Commission and operate the upgraded STP.

The anticipated timeline to complete Phase I and Phase II of the proposed Project is 6-8 months per phase. Work is anticipated to be completed Monday to Saturday during daylight hours using standard construction equipment (e.g., mini-excavator, backhoe, dump trucks, etc.).

### 2.6.3 Project Schedule

Upon EIA approval and receipt of all required approvals and authorizations, the estimated start date for site preparation is spring 2023, pending budget approval. The proposed timeline for Phase 1 construction of the upgraded STP and associated infrastructure is also anticipated to occur in 2023, and Phase 2 construction will follow at a later date (anticipated to be in 2026), depending on the approved budget. Finalized plans will be circulated to NBDELG for review and approval as this is anticipated to be a Condition of the EIA Determination.

## 2.7 Operation and Maintenance Details

The current sanitary sewage inflows, treatment processes, effluent parameters and discharge location will remain the same after the completion of the upgrade Project. The upgraded STP will have generator backup power and no lift stations will be required (gravity fed).

The domestic wastewater produced will continue to be treated and discharged via the existing outfall into the small watercourse and subsequently the downstream wetland and Bay of Fundy. Effluent will remain below the current allowable discharge criteria outlined in the current *Approval to Operate* and will be discharged on a continuous basis. There are currently no diffusion/dispersion methods used at the outfall. Refer to Section 2.2.2 for the characteristics of the raw influent wastewater loadings and flow volumes as well as the projected characteristics of the treated effluent.

Waste sludge from the existing containerized MBR system (as well as the new skid-mounted MBR system once operational) will be stored in the new sludge tank and periodically removed from site and disposed of at an approved disposal facility.

The estimated lifespan of the upgraded STP infrastructure is 25 years, with only regular routine maintenance being required. NB Power will be responsible for maintenance of the system.

## 2.8 Future Modification, Extensions or Abandonment

The proposed phased replacement of the STP is being designed to meet the current and foreseeable needs of NB Power. The upgraded STP is proposed to operate indefinitely; NB Power will work with NBDELG in the event future closure of the STP is required and a decommissioning plan would be submitted for review and approval. Repair and maintenance is intended to support the operation of the STP indefinitely. Incremental replacement or upgrades of the infrastructure may be required in the future for continued effective operation or to maintain regulatory compliance.

## 2.9 Project Related Documents

The preparation of this EIA registration document was based on the CBCL letter titled *EIA Request for Project Review - New Brunswick Power Corporation Point Lepreau Nuclear Generating Station (PLNGS), Domestic Sewage Treatment Plant Phased Replacement* dated June 24, 2022 (Appendix A) and existing *Approval to Operate* the STP filed under the NB Clean Environment Act (S-3271) issued by NBDELG (expires June 26, 2024; Appendix B). In addition, a number of other studies and documents were also consulted for the preparation of this registration document, and are referenced throughout.

# 3. Description of the Existing Environment

## 3.1 Overview

The Project Area is situated within the PLNGS industrial site, which is located on the northern coast of the Bay of Fundy, on the Lepreau Peninsula in southern New Brunswick. Indian Cove is located to the southwest of the facility and Duck Cove is located to the east. The nearest municipality is the City of Saint John, approximately 25 km

northeast of the Project Area. The nearest communities are Maces Bay, Dipper Harbour and Chance Harbour, all located within 10 km of the PLNGS. Land surrounding the facility is primarily forested and undeveloped, as the PLNGS is situated within a sparely populated rural area.

Construction is proposed within a partially developed portion of the south side of the PLNGS property at the current location of the existing STP, adjacent to access roads and the existing industrial water treatment infrastructure which includes a warehouse building, which used to be used for the “pickling” of steel (i.e., removing surficial metal impurities utilizing acidic solution) and Industrial settling lagoons (Appendix A).

## 3.2 Climate

Climate at the site is moderated by the Bay of Fundy leading to relatively mild winters and cool summers. The nearest active ECCC weather station is the Point Lepreau weather station (45°04’23.04” N 66°26’57.09” W), located 1 km east of the Project Area. The nearest ECCC weather station with the most recent Climate Normals (1981-2010) is located in Pennfield (45°06’00” N 66°44’00” W), approximately 22 km northwest from the proposed Project Area. According to this station, Climate Normals included an annual daily mean temperature of 5.2 Degrees Celsius (°C) with extremes ranging from -36.5°C to 37.2°C. The average annual total precipitation is 1429.7 millimetres (mm), with most precipitation occurring in November and the least amount of precipitation occurring in August.

Wind data were obtained from numerical simulations at 30 m altitude provided by the Canadian Wind Atlas. In the Project Area, predominant winds blow from the southwest at an annual average speed of 6.38 m/s. The strongest winds come from the north and northwest in winter with the monthly average speed reaching 7.75 m/s. In summer, the predominant winds come from the southwest, reaching a monthly average speed of 5.36 m/s. The fall season is characterized by predominant winds blowing from the southwest, attaining a monthly average speed of 6.52 m/s. In spring, the predominant winds come from the southwest, with a monthly average speed of 6.61 m/s (ECCC, 2022).

## 3.3 Regional Ecological Features

The PLNGS is located in the Fundy Coast Ecoregion (and Fundy Coastal Ecodistrict) in the southern portion of New Brunswick. This Ecoregion spans the entire southern coastline of New Brunswick along the Bay of Fundy from the east side of Passamaquoddy Bay to the east side of Shepody Bay. It also encompasses the Western and Outer Isles which include Grand Manan, Campobello, Deer and Machias Seal islands.

The Fundy Coast Ecoregion is known for its unique type of raised bogs and the world’s highest tides. Elevations generally lie below 100 m, however, coastal cliffs can reach over 300 m. All of the rivers in this Ecoregion flow directly into the Bay of Fundy or one of its subsidiary bays/basins. Rivers meet the ocean as waterfalls and swift streams, or gently through coastal estuaries and marshes. There is also a rich diversity of wetland types, including coastal bogs. Coniferous forests dominate this Ecoregion with red spruce as the main tree species mixed with balsam fir, black spruce, white spruce and tamarack (NBDNR, 2007).

The geology in the vicinity of the PLNGS typically consists of Triassic age bedrock mapped as the Lepreau Formation, which consists of red, granite-clast sharpstone conglomerate and roundstone conglomerate, fine- to medium-grained sandstone to pebbly sandstone and minor red mudstone locally containing calcareous nodules (Barr and White, 2005). The land surface in the area of the PLNGS is covered with morainal sediment that was either deposited directly by Late Wisconsinan glacial ice or with minor reworking by water. The surficial geology of the Point Lepreau area is mapped as discontinuous veneer over rock consisting mainly of stony till (more than 35% of clasts pebble-sized and larger) less than 0.5m thick (Rampton, 1984).

As outlined in the 2022 CBCL letter report, a geotechnical investigation was completed for the PLNGS which found bedrock close to surface at approximately 2 m depth along the western side of the existing drainage channel and proposed STP location. CBCL also reported rip-rap/armour stone and remnant structural fill materials appearing to be embedded in the banks of the watercourse at the current STP location. GHD completed a site visit on August 16, 2022 and confirmed the presence of rip-rap/fill materials embedded in the banks of the watercourse. Refer to Appendix C for site photos and Figure 3 following the text for site photo locations and direction.

## 3.4 Fish and Fish Habitat

A small watercourse is located adjacent to the proposed location of the Project, which is primarily fed by effluents discharged from two outfalls draining treated wastewater and surface water run-off from the PLNGS facility. The small watercourse carries discharged effluents and storm water from the existing outfalls downstream through a small, degraded wetland to a cobble shoreline/beach on Maces Bay of the Bay of Fundy.

On August 16, 2022, a GHD field biologist conducted a qualitative aquatic habitat assessment of the drainage channel. Substrate in the channel varied, with gravel and rock being dominant in the upstream reach, and silt/mud being dominant in the downstream reach near the wetland boundary. Banks of the watercourse are steep and moderately vegetated with a mix of grass and shrubs (mostly speckled alder [*Alnus incana*]). The width of the watercourse ranged between 0.4 and 0.5 m, and depth of the channel was 0.1 m. A culvert is located at the downstream extent of the channel where it drains into the wetland. The wetland discharges to the Maces Bay shoreline through a second culvert, which has become mostly infilled with gravel and cobbles. No distinct channel is present downstream of the partially infilled culvert; water disperses across the shoreline prior to entering the Bay of Fundy. Since the culvert is located above the high-water mark, it is unlikely that fish are able to access the wetland and drainage channel from the Bay of Fundy. Furthermore, no fish were observed in the wetland or drainage channel during the August 2022 site visit and is considered unlikely that the watercourse or wetland area is fish bearing. Refer to Appendix C for site photos.

The Bay of Fundy is located approximately 115 m southwest of the Project Area. The Bay of Fundy exhibits the most extreme tides in the world and is home to over 100 species of fish, including striped bass (*Morone saxatilis*), American eel (*Aguillia rostrata*), American plaice (*Hippoglossoides platessoides*), Atlantic salmon (*Salmo salar*), Atlantic wolffish (*Anarhichas lupus*), Atlantic cod (*Gadus morhua*), Atlantic and shortnose sturgeon (*Acipenser oxyrhynchus oxyrhynchus* and *brevirostrum*), Atlantic herring (*Clupea harengus*), haddock (*Melanogrammus aeglefinus*), pollock (*Pollachius virens*), Atlantic halibut (*Hippoglossus hippoglossus*) and various skate species among many others (Stantec, 2018). Recreational fisheries exist in the Bay of Fundy for groundfish (cod, flounder, haddock, dogfish, pollock, and striped or Atlantic wolffish), mackerel, shark (porbeagle, blue shark, shortfin mako), bluefin tuna, marine worms, and shellfish, which includes bar clams, bay quahaug, razor clams, soft shell clams, scallops, and oysters (Stantec, 2018).

As construction activities are proposed to occur within 30 m of the watercourse, a *Watercourse and Wetland Alteration (WAWA) Permit* will be required. Fish and fish habitat are also protected under the federal Fisheries Act, which prohibits the death of fish, other than by fishing and the harmful alteration, disruption or destruction of fish habitat. The Act also prohibits the deposit of all deleterious substances into water frequented by fish or to any place, under any condition, where it may enter water frequented by fish. A Request for Review including a Project description should be submitted to Fisheries and Oceans Canada (DFO) for determining if the Project will negatively impact fish or fish habitat. If DFO determines that the Project will negatively impact fish or fish habitat despite mitigation measures, a Fisheries Act Authorization (FAA) will be required. In New Brunswick, WAWA permit applications are reviewed by DFO which acts as a Request for Review.

Based on the results of the aquatic habitat assessment, scope of the Project and current design, it is not anticipated that an FAA will be required.

## 3.5 Wetlands

The drainage channel flows into a small (<1 ha) wetland, which discharges onto a cobble shoreline/beach prior to reaching the Bay of Fundy (Appendix A: Figure 2). Photographs of the area collected during previous site visits by CBCL personnel indicate that the watercourse and wetland areas have likely been historically modified, as the banks and the downstream portion of the watercourse appear to consist of remnant structural fill materials (CBCL, 2022). GHD field personnel also noted rip-rap and fill materials along the banks of the watercourse and wetland during a site walk-through on August 16, 2022. Refer to Appendix C for site photos.

CBCL had identified the wetland based on a review of the site and previous environmental mapping in 2018. Since that time, the wetland reference mapping has been updated and the wetland is no longer mapped. As such, Maqamigew Anqotumeg Inc. (Maqamigew Anqotumeg) completed wetland delineation on September 1, 2022 to confirm the wetland boundary. Results indicated that the wetland is a flooded herb marsh and the wetland boundary has not changed significantly. The wetland shows evidence of past soil disturbance, including dyking and culvert installations along the southwest and northeast ends of the wetland. Field observations indicate the wetland may have previously been marine influenced, however current conditions do not allow for tidal waters to enter the wetland which appears to be transitioning into a watercourse. The wetland is not a salt marsh or any type of coastal wetland. The wetland survey report is found in Appendix D.

Based on the current wetland boundary, it was identified that the future Process Building will not infringe on the wetland itself, but will be constructed inside of the 30 m buffer of the wetland. Therefore, work associated with the construction of the Process Building will need to be included in the *WAWA Permit* application.

## 3.6 Flora

The proposed Project occurs in an area mostly cleared of vegetation, although some shrubs and small trees are located within the previously disturbed areas of the small watercourse. GHD field personnel conducted a site walk-over on August 16, 2022 to identify flora at the Project site. GHD noted the presence of grasses and alders along the banks of the watercourse, and mowed grass areas within the proposed Project footprint. Densely vegetated forest consisting primarily of spruce species and balsam fir (*Abies balsamea)* is located approximately 25 m south of the Project Area. Broadleaf cattail (*Typha latifolia*) dominates the wetland area, with speckled alder (*Alnus incana*), Canada goldenrod (*Solidago canadensis*), thistle species, annual fleabane (*Erigeron annuus*), horsetail (*Equisetum arvense*), spotted knapweed (*Centaurea stoebe*) and pussy willow occurring along the steep banks of the wetland.

Maqamigew Anqotumeg completed wetland delineation on September 1, 2022 and noted that dominant vegetation within the wetland included broadleaf cattail (*Typha latifolia*) and bluejoint grass (*Calamagrostis canadensis*), with lesser amounts of curly dock (*Rumex crispus*) and coltsfoot (*Tussilago farfara*). It was also noted that a mature boreal forest is located south of the wetland which is dominated by balsam fir (*Abies balsamea*) with lesser amounts of white spruce (*Picea glauca*) and paper birch (*Betula papyrifera*). A moderate understory of speckled alder (*Alnus incana*), low-bush blueberry (*Vaccinium angustifolium*), bunchberry (*Cornus canadensis*), twinflower (*Linnea borealis*) and balsam fir saplings was also noted.

A review of the New Brunswick Department of Natural Resources and Energy Development (NBDNRED) Protected Natural Area database indicates that no current or proposed Protected Natural Areas (PNAs) are found in the proposed Project footprint or within 5 km of its boundaries. In addition, the Project involves construction activities in previously developed areas; as such, old growth forest habitat or deer wintering areas are not present within the proposed Project footprint.

## 3.7 Fauna

Given the extended industrial use of the PLNGS and the general lack of functional habitat over most of it, terrestrial wildlife associated with the Project area is likely restricted to a variety of small terrestrial mammals (e.g., meadow vole), soil invertebrates, transient birds and potentially small, upper trophic level terrestrial mammals (e.g., fox).

Based on a review of aerial photographs and a site walk over in August 2022, the Project Area likely does not contain habitat sufficient to support larger mammals (e.g., deer, moose), with the exception of the outer boundaries of the PLNGS facility; Since the site is not fenced, larger animals could wander across the property and spend limited periods of time on site.

Given that the area surrounding the PLNGS consists largely of mixed forest habitat, larger mammals such as deer, moose or black bear may utilize the site for foraging. Wildlife most likely to utilize the site on a regular basis are typically associated with developed areas and relatively insensitive to anthropogenic activities.

# 3.8 Species at Risk

Information obtained in July 2022 from the Atlantic Canada Conservation Data Centre (ACCDC) regarding the historical and current occurrence of animal and plant species of concern at the PLNGS was used to determine if potential species at risk (SAR) occur in the vicinity of the proposed Project Area (report attached as Appendix E). The ACCDC maintains linked databases that document species that occur in each province in Atlantic Canada.

The ACCDC database identified 1 species of flora and 10 species of fauna SAR under Schedule 1 of the federal Species at Risk Act (SARA) as potentially occurring within 5 km of the Project Area. Those 11 species are: Van Brunt's Jacobs-ladder (*Polemonium vanbruntiae*), piping plover melodus subspecies (*Charadrius melodus melodus*), bank swallow (*Riparia riparia*), harlequin duck – Eastern population (*Histrionicus histrionicus pop. 1*), barn swallow (*Hirundo rustica),* rusty blackbird (*Euphagus carolinus*), barrow's goldeneye (*Bucephala islandica*), red-necked phalarope (*Phalaropus lobatus*), horned grebe (*Podiceps auritus*), red knot rufa subspecies – Tierra del Fuego/Patagonia wintering population (*Calidris canutus rufa*), and monarch (*Danaus plexippus*). Two (2) additional species were identified as SAR under the NB SARA and/or have Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designation: lesser yellowlegs (*Tringa flavipes*) and harbour porpoise (*Phocoena phocoena*). Five (5) of the above noted species were identified as occurring within 1 km of the site centroid (piping plover, lesser yellowlegs, harlequin duck, horned grebe, and monarch). A description of the identified SAR follows.

**Van Brunt's Jacobs-ladder**

Van Brunt's Jacobs-ladder is listed as Threatened under Schedule 1 of SARA, Schedule A of NB SARA and by COSEWIC. Several occurrences were reported for this species in 2012 and 2013; however, they are all greater than 4 km from the proposed STP location. Van Brunt's Jacobs-ladder is a plant species found in open or semi-open moist habitats with rich soils subject to flooding in the spring (such as riparian alder thickets, wet clearings, riparian herbaceous meadows and old fields with sufficient moisture), often located near the bottom of slopes or near streams (COSEWIC, 2002). The PLNGS generally lacks the habitat required for Van Brunt's Jacobs-ladder to be present.

**Piping Plover**

Piping plover is listed as Endangered under Schedule 1 of SARA, Schedule A of NB SARA and by COSEWIC. There were 3 occurrences of sightings reported with 2 occurrences being observed within 1 km of the proposed STP location, however, these occurrences were reported in 1977 and 1978. Piping plover feed along the shoreline and nest on wide sandy beaches with little vegetation and a mix of substrates such as pebbles, gravel, shells and sticks (COSEWIC, 2013c). On the Atlantic coast, piping plover most commonly nest on sandy beaches found on barrier islands, ocean fronts, bays and sand bars. GHD field personnel noted that the beach located approximately 100 m southwest of the proposed Project Area is dominated by larger rock and cobble and generally lacks suitable nesting habitat for piping plover. Furthermore, construction activities are not anticipated to occur within the shoreline of the Bay of Fundy. As such, the proposed Project is not anticipated to impact piping plover.

**Bank Swallow**

Bank swallow is listed as Threatened under Schedule 1 of SARA and by COSEWIC and is not listed under Schedule A of NB SARA. The only occurrence of bank swallow was in 2013 and was more than 4 km from the proposed STP location. Bank swallow is a small insectivorous songbird which breeds in areas with vertical banks, including the banks of watercourses. Breeding sites are often situated near open areas used to forage for insects (COSEWIC 2013a). The banks of the small watercourse adjacent to the STP are not vertical and the PLNGS generally lacks the habitat required for bank swallow to be present in the area.

**Harlequin Duck Eastern population**

Harlequin duck is listed as Special Concern under Schedule 1 of SARA and by COSEWIC and Endangered under Schedule A of NB SARA. Although there are several occurrences listed for this species, only one occurrence was reported within 1 km of the proposed STP location in 2019. The harlequin duck is a small sea bird that occupies clear, fast-flowing rivers and streams during the breeding season, and rugged, outer-marine coastlines in the winter (COSEWIC, 2013). In New Brunswick, the Eastern population breeds in the northern part of the province and winters

along the coastlines of the Bay of Fundy. The PLNGS lacks suitable breeding habitat for the harlequin duck; however, known wintering habitat can be found off the coast of Point Lepreau, approximately 900 m south of the proposed STP location. As such, potential wintering habitat may also be present off the coastline located approximately 125 m southwest of the proposed Project Area. However, construction activities are not anticipated to occur within the shoreline of the Bay of Fundy and no interaction between the Project and harlequin duck is anticipated.

**Barn Swallow**

Barn swallow is listed as Threatened under Schedule 1 of SARA and Schedule A of NB SARA, and as Special Concern by COSEWIC. Only 2 occurrences of sightings were reported and both occurrences were greater than 4 km from the proposed STP location. Barn swallow is most often associated with open rural and urban areas where bridges, culverts and buildings are found near rivers, lakes, marshes or ponds. Barn swallow nests are typically constructed on vertical or horizontal building structures under suitable overhang, on bridges or in a culvert, usually made of mud and grass or straw (COSEWIC, 2011). Based on the abundance of buildings and infrastructure at the PLNGS and the availability of nest materials, there is potential for barn swallow to be present at the site.

**Rusty Blackbird**

Rusty blackbird is listed as Special Concern under Schedule 1 of SARA, Schedule A of NB SARA and by COSEWIC. The only occurrence of Rusty blackbird was in 2006 and was more than 3 km from the site. Rusty blackbird is most often associated with treed bogs, fens, beaver ponds, wet meadows and the shrubby shorelines of lakes, rivers and swamps. Rusty blackbird nests are typically constructed low in shrub or small conifers, often over or near water. The nest is made of twigs, grass and lichen (COSEWIC, 2006b). The proposed STP location generally lacks the habitat required for Rusty blackbird to be in the area, with the exception of flying by.

**Barrow's Goldeneye**

Barrow's Goldeneye is listed as Special Concern under Schedule 1 of SARA, Schedule A of NB SARA and by COSEWIC. The only occurrence of Barrow's Goldeneye was in 2005 and was more than 3 km from the site. The eastern Canadian population of barrow's goldeneye is centered in Québec where most of the birds breed and winter, with the exception of a small number of birds that winter in the Maritime Provinces and along the north Atlantic coast of the United States (COSEWIC, 2000). Barrow's goldeneye typically winters in coastal waters near protected rocky shorelines, with a few occasional birds being found in open rivers (COSEWIC, 2000). Potential wintering habitat may be present off the coastline located approximately 125 m southwest of the proposed STP location. Due to the scope of the Project and distance from potential wintering habitat, no interaction between the Project and barrow's goldeneye is anticipated.

**Red-necked Phalarope**

Red-necked phalarope is listed as Special Concern under Schedule 1 of SARA and by COSEWIC and is not listed under Schedule A of NB SARA. The only occurrence of red-necked phalarope was in 1976 and was 4 km from the site. Red-necked Phalarope typically breed in Arctic and sub-Arctic grounds and winter on the open ocean (COSEWIC, 2014). During migration, they are most abundant in the lower Bay of Fundy where they are concentrated along areas of calm caused by upwelling and sinking. Potential migration habitat may be found off the coastline of the Bay of Fundy, located approximately 125 m southwest of the proposed STP location. Due to the scope of the Project and distance from potential migration habitat, no interaction between the Project and red-necked phalarope is anticipated.

**Horned Grebe**

Horned Grebe is listed as Special Concern under Schedule 1 of SARA, Schedule A of NB SARA and by COSEWIC. Although there are several occurrences listed for this species, only two occurrences were reported within 1 km of the proposed STP location, both in 2014. Horned Grebe generally breeds in freshwater and occasionally in brackish water on small ponds, but also uses marshes and shallow bays on lake borders, however, the only known breeding record in New Brunswick dates back to 1873 (COSEWIC, 2009). Horned Grebe typically winter in marine habitats, mainly estuaries and bays. The Bay of Fundy is located approximately 125 m southwest of the proposed Project Area and

construction activities are not anticipated to occur along the shoreline. Due to the scope of the Project and distance from potential wintering habitat, no interaction between the Project and horned grebe is anticipated.

**Red Knot rufa subspecies Tierra del Fuego/Patagonia wintering population**

Red Knot rufa subspecies Tierra del Fuego/Patagonia wintering population is listed as Endangered under Schedule 1 of SARA and Schedule A of NB SARA and is listed as Endangered and Special Concern by COSEWIC. Three occurrences of sightings were reported, and all occurrences were 4 km from the proposed STP location. Red Knot rufa subspecies Tierra del Fuego/Patagonia wintering population have an extreme migration route as they breed in the central Canadian Arctic and winter at the southern tip of South America, in Patagonia, Argentina, and Tierra del Fuego (COSEWIC, 2020b). During migration, red knots use coastal areas with extensive sandflats, mudflats and rocky flats, where birds feed on bivalves and other invertebrates. The rocky/cobble beach located 100 m southwest of the proposed STP location may provide suitable feeding habitat for migrating red knot. Construction activities are not anticipated to occur along the shoreline of the Bay of Fundy. Due to the scope of the Project and distance from potential feeding habitat, and no interaction between the Project and red knot is anticipated.

**Monarch**

Monarch is listed as Special Concern under Schedule 1 of SARA and Schedule A of NB SARA and is listed as Endangered by COSEWIC. The only occurrence of monarch was in 2015 and was within 1 km of the site, however, staff of the PLNGS have noted sightings of monarchs regularly. 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, dry sandy areas, prairies, riverbanks, ditches, valleys and hillsides (COSEWIC, 2010). In New Brunswick, breeding occurs mainly along the banks of the Saint John River. The late summer adults migrate south to Mexico where they overwinter. There is an area on Point Lepreau that is a Monarch butterfly tagging station (Figure 2). In 2017, it was designated an ‘Official Monarch Watch Stop’ as a critical stop for the annual migration of butterflies from Canada to Mexico where they overwinter. The Saint John Naturalists’ Club leads annual tagging of the butterflies and provides guidance to the preservation of existing milkweed growing on site as well efforts to plant more. Milkweed is generally located out on the Point (adjacent to the lighthouse area) away from active areas of the PLNGS. It should be noted this area is approximately 0.8 km south of the proposed STP location. Milkweed was not observed in the vicinity of the proposed STP location, therefore no interaction between the Project and monarch butterfly is anticipated.

**Lesser Yellowlegs**

Lesser yellowlegs is listed as Threatened by COSEWIC and is not listed under Schedule 1 of SARA and Schedule A of NB SARA. There are several occurrences listed for this species with 6 occurrences reported within 1 km of the proposed STP location, all of them in 1978. Lesser yellowlegs breeds primarily in the boreal forest of Canada and Alaska, including all provinces and territories except the Maritimes (COSEWIC, 2020a). In the Maritimes, lesser yellowlegs uses both freshwater and marine shorelines during migration. The Bay of Fundy shoreline is located approximately 100 m southwest of the proposed STP location, which may provide suitable habitat for lesser yellowlegs during migration. Due to the scope of the Project and distance of the shoreline from the proposed STP location, no interaction between the Project and lesser yellowlegs is anticipated.

**Harbour Porpoise**

Harbour porpoise is listed as Special Concern by COSEWIC and under Schedule A of NB SARA but is not listed under Schedule 1 of SARA. The only occurrence of harbour porpoise was in 1973 and was more than 1 km from the site. Harbour porpoise are widely distributed over the continental shelves of the temperate Northern Hemisphere and, in eastern Canada, occur from the Bay of Fundy north to Cape Aston (COSEWIC, 2006a). They are sometimes found in bays and harbours, particularly during the summer. Due to the scope of the Project and distance from suitable habitat, no interaction between the Project and harbour porpoise is anticipated.

**Location Sensitive Species**

Reports prepared by the ACCDC provide the user with coordinates of records of SAR within 5 km (from centre) of a site. NBDNR has, however, 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. Location sensitive species in New Brunswick include Eastern painted turtle (*Chrysemys picta picta*), snapping turtle (*Chelydra serpentine*), wood turtle (*Glyptemys insculpta*), bald eagle (*Haliaeetus leucocephalus*), peregrine falcon anatum/tundius pop. (*Falcon peregrinus pop.1),* cobblestone tiger beetle (*Cicindela marginipennis*), Maritime ringlet (*Coenoympha nipisiquit*) and bat (*Bat hibernaculum*). If any of these species are present within 5 km (from centre) of a site, the ACCDC report identifies them as present.

The ACCDC reported one location sensitive species (bald eagle) within 5 km of the proposed STP site. Bald eagle is listed under the NB SARA as Endangered. Bald eagles nest in large trees, generally near water as fish are a major component of their diet. Bald eagles build the largest nest of any bird in North America and prefer nesting sites near open water (NBDNR, 2015). During winter, individuals from the resident population are often found in the southwestern part of the province, where they have access to the Bay of Fundy for fishing. They also feed on carrion and small mammals. Critical habitat for the species has not been identified in New Brunswick. During a field reconnaissance, CBCL noted an observation of bald eagle, however this species is not known to inhabit the proposed location of the STP.

No other rare or endangered species were identified in the Project Area during CBCL's previous site investigation; however, large purple fringed orchid was observed within 250 m of the Project Area. No other known rare or endangered species were identified within approximately 1 km of the proposed site (CBCL, 2022).

# 3.9 Special Areas

Two biologically significant sites were identified within a 5 km radius of the Project Area: the Point Lepreau and Maces Bay Important Bird Area (IBA) and the Dipper Harbour Environmentally Sensitive Area (ESA). The Point Lepreau and Maces Bay IBA (NB020) is internationally recognized as an ecologically significant area for migratory waterfowl and wading shorebirds. The Project is located on lands within the eastern boundary of the IBA, which generally spans the marine area between Point Lepreau and Maces Bay and includes intertidal reef ledges bordered by mud flats and shallow inlets which provide foraging and migratory habitats for waterfowl and shorebirds (IBA Canada, 2022). Due to the scope and location of the Project, and the existing industrial nature of the PLNGS, the Project is not anticipated to impact the IBA.

The Dipper Harbour ESA is a small area of geological interest located on Route 790, between Maces Bay and Chance Harbour (approximately 5 km northeast of the Project Area). The ESA is described as follows: "Precambrian light-coloured felsic volcanic rocks are exposed along the east side of the harbour and in nearby roadcuts. Small, clear "Quartz eyes" (phenocrysts) can be seen in these rocks." (ACCDC, 2022). Due to the distance from the proposed Project site, no interaction between the Project and Dipper Harbour ESA is anticipated.

The Point Lepreau Bird Observatory (PLBO) is located at the tip of Point Lepreau, approximately 0.8 km south of the proposed STP location. The PLBO was established by the Saint John Naturalists' Club in 1995 to monitor seabird migration through the Bay of Fundy. The mouth of the Bay of Fundy acts as a funnel for birds following the North Atlantic coastline during northward migration. Once the birds enter the Bay, they fly northeast toward its head and there make their first overland crossing in as much as six months before continuing up the east coast of New Brunswick and beyond. In fall the birds return to the Atlantic Coast from scattered locations in the North, resulting in little concentration in the Bay of Fundy. Seabird counts have been conducted annually in spring and fall since 1996 with the bulk of bird traffic observed during the month of April. Due to the distance from the proposed Project site, no interaction between the Project and PLBO is anticipated.

# 3.10 Water Quality

## 3.10.1 Effluent

Monitoring of the quality of the STP effluent discharged to the small watercourse is required to meet the conditions of the *Approval to Operate* S-3271, issued June 27, 2019 by NBDELG under the *Water Quality Regulation* of the Clean

Environment Act (valid to June 26, 2024). Effluent performance standards are outlined for CBOD, TSS, un-ionized ammonia and residual chlorine (Table 1). The Approval also outlines conditions for the settling lagoons associated with the industrial wastewater treatment facility. There are no other effluent discharges downstream of the existing discharge location.

The conditions associated with the STP include requirements for emergency reporting and record keeping, overflow management, temporary bypass authorization, monitoring and sampling. Monitoring requirements include:

– Calculating and recording annually the Average Daily Volume of effluent deposited via the final discharge point;
– Collecting grab or composite samples from the final discharge point to be analysed for CBOD and suspended solids. The frequency and type of collection depends on the calculated Average Daily Volume of effluent. Reporting of CBOD and TSS is completed on a quarterly basis; and
– Collect a grab sample at the final discharge point for Acute Lethal Toxicity testing. Frequency (quarterly or monthly) depends on the calculated Average Daily Volume of effluent and results of previous acute lethal toxicity tests.

NB Power is also required to have an approved Effluent Monitoring Plan and must follow the monitoring requirements outlined within the Effluent Monitoring Plan.

The current STP is operating well and is meeting the effluent requirements outlined in the *Approval to Operate*, however, the installation of the MBR in 2009 was only meant to operate temporarily and requires significant modifications for long term use.

### 3.10.2 Groundwater

The proposed Project is not located within a protected wellfield area. The nearby communities of Maces Bay and Dipper Harbour obtain their drinking water from potable wells. The nearest residence is located approximately 1.5 km northwest of the Project Area. Potable water at the PLNGS is provided by a third party and is trucked into the facility. There are no potable wells at the PLNGS. All non-potable water requirements are satisfied by the existing onsite surface water reservoir (Hanson Stream pumphouse), which is located approximately 600 m northeast of the current domestic wastewater treatment facility.

GEMTEC Consulting Engineers and Scientists Limited (GEMTEC) completed a geotechnical investigation at the PLNGS in 2021 and found that depth to groundwater in close proximity of the proposed STP location is 1.628 m below ground surface (bgs). A review of the NBDELG Online Well Log System (OWLS) was also completed, which identified six (6) domestic drinking water wells and one (1) industrial, non-drinking water well within 2 km of the Project Area. Well depths ranged from 36.58 to 68.58 m.

## 3.11 Ambient Air Quality

NB Power controls and monitors airborne emissions from the PLNGS under their Environmental Management Plan (EMP) by conducting ambient air quality monitoring to confirm that airborne emissions from the PLNGS site remain at levels that are protective of human health and the environment. Routine atmospheric monitoring data, which is reported annually in NB Power's annual compliance reports, includes airborne particulates, iodines, water vapour, carbon dioxide ($CO_2$), sulphur dioxide ($SO_2$) and volatile organic compounds (VOCs), among others (CNSC, 2021).

In addition, ambient gamma radiation is measured using dosimeters at 76 locations at and around the PLNGS, including at a reference location about 50 km from the PLNGS that is not impacted by the facility releases, and thus, is used as a proxy for background conditions. Measurements are taken at several locations and averaged. Ambient gamma measurements are collected quarterly and reported in NB Power's annual compliance reports (CNSC, 2021).

NB Power assessed potential impacts to ambient air quality at the PLNGS in their 2021 Environmental Risk Assessment (ERA) using air dispersion modelling based on emissions data from the facility. Overall, the ERA found that predicted influence on ambient air quality at the facility is negligible. The Canadian Nuclear Safety Commission

(CNSC) reviewed the most recent version of the ERA and also determined that ambient air quality at the PLNGS remains at levels protective of human health and the environment (CNSC, 2021).

Aside from a temporary, localized increase of greenhouse gas (GHG) emissions and the potential for intermittent fugitive dust due to construction activities, ambient air quality is not anticipated to be adversely impacted by the Project as the STP will continue to operate in the same manner as current conditions.

## 3.12 Noise

Existing sound quality conditions in the vicinity of the Project were not measured for this assessment. Given the scope and setting of the Project and the current operation of the site as a Nuclear Generating Station, existing noise levels in the vicinity of the Project are expected to be typical of an energy production facility located in a rural setting. The nearest residential dwelling is located approximately 1.5 km northwest of the proposed Project Area, therefore ambient sound quality at residential receptors is not anticipated to be adversely impacted by Project related activities.

## 3.13 Transportation

The PLNGS is located approximate 2.3 km southwest of the Route 790 Highway and can be accessed via County Line Road or Duck Pond Road. Duck Pond Road is a dirt road that traverses entirely through undeveloped forested land between the PLNGS and Route 790. County Line Road is a paved road that extends from the PLNGS to Route 790 in the community of Maces Bay. The PLNGS access gate is located on County Line Road near its intersection with Ridge Road in the community of Maces Bay; therefore, the majority of County Line Road is only accessible to NB Power personnel and other approved workers. Traffic activity may marginally increase at the PLNGS during construction activities, however this increase will be temporary and mostly contained within the PLNGS property. No change in traffic is anticipated during operation of the Project, as the upgraded STP will operate in the same manner as current conditions.

Due to the scope and magnitude of the proposed Project, it is not anticipated that transportation near the PLNGS will be significantly impacted during construction and operation activities.

## 3.14 Socio-Economic and Cultural Features

The Project Area is located in a sparsely populated area of southern New Brunswick, on the boundary between the Lepreau Parish of Charlotte County, and Musquash Parish of Saint John County. Land surrounding the PLNGS is undeveloped forested land with the nearest communities (Maces Bay and Dipper Harbour) being located approximately 3 km north and northeast of the PLNGS. According to the 2016 Census, populations of the Lepreau and Musquash Parishes were 707 and 1,194, respectively (Statistics Canada, 2016). The average age of the Lepreau Parish population is 48.6 and the average age of the Musquash Parish population is 43.2. The labour participation rates for both Parishes are 55.5% (Lepreau) and 58.9% (Musquash), which are below the average for the province (61.5%).

There is currently a Prohibition Order (MTN-2019-025) for the harvesting of blue mussels, horse mussels, Atlantic surf clams and bay quahaugs in the Bay of Fundy due to the presence of biotoxins. However, other fisheries remain open in the Point Lepreau area.

The nearest First Nation community to the proposed Project is Oromocto First Nation which is located approximately 87 km northwest of the Project Area, followed by St. Mary’s and Kingsclear First Nations located 102 and 103 km northwest, respectively. All three First Nations are members 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.

The Peskotomuhkati (Passamoquoddy) Nation consists of three communities, Sipayik and Motohkamikuk in Maine, and Skutik in New Brunswick. Although there is no officially recognized Passamoquoddy First Nation in Canada, the traditional territory of the Passamoquoddy Nation includes Eastern Maine and Southwest New Brunswick, specifically,

the watershed of the Schoodic (St. Croix) River and Passamaquoddy Bay. The Passamoquoddy Nation at Skutik Community is located approximately 50 km southwest of the Project Area (ATRIS, 2022).

A predictive desktop archaeological assessment conducted by the Archaeological Services Branch of the New Brunswick Department of Tourism, Heritage and Culture (NBDTHC) indicates that there are no registered archaeological sites within the area of the proposed upgraded STP (CBCL, 2022). Furthermore, the proposed Project footprint is located on previously disturbed land within the PLNGS footprint.

# 4. Summary of Environmental Impacts

The present EIA establishes the interactions between Project activities and aspects of the natural and socio economic environment, identifies Valued Environmental Components (VECs) to focus the assessment on the issues of greatest ecological and socio economic concern, assesses the significance of potential impacts of the phased Project on the VECs and suggests measures to avoid or mitigate them. Section 4.1 further outlines the EIA methodology. It is consistent with the guidance provided in the NBDELG Guide to Environmental Impact Assessment in New Brunswick (NBDELG, 2018) and Additional Information Requirements for Wastewater Treatment Projects (NBDELG, 2022).

## 4.1 Assessment Methodology

The interactions between the Project activities, described in Section 2.0, and environmental components were established on the basis of the sources of potential impacts of those activities. The VECs were established principally on the basis of protection afforded by legislation and importance accorded by regulators, stakeholders and the scientific community. Section 4.3 discusses the VECs and the potential impacts thereon.

The potential impacts on the VECs are assessed in the context of their magnitude, geographic extent, duration, degree of reversibility and probability of occurrence, where possible. The significance of potential negative impacts is first reduced by design features and siting considerations of the Project (discussed in Section 2.5) and standard mitigation measures, which are outlined in Section 4.2. The potential impacts are assessed taking into account those features and measures, and additional mitigation measures are proposed to further reduce impact significance where warranted. The significance of the resulting residual negative impacts is ascribed to one of four categories: negligible; low; moderate; or high.

## 4.2 Impact Assessment

### 4.2.1 Surface Water Quality

Ground disturbance activities during site preparation and construction are anticipated to occur within 30 m of the small, unmapped drainage ditch and wetland. Any physical disturbance that results in the exposure of soils has the potential to allow sediments to enter watercourses, wetlands, and waterbodies, particularly during the spring months and early fall when larger precipitation events occur. Sediment entering watercourses, wetlands or other sensitive habitat has the potential to cause adverse environmental effects to these habitats. Therefore, erosion and sedimentation control measures and best practices will be incorporated for all phases of the Project and will be checked regularly and prior to and after storm events to ensure they are continuing to operate properly to prevent the undue release of suspended sediments.

Earth moving activities required during various phases of the Project will be confined to the immediate Project Area, given the already-developed nature of the site. Specific environmental mitigation measures to prevent surface erosion and siltation during these activities include:

– Any excavation materials will be stored at a location on-site which is sufficiently distant from any watercourse and wetland, so as to prevent siltation;

– Erosion and sediment control devices will be installed where necessary prior to the onset of construction and modified as necessary to account for changing patterns as construction proceeds;
– Erosion control structures will be inspected daily and immediately following storm events until stable conditions are achieved. Necessary repairs will be undertaken immediately;
– All necessary measures will be taken to ensure compliance with environmental approvals & regulations;
– During construction, and until such time as any disturbed areas can be re-vegetated, the disturbed areas which are outside the active construction area will be stabilized with mulch or other material to prevent erosion and siltation;
– Site runoff which contains suspended sediments shall be controlled on-site to the extent possible, and all reasonable measures shall be taken to minimize their entry into waterways or other sensitive habitat;
– The release of surface runoff which contains suspended sediments shall be in accordance with federal and provincial requirements. The concentration of TSS in effluent released to the environment should not exceed 25 mg/L (monthly average) or 50 mg/L (grab sample); and
– Work shall be scheduled or suspended as much as possible so as to avoid periods of heavy precipitation.

In addition, mitigation measures outlined in Section 4.2.9, Accidents and Spills, will be followed to prevent the accidental release of petroleum products or other contaminants from construction equipment and vehicles into any surface water bodies.

Based on the above, the residual Project impact on surface water quality is predicted to be negative yet of negligible importance during construction activities and potential positive long-term impact due to enhanced treatment reliability compared to current conditions.

### 4.2.2 Soil Quality and Groundwater

The main Project component with the potential to impact soil quality and groundwater in the Project Area is the accidental release of petroleum products or other contaminants from vehicles, machinery or equipment during site preparation and construction activities. Refer to Section 4.2.9 for mitigation measures associated with accidental spills and releases, and the procedure for containing spills in the event one occurs.

### 4.2.3 Air Quality

Exhaust from construction vehicles and equipment and fugitive dust resulting from site preparation and construction activities are the main anticipated air emissions resulting from the Project. The emissions produced will include particulate matter (PM), carbon monoxide (CO), $CO_2$, nitrogen oxides ($NO_x$) and $SO_2$.

Increased exhaust emissions and dust generated during the site preparation and construction phases of the Project will be localized and temporary in nature. No residential receptors are present within 1.5 km of the Project Area.

Mitigation measures that will be implemented include the following:

– Use standard construction equipment and existing roads for movement of equipment and materials into and out of the Project Area;
– No excessive idling of construction vehicles;
– Use of wet suppression controls as required to minimize dust produced by on-site vehicles and equipment; and
– Routine inspection of construction equipment by qualified staff and/or a NB Power representative to ensure efficient operation.

Based on the above, the residual short-term impact on air quality is predicted to be negative yet of negligible importance during site preparation and construction activities associated with the Project. Long-term air quality is not anticipated to be impacted by the Project as the STP will continue to operate in the same manner as current conditions.

### 4.2.4 Fish and Fish Habitat

The upgraded STP infrastructure will be installed within 30 m of the drainage ditch and wetland, therefore a *WAWA Permit* will be required. Any potential negative interaction with construction activities and the watercourse/wetland will be mitigated through proper erosion and sediment controls, as discussed in Section 4.2.1, in addition to any other conditions outlined in the *WAWA Permit*. An FAA may also be required if DFO determines that fish and/or fish habitat will be negatively impacted despite mitigation efforts. If an FAA is required, conditions set out in the approval will be followed in addition to those noted above.

Treated effluent currently discharges into the small watercourse which subsequently flows through the downstream wetland and Bay of Fundy. Discharge from the upgraded STP will be through the current STP's outfall infrastructure and will not exceed the quality limits currently in place under the *Approval to Operate* for the STP. As such, interactions between treated wastewater and fish or fish habitat will be similar to current conditions.

The proposed Project represents an overall improvement in reliability and extends the design life and capacity of the STP providing treatment of sanitary sewage at PLNGS. This in turn will provide additional mitigation by reducing the probability of an accidental release of untreated sewage into the small watercourse and subsequently the downstream wetland and Bay of Fundy from failure of the existing STP.

Based on the above, the residual Project impact on fish and fish habitat is predicted to be negative yet of negligible importance during construction activities and potential positive long-term impact due to enhanced treatment reliability compared to current conditions.

### 4.2.5 Wetlands

The STP outfall discharges into the adjacent drainage ditch which then flows through a small wetland and subsequently the Bay of Fundy. As noted previously, treated effluent discharging from the upgraded STP will meet the treatment criteria outlined in NB Power's current *Approval to Operate*. As such, interactions between treated wastewater and the coastal wetland will be similar to current conditions and impacts are anticipated to be negligible.

The future Process Building will be constructed inside the 30 m buffer of the wetland during Phase 2 of the Project, which would require approval under a *WAWA Permit*. As construction activities are only anticipated to occur in the 30 m buffer and not within the wetland itself, it is not anticipated that compensation will be required. Potential impacts to the wetland will be mitigated through proper erosion and sediment controls (as discussed in Section 4.2.1) in addition to any other conditions outlined in the *WAWA Permit*.

Based on the above, the residual Project impact on wetlands is predicted to be negative yet of negligible importance during construction activities and potential positive long-term impact due to enhanced treatment reliability compared to current conditions.

### 4.2.6 Migratory Birds

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 or 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.

Vegetative clearing is projected to occur on a limited basis, based on the preliminary design drawings for the proposed Project. Work areas will mainly be limited to disturbed areas that generally lack vegetation suitable for nesting/breeding migratory birds (mowed grass). A small portion of alders may be cleared along the top of the eastern bank of the drainage ditch. If clearing is required during the bird nesting season (mid-April to late August), it will be conducted in accordance with guidance from ECCC and NB Power's internal Avian Protection Plan document, which may include a pre-clearing site visit by a qualified birder before conducting clearing activities.

Potential impacts to surface water in the drainage ditch, wetland or Bay of Fundy that may be used by migratory birds will be minimized through the application of the mitigation measures relative to surface water bodies.

Based on the above, the residual Project impact on migratory birds is predicted to be negative yet of negligible importance.

### 4.2.7 Species at Risk and Special Areas

SAR are protected under the federal and provincial SARAs, which prohibits harm to a listed species or its habitat.

The ACCDC database identified 11 SAR as potentially occurring within 5 km of the proposed Project Area (identified in Section 3.8). Figure 4 following the text shows that species identified as occurring within 1 km of the Project Area are generally located on or off the southern tip of Point Lepreau. Five (5) of these species are identified as SAR, which are mostly migratory birds.

Potential exists for barn swallow to utilize buildings and infrastructure located on-site. However, no demolition or alteration of existing buildings is expected for the proposed Project. Project related activities will also be conducted in accordance with guidance from ECCC and NB Power's internal Avian Protection Plan document.

One location-sensitive species was identified within 5 km of the Project Area: bald eagle (*Haliaeetus leucocephalus*).

As noted in Section 4.2.6, vegetative clearing for the Project is projected to occur on a limited basis. The footprint requiring clearing for construction activities generally consists of mowed grass, and a small section of alders. If clearing is required during the bird nesting season (mid-April to late August), it will be conducted in accordance with guidance from ECCC and NB Power's internal Avian Protection Plan document, which may include a pre-clearing site visit by a qualified birder before conducting clearing activities.

Of the two special areas identified by ACCDC as being within 5 km of the Project Area, only one – the Point Lepreau and Maces Bay IBA – is within 1 km of the Project Area. The PLBO is also located within 1 km of the Project Area. However, due to the scope and location of the Project, and the existing industrial nature of the PLNGS, the Project is not anticipated to impact the IBA or PLBO.

Based on the above, the residual impact on SAR and special areas is predicted to be negative yet of negligible importance.

### 4.2.8 Accidental Spills and Releases

Accidental spills and releases of petroleum products and/or other contaminants can occur during the operation of motorized vehicles or equipment on site during Project related activities. These unplanned releases into the environment can impact soil, surface water, groundwater and wildlife. To reduce the likelihood of accidental spills and releases, the following mitigation will be followed:

– Vehicle and equipment re-fueling and maintenance will be conducted a minimum of 30 m away from any body of water, drainage channel, watercourse, or wetland;
– Construction vehicles and equipment will be maintained in good working order and will be inspected regularly for fuel leaks and repaired immediately if leaks are found;
– Emergency spill kits will be maintained on-site and all staff will be trained on how to use them;
– The storage of chemicals and petroleum hydrocarbons will be in appropriate containers and in designated areas to reduce the potential of leaks; and
– In the event of a spill, all work in the immediate area shall be halted and the spill shall be promptly contained, cleaned up and reported to NBDELG at 506-547-2092 during weekday working hours and to 1-800-565-1633 after normal working hours.

Based on the above, the residual impact of potential accidental spills on soil, groundwater and surface water is predicted to be negative yet of negligible importance.

### 4.2.9 Socio-Economic

The proposed Project will result in short-term additional employment and contracts, however, upon completion the upgraded STP will operate in a similar capacity to current conditions and no requirement for additional employees is anticipated.

Based on the above, the Project will have a small short-term positive impact on employment during construction activities. No negative impacts on employment are anticipated from Project related activities.

### 4.2.10 Archaeological Resources

NBDTHC conducted a predictive desktop assessment and indicated that no registered archaeological sites are located within the proposed Project Area (CBCL, 2022). The proposed Project Area is also located in a previously disturbed area of the PLNGS site, and a relatively limited area of disturbance is required for construction. While the potential for encountering any archaeological or heritage resources at the construction site is low, caution will be exercised during Project activities in the event any artifacts of archaeological and/or heritage significance are discovered. If at any time archaeological resources are discovered over the course of the Project, all work shall cease near the find and the Archaeology and Heritage Branch of NBDTHC shall be contacted immediately at (506) 453-2738 for further direction. Furthermore, NB Power has developed a Corporate Procedure (HSEE-02-P028) for the Accidental Discovery of Archaeological Resources and Human Remains which will be followed in the event of a discovery. A copy of this procedure can be found in Appendix F.

# 5. Public Involvement and Aboriginal Engagement

As presented in Section 2.6.1.1, NB Power proposes to meet or exceed the minimum notification, involvement and engagement requirements of the NBDELG Guide to Environmental Impact Assessment. As such, direct communication with stakeholders (nearby residents and community groups, local service district, etc.) and First Nations is required.

NB Power holds regular routine meetings with MTI, WNNB and Peskotomuhkati to inform and update First Nations on current and up-coming projects. Within the last few meetings, NB Power has notified First Nations of the upcoming Project and has provided an opportunity to answer questions and address concerns. To date, no major concerns have been received, and NB Power has committed to providing a copy of the EIA registration document to First Nations for review and input at the time of EIA registration along with a formal notification letter. Any comments or concerns identified, will be tracked and addressed as part of the EIA review process.

Formal Stakeholder and First Nation notification will consist of an information flyer that will briefly describe the undertaking and the Project Area as well as the status of the Government of New Brunswick (GNB) approval process; the flyer will also explain how to view the EIA Registration document, invite comments or questions about the environmental impacts by a specified date and provide the relevant contact information. NB Power will make copies of the EIA Registration document available to any interested member of the public or Aboriginal group. NB Power will also provide a hard copy of the EIA Registration document to the nearest municipality's office (City of Saint John) for viewing by the public and will request that the City provides notice of such on their website.

In addition, project Information was presented at a community meeting held on August 18, 2022, and to-date no major concerns have been received. The community meeting included representation from:

– The Musquash Fire Department
– The Royal Canadian Mounted Police (RCMP)
– The Fundy North Fishers Association

– The Musquash Recreational Center
– The Province of NB Emergency Measures Organization (EMO) Warden Service
– The 50+ Fundy Senior Club
– Horizon Health – Charlotte County
– The Point Lepreau Community Relations Liaison Committee

Finally, NB Power will submit to NBDELG a report documenting the public involvement and Aboriginal engagement/consultation activities, describing any issues or concerns received and indicating how they were, or will be, addressed. These commitments will also be captured through a Project Specific Environmental Management Plan (PSEMP), anticipated to be a Condition of EIA Determination should the project receive EIA approval.

# 6. Approval of the Undertaking

The permits, licenses, approvals or authorizations that may be required for the proposed Project include (but are not limited to):

– *Certificate of Determination* from NBDELG under the *Environmental Impact Assessment Regulation* of the Clean Environment Act, per *Schedule A*, construction, modification, or decommissioning of a sewage disposal or treatment facility
– Approvals to Construct and Operate issued by NBDELG under the *Water Quality Regulation* of the Clean Environment Act
– *WAWA Permit* issued by NBDELG under the *Watercourse and Wetland Alteration Regulation* of the Clean Water Act
– Submit a Request for Project Review to DFO for determining if an Authorization is required under the Fisheries Act

# 7. Funding

The proposed Domestic STP Phased Replacement Project is fully funded by the proponent, NB Power.

# 8. Closure

All of which is respectfully submitted,

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Environmental Engineer

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# Figures


Paper Size ANSI A

0 0.5 1 1.5 2

Kilometers

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GHD

**NEW BRUNSWICK POWER CORPORATION**
**POINT LEPREAU NUCLEAR GENERATING STATION**
**MACES BAY, NEW BRUNSWICK**
**DOMESTIC SEWAGE TREATMENT PLANT**
**PHASED REPLACEMENT - EIA REGISTRATION**

**SITE LOCATION**

Project No. **12586687**
Revision No. **-**
Date **August 2022**

# FIGURE 1

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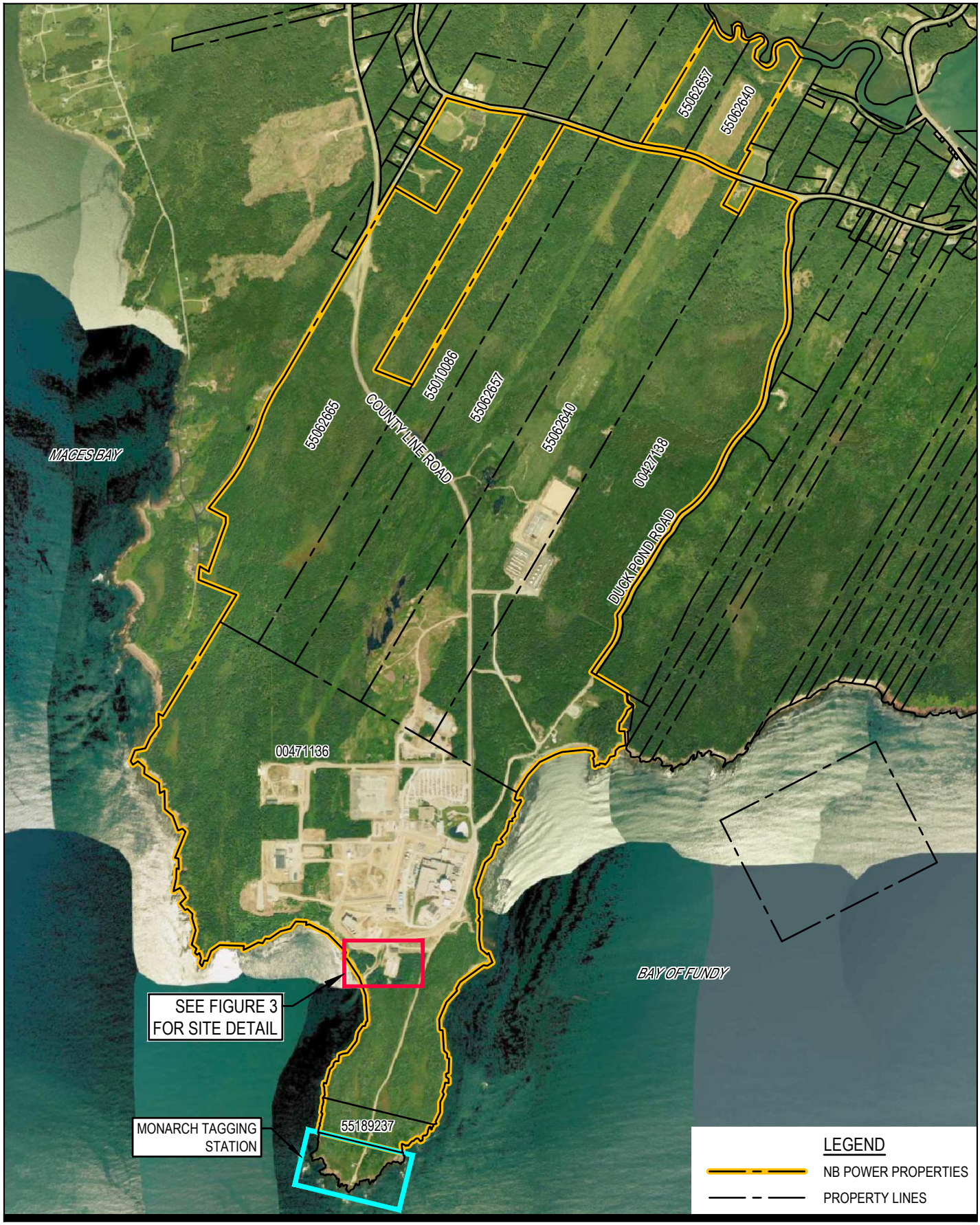


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NB Stereographic Projection NAD83 (CSRS)

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**NEW BRUNSWICK POWER CORPORATION**
**POINT LEPREAU NUCLEAR GENERATING STATION**
**MACES BAY, NEW BRUNSWICK**
**DOMESTIC SEWAGE TREATMENT PLANT**
**PHASED REPLACEMENT - EIA REGISTRATION**

**PROPERTY PLAN**

Project No. **12586687**
Date **November 2022**

# FIGURE 2

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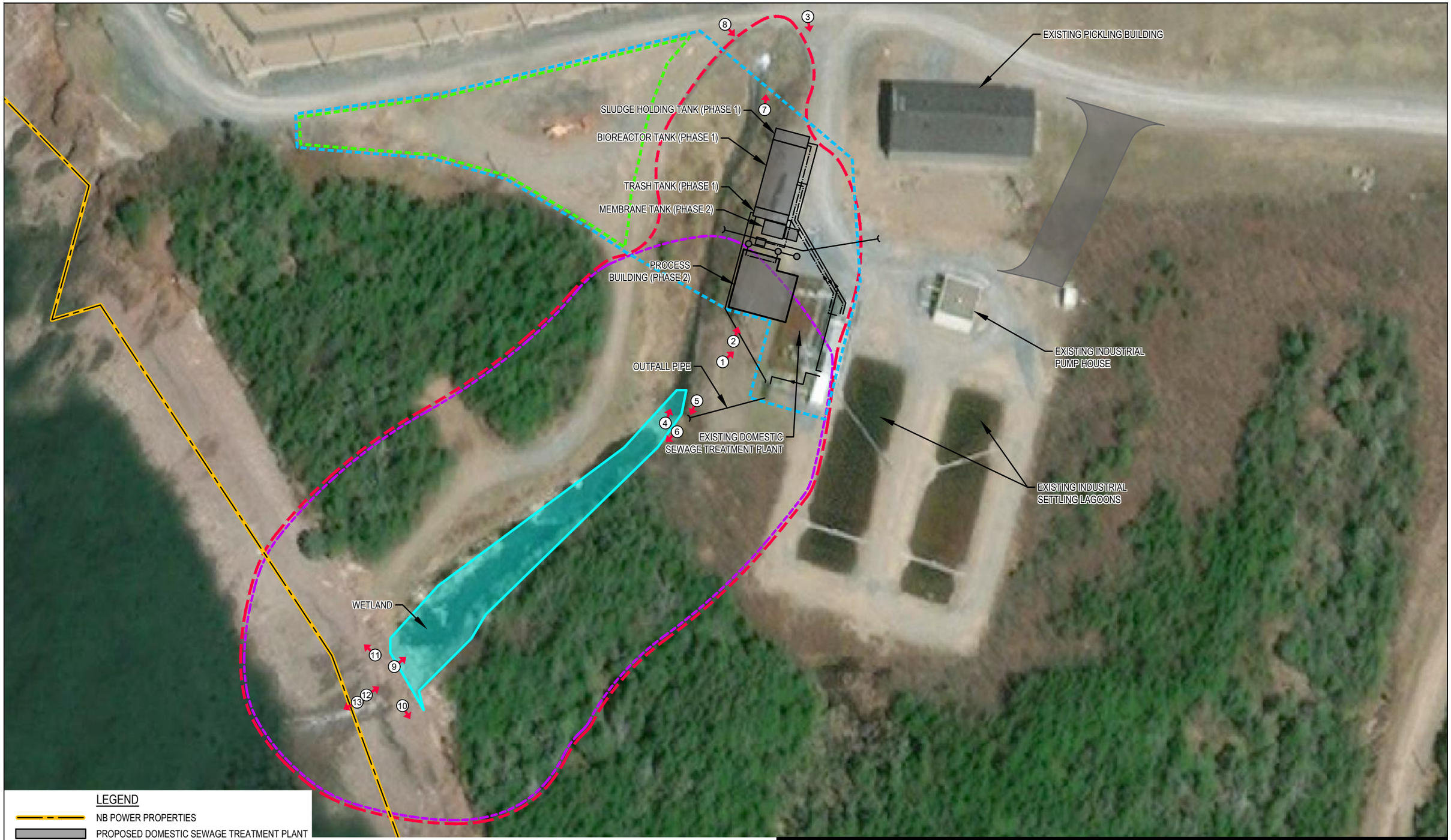


LEGEND

- NB POWER PROPERTIES
- PROPOSED DOMESTIC SEWAGE TREATMENT PLANT
- PROJECT AREA
- ASSUMED LAYDOWN AREA
- ASSESSMENT AREA
- WETLAND (GEONB WETLAND DATA CATALOG)
- 30m WETLAND BUFFER
- (1) PHOTOGRAPH LOCATION AND DIRECTION

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**NEW BRUNSWICK POWER CORPORATION**
**POINT LEPREAU NUCLEAR GENERATING STATION**
**MACES BAY, NEW BRUNSWICK**
**DOMESTIC SEWAGE TREATMENT PLANT**
**PHASED REPLACEMENT - EIA REGISTRATION**

**SITE PLAN**

Project No. **12586687**
Date **August 2022**

**FIGURE 3**

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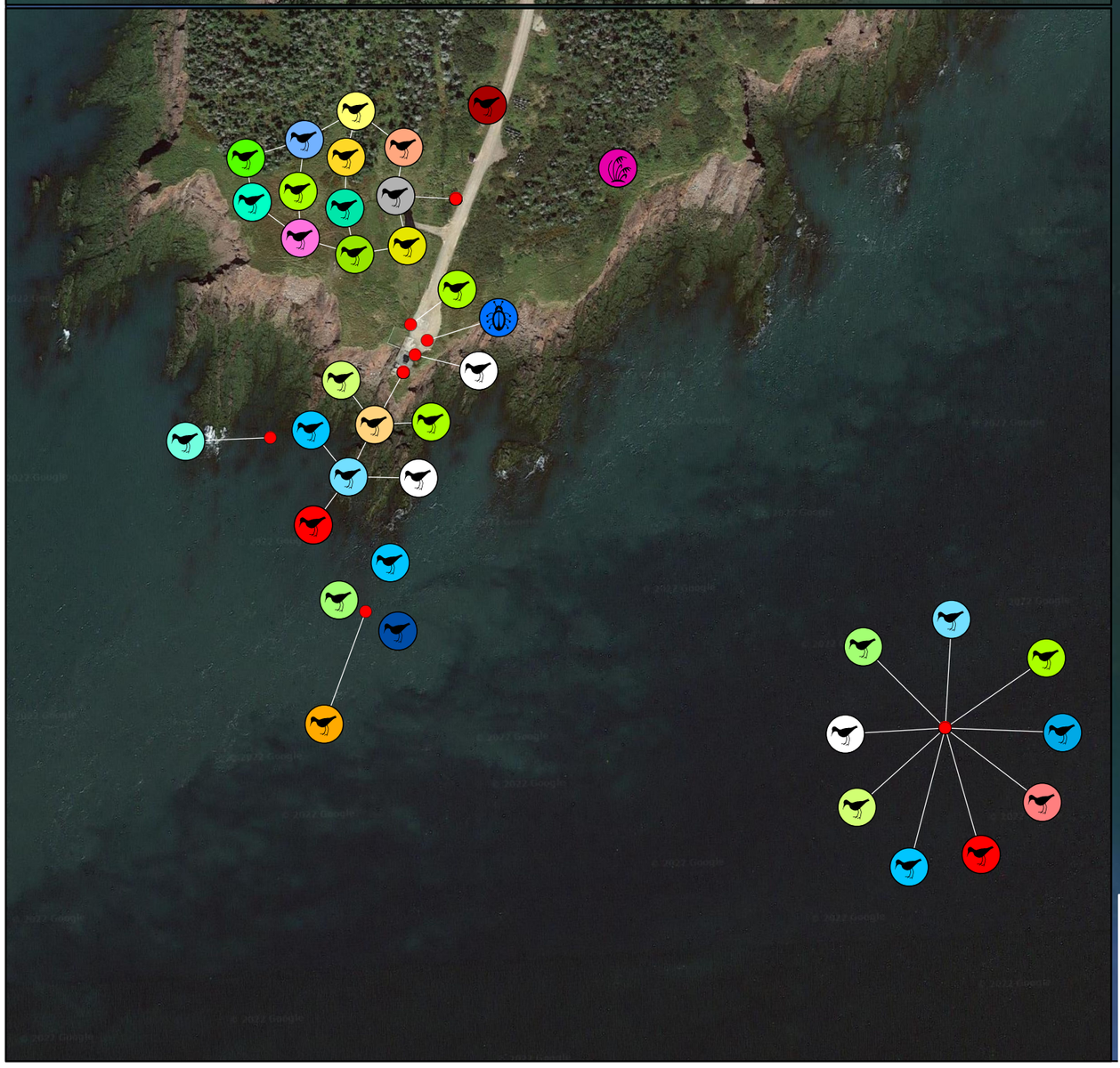
Data Source: Microsoft Product Screen Shot reprinted with permission from Microsoft Corporation, Accessed August, 2022.



**Legend**

- Streams
- Site location
- Site (1km radius)
- Location of species

**Species**

- American Scoter
- Black Guillemot
- Black-bellied Plover
- Brant
- Bufflehead
- Common Eider
- Greater Yellowlegs
- Harlequin Duck - Eastern population
- Horned Grebe
- Killdeer
- Large Purple Fringed Orchid
- Lesser Yellowlegs
- Monarch
- Northern Gannet
- Pectoral Sandpiper
- Piping Plover melodus subspecies
- Purple Sandpiper
- Red-breasted Merganser
- Red-necked Grebe
- Roseroot
- Ruddy Turnstone
- Sanderling
- Semipalmated Sandpiper
- Short-billed Dowitcher
- Solitary Sandpiper
- Spotted Sandpiper
- Surf Scoter
- Thick-billed Murre
- Willet


Paper Size ANSI B

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Meters

Map Projection: Transverse Mercator
Horizontal Datum: North American 1983 CSRS
Grid: NAD 1983 CSRS UTM Zone 19N

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**NEW BRUNSWICK POWER CORPORATION**
**ENVIRONMENTAL IMPACT ASSESSMENT REGISTRATION**
**PLNGS DOMESTIC SEWAGE TREATMENT PLANT PHASED REPLACEMENT**
**122 COUNTY LINE RD, MACES BAY, NB E5J 1W1, CANADA**

Project No. **12586687**
Revision No. **-**
Date **Aug 30, 2022**

## FAUNA AND FLORA OF CONCERN

## FIGURE 4

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Print date: 30 Aug 2022 - 12:18

Data source: Species Data - Atlantic Canada Conservation Data Centre (ACCDC), 2022; Water - Canvec, 2022; Road Network -New Brunswick Road Network (NBRN), 2022;

# Appendices

# Appendix A

## CBCL Letter to NB Power Dated June 24, 2022

CBCL
Solutions today | Tomorrow IN mind
CenterBeam Place, 14 King Street, Suite 420
PO Box 20040, Saint John, NB E2L 1G2
506-633-6650 | CBCL.ca | info@CBCL.ca



June 24, 2022

David Maguire
Environmental Technical Specialist
New Brunswick Power Corporation
515 King Street
P.O. Box 2000, Stn. A
Fredericton, NB E3B 4X1

Dear Mr. Maguire:

*RE: EIA Request for Project Review - New Brunswick Power Corporation Point Lepreau Nuclear Generating Station (PLNGS), Domestic Sewage Treatment Plant Phased Replacement*

CBCL Limited (CBCL) was engaged by the New Brunswick Power Corporation (NB Power) to develop a preliminary design and a project description for a proposed phased replacement of the domestic sewage treatment plant (STP) at the Point Lepreau Nuclear Generating Station (PLNGS) in Lepreau, New Brunswick (the Project). PLNGS is currently operating an STP with a containerized membrane bioreactor; the proposed Project involves the construction of a replacement bioreactor tank that will use the existing membrane bioreactor equipment designed to meet PLNGS's domestic wastewater effluent requirements.

In 2020, CBCL prepared a summary of the project, which was submitted to New Brunswick Department of Environment and Local Government (NBDELG) for review. Since that time, the project has been further refined to include the following notable changes:

- Existing outfall will not be altered.
- Infill of the existing storm channel is no longer required.
- All flow to the STP will be conveyed by gravity.
- Most of the work takes place within existing STP site boundaries.

The purpose of this letter is to provide the New Brunswick Department of Environment and Local Government (NBDELG) with the necessary information required to facilitate NBDELG's determination as to whether an Environmental Impact Assessment (EIA) and EIA Determination Review are required for the proposed Project under Schedule A of the *Environmental Impact Assessment Regulation* (Regulation 87-83), pursuant to the *Clean Environment Act.*

# 1 General Information

## 1.1 Purpose of the Project

The Project involves the construction and operation of an upgraded facility designed to replace the existing treatment facility originally installed in 1979. The existing facility and a membrane bioreactor (MBR), installed in 2009, are currently meeting the effluent quality requirements under the facility's Approval to Operate (S-3271); the MBR, however, was only intended to operate on a short-term basis and will require significant modifications for long-term use and sustainable function. PLNGS has decided to take a phased approach to the design and installation of a permanent MBR treatment system with equalization capacity which will provide reliable treatment of average and peak flows based on their effluent objectives for the next 25 years. Effluent quality requirements for the upgraded facility, including those in the existing Approval to Operate (S-3271), are provided in Table 1. General site plans displaying the existing conditions on site, preliminary design drawings and the proposed facility layout, by phase, are provided in Appendix A.

**Table 1: Effluent Quality Requirements**

| Parameter | Limit | Units |
|---|---|---|
| Carbonaceous Biochemical Oxygen Demand ($CBOD_5$) | 25 | mg/L (average) |
| Suspended Solids, Total Suspended Solids (TSS) | 25 | mg/L (average) |
| Un-ionized Ammonia (expressed as N, everything except $NH_4^+$) | 1.25 | mg/L (every sample less than) |
| Total Chlorine Residual | 0.02 | mg/L (average less than) |

The existing treatment facility's Approval to Operate (S-3271) is valid until June 26, 2024.

## 1.2 Proponent Contacts

The contact information for the primary point of contact at NB Power, which owns and operates PLNGS and is proposing the upgraded treatment facility, is provided in Table 2.

**Table 2: Proponent Contact Information for NB Power**

| Proponent Contact Information |
|---|
| New Brunswick Power Corporation<br>David Maguire<br>Environmental Technical Specialist<br>515 King Street<br>P.O. Box 2000, Stn. A<br>Fredericton, NB E3B 4X1<br>Phone: (506) 458-5003<br>DMaguire@nbpower.com |

## 1.3 Background Project History

The domestic sanitary sewer system currently in operation at PLNGS collects domestic wastewater from onsite sources and operations. This package extended aeration STP was originally installed in 1979 to treat wastewater collected from the PLNGS domestic sanitary sewer system, and was installed near the existing industrial wastewater treatment plant on the southern portion of the PLNGS property. The existing industrial wastewater treatment plant will not be modified or altered as part of the proposed phased replacement STP Project.

The original domestic wastewater treatment system comprised a comminutor, a 90,000 US gallon aeration basin, two 15 HP blowers, two air lift sludge pumps, two parallel secondary clarifiers, and a chlorine contact chamber. The following modifications have been completed since the installation of the original extended aeration facility:

- A baffle wall was installed in the aeration tank in 2003 to create a 23,000 US gallon sludge holding tank reducing the working volume of the aeration tank to 67,000 US gallons and reducing the capacity to 67,000 US gallons per day.
- The influent water and return active sludge lines were relocated in 2003 to accommodate the addition of the sludge holding tank while a waste activated sludge line was added for the conveyance of sludge to the sludge holding tank.
- Following a 2007 study, a flow meter was installed on the raw influent line and a dissolved oxygen probe was installed in the aeration tank to allow for feedback control to the newly installed variable frequency drives on the blowers.
- Following the establishment of more stringent effluent permit limits for $BOD_5$ and TSS in 2008, the treatment facility was modified with the addition of a containerized MBR skid in 2009. The sludge holding tank was modified to be a trash tank, which removes large debris and rocks from the incoming flow to protect the membranes from damage.

This STP regularly achieved the original effluent permit requirements of 50 mg/L $BOD_5$ and TSS, however the facility could not consistently achieve the more stringent effluent permit limits of 25 mg/L for $BOD_5$ and TSS limits established in 2008 until after the installation of the

temporary MBR in 2009. While the MBR is currently operating well and meeting the more stringent effluent requirements, this installation was only meant to operate temporarily and will require significant modifications for long term use. PLNGS has decided to take a phased approach to the design and installation of a permanent MBR treatment system with equalization capacity which will provide reliable treatment of average and peak flows based on their effluent objectives for the next 25 years.

# 2 Project Description

## 2.1 Project Location

The Project is located at the Point Lepreau Nuclear Generating Station, Lepreau, New Brunswick, approximately 40 km west of Saint John, New Brunswick. The proposed replacement STP will be located south of the Station, to the west of the existing industrial wastewater treatment plant.

The proposed replacement STP will be constructed adjacent to the existing industrial wastewater treatment plant, with only minor modification of the existing footprint in this area. The general site location, site plans, and existing conditions are provided in Appendix A. Preliminary designs for the upgraded treatment facility are also provided in Appendix A.

Treated effluent from the existing treatment facility flows to a small watercourse south of the Station which subsequently discharges to the Bay of Fundy. The outfall for the upgraded treatment facility will not be altered. The current sanitary sewage inflows, treatment processes, effluent parameters and discharge location will remain the same after the completion of the upgrade Project. The Project represents an overall improvement in reliability and extends the design life of the STP providing treatment of sanitary sewage at PLNGS.

## 2.2 Project Design Criteria

In 2022, CBCL developed design parameters of the proposed MBR based on recorded flow and concentration data as presented in Table 3.

**Table 3: Proposed STP Design Parameters**

| Parameter | Value |
|---|---|
| Design Population | 1600 |
| Average Flow ($m^3$/day) | 140 |
| Peak Flow ($m^3$/day) | 480 |
| Average CBOD Load (kg/day) | 30 |
| Peak CBOD Load (kg/day) | 80 |

| Parameter | Value |
|---|---|
| Average TSS Load (kg/day) | 40 |
| Peak TSS Load (kg/day) | 135 |
| Average TKN Load (kg/day) | 5 |
| Peak TKN Load (kg/day) | 15 |
| Effluent $CBOD_5$ (mg/L) | 25 |
| Effluent TSS (mg/L) | 25 |
| Effluent Un-ionized Ammonia (as $NH_3$-N) (mg/L) | 1.25 |

## 2.3 Project Components

### 2.3.1 Proposed Facility Layout

The proposed Phase 1 Project consists of a concrete bioreactor tank to replace the existing steel tank, which is in poor condition, as well as install below grade connections to the existing containerized MBR system. The existing or similar comminutor, bioreactor blowers, membrane feed pumps, and process instruments will be relocated to the new concrete tank (Appendix A).

Following Phase 1, raw wastewater will flow into the in-ground concrete aerated bioreactor tank for biological treatment, after passing through the preceding trash tank for debris removal. From there, all flow will be pumped to the existing membrane tank. Return flow will return by gravity, and membrane permeate will be pumped to the existing unused chlorine contact chamber, from where it will flow through the existing effluent outfall pipe to the watercourse adjacent to the upgraded site which subsequently discharges to the Bay of Fundy. Waste sludge from the MBR will be stored in the new sludge tank and periodically removed from site and disposed of at an approved disposal facility. The effluent flows of the upgraded facility will meet the Conditions of Approval under the existing Approval to Operate (S-3271).

During Phase 2, the existing containerized MBR system will be replaced with a skid-mounted MBR system housed in a future Process Building. The Process Building will also contain a fine screen for preliminary treatment before influent enters the trash tank, an MCC room, and operator lab/office and washroom to replace the existing Operations building on site. This building will be further developed during Phase 2 design, and is shown as a conceptual layout in Figure 4, attached.

### 2.3.2 Treatment Capacity and Equalization Strategy

The Phase 1 treatment capacity will be the same as the existing STP, with no additional redundancy. The trash tank and bioreactor tank contain approximately 80 $m^3$ of equalization volume, in addition to 240 $m^3$ of biological treatment volume. The equalization and treatment capacity of the tank are unchanged from the existing capacity to allow reuse of existing equipment to the greatest extent possible.

In Phase 2, the replacement membrane equipment package will contain two trains of membrane modules, each of which can treat the maximum day flow with the second train out of service, for limited periods of time. The biological process can be isolated from one membrane tank using an automated valve arrangement. This allows the system to independently backwash each membrane or complete routine maintenance and cleaning with only one of the two membranes in operation. The equalization volume is based on the membrane capacity of approximately 480 $m^3$/day, and will allow treatment of all flows without overflows, based on historical data. The site has not had any overflow events since the site power was upgraded to Class IV power, which has generator backup.

## 2.4 Project Activities

While the Project is currently undergoing the detailed design process, the following Project Activities have been identified and will be undertaken upon commencement of construction of the upgraded STP. The final sequencing will be determined during construction, including:

- Site preparation, including but not necessarily limited to the following:
  - Installation of sediment and erosion control measures, where necessary;
  - Clearing of the existing site in preparation of construction activities; and
  - Rerouting any existing infrastructure in the area of the proposed treatment facility including the realignment of the nearby access road and overhead power lines.
- Level and grade the Project site;
- Excavate foundations for the replacement bioreactor tank and sludge tank;
- Excavate trenches for the underground piping;
- Infill and regrade the excavated trenches following the installation of the underground piping;
- Construct all proposed infrastructure including in-ground trash tank, bioreactor tank, and sludge holding tank;
- Relocate all necessary process equipment and instrumentation including comminutor, blowers, pumps, and instruments;
- Reinstate the site including cleaning out, cutting the existing tank down below grade, and backfilling, the removal of construction debris and waste generated during the construction phase of the Project; and
- Commission and operate the upgraded STP.

## 2.5 Project Schedule

Site preparation is tentatively scheduled for 2023 pending budget approval. The proposed timeline for Phase 1 construction of the upgraded STP and associated infrastructure is anticipated to occur in 2023, and Phase 2 construction will follow at a later date, depending on the approved budget. The STP is proposed to operate indefinitely; NB Power will work with NBDELG in the event future closure of the STP is required.

Upon receipt of all required approvals and authorizations, the estimated start date for site preparation is spring 2023. Clearing is projected to occur on a limited basis, based on the preliminary design drawings for the proposed Project. NB Power recognizes that clearing, if required, may occur during the breeding bird nesting season as determined by Environment and Climate Change Canada (ECCC) (mid-April to late August: ECCC, 2018). If clearing is required, it will be conducted in accordance with guidance from ECCC and NB Power's internal Avian Protection Plan document, which may include a pre-clearing site visit by a qualified birder before conducting clearing activities.

# 3 Summary of Existing Environment

The following sections summarize our understanding of the existing environment in the Project area based on previous site visits and a desktop analysis undertaken in 2019.

**Land Area**

The upgraded STP will be constructed in the same area as the existing facility. Construction is proposed within a partially developed portion of the south side of the PLNGS property at the current location of the existing STP, and other existing industrial water treatment infrastructure including a pickling building and settling lagoons, and access roads (Appendix A).

**Geology and Soils**

Early Carboniferous sediment rock generally compose the geological bedrock on Point Lepreau (NBDNR, 2007). A geotechnical investigation of the Project site found bedrock close to surface at approximately 2 m depth along the Western side of the existing drainage channel and proposed facility layout. Rip-rap / armour stone and remnant structural fill materials appear to be embedded in the banks of the watercourse at the current location.

**Vegetation**

The Project area is set along the Fundy Coast Ecoregion which generally spans the coastline of New Brunswick along the Bay of Fundy. This ecoregion features a maritime climate moderated by the Bay of Fundy and coastal elevations typically less than 100 m (NBDNR, 2007). The proposed Project occurs in an area mostly cleared of vegetation, although some shrubs and small trees are located within the previously disturbed areas of the small watercourse.

**Aquatic Habitats**

A small watercourse is located adjacent to the proposed location of the Project is primarily fed by effluents discharged from two outfalls draining treated wastewater, plant storm water, and storm water. The small watercourse carries discharged effluents and storm water from the

existing outfalls downstream through a small provincially significant coastal wetland to a cobble beach on the Bay of Fundy.

**Wetlands**

The small watercourse flows through a small (<1 hectare) provincially significant coastal wetland to the Bay of Fundy (Appendix A: Figure 2). Photographs of the area collected during previous site visits by CBCL personnel indicate that the watercourse and wetland areas have likely been historically modified, as the banks and the downstream portion of the watercourse appear to consist of remnant structural fill materials. The future Process Building may be constructed inside of the 30 m buffer of the identified wetland.

**Sensitive Species**

The Atlantic Canada Conservation Data Centre (AC CDC) generated a data report identifying known rare and endangered flora and fauna, in addition to known sites of ecological interest or sensitivity, in the Project area. The report generated on January 30, 2019, identified six rare or endangered species of flora and thirty-seven rare or endangered species of fauna within a 5 km radius of the center of the Project area. Nine of these species are protected under the federal *Species at Risk Act* or the provincial New Brunswick *Species at Risk Act*; these species are listed in Table 4. The required habitats for these rare or endangered species are not anticipated to occur in the vicinity of the proposed upgraded treatment facility.

**Table 4: Species at Risk identified within 5 km of the Project Area (AC CDC, 2019)**

| Taxon | Common Name | Scientific Name | Federal SARA Status* | Provincial NBSAR Status * | Distance from Project Area (km) |
|---|---|---|---|---|---|
| **Plant** | Van Brunt's Jacob's-ladder | *Polemonium vanbruntiae* | Threatened (Schedule 1) | Threatened | 4.5 |
| **Bird** | Piping Plover melodus | *Charadrius melodus melodus* | Endangered (Schedule 1) | Endangered | 0.8 |
| **Bird** | Red Knot rufa | *Calidris canutus rufa* | Endangered (Schedule 1) | Endangered | 4.0 |
| **Bird** | Barn Swallow | *Hirundo rustica* | Threatened (Schedule 1) | Threatened | 4.3 ± 2.0 |
| **Bird** | Harlequin Duck | *Histrionicus histrionicus* | Special Concern (Schedule 1) | Endangered | 4.5 |

| Taxon | Common Name | Scientific Name | Federal SARA Status* | Provincial NBSAR Status * | Distance from Project Area (km) |
|---|---|---|---|---|---|
| **Bird** | Barrow's Goldeneye | *Bucephala islandica* | Special Concern (Schedule 1) | Special Concern | 3.9 ± 2.0 |
| **Bird** | Rusty Blackbird | *Euphagus carolinus* | Special Concern (Schedule 1) | Special Concern | 3.9 ± 1.0 |
| **Bird** | Horned Grebe | *Podiceps auritus* | N/A | Special Concern | 0.9 |
| **Mammal** | Harbour Porpoise | *Phocoena phocoena* | Threatened (Schedule 2) | Special Concern | 1.4 ± 1.0 |

* Updated to 2022 status or ranking

Bald eagle (*Haliaeetus leucocephalus*) (New Brunswick *Species at Rick Act* – Endangered) was observed during the field reconnaissance, however this species is not known to inhabit the proposed location of the STP. No other rare or endangered species were identified in the Project area; however, large purple fringed orchid was observed within 250 m of the Project area. No other known rare or endangered species were identified within approximately 1 km of the proposed site.

Although not identified in the Project area, as a precaution, a habitat suitability assessment for nesting piping plover will occur on the cobble beach through which the treated effluent flows due to the observation of Piping Plover within 1 km of the Project area. This assessment will assess key habitat attributes identified in Environment Canada's (2012) *Recovery Strategy for the Piping Plover in Canada*.

Two biologically significant sites were identified within a 5 km radius of the Project area: the Point Lepreau and Maces Bay Important Bird Area (IBA) and the Dipper Harbour Environmentally Sensitive Area (ESA). The Point Lepreau and Maces Bay IBA is internationally recognized as an ecologically significant area for migratory waterfowl and wading shorebirds. The IBA designation does not confer protection under Canadian law, nor is the area protected by federal or provincial legislation. The Project is located on lands near the fringe of the IBA, which generally spans the marine area between Point Lepreau and Maces Bay, and includes intertidal reef ledges bordered by mud flats and shallow inlets which provide foraging and migratory habitats for waterfowl and shorebirds (IBA Canada, 2019). The Project is not anticipated to impact the IBA. The Dipper Harbour ESA is a small area of geological interest

5 km northeast of the Project area; exposed rocks along the east side of the harbour contain Precambrian felsic volcanic rock with small phenocrysts or 'quartz eyes' (AC CDC, 2019). The Project is not anticipated to have an effect on this ESA.

**Archaeology**

A predictive desktop archaeological assessment conducted by the Archaeological Services Branch of the New Brunswick Department of Tourism, Heritage and Culture (NBDTHC) indicates that there are no registered archaeological sites within the area of the proposed upgraded STP (NBDTHC, 2019; Hamilton, *pers. comm.*, 2019).

# 4 Regulatory Requirements

Additional permits and approvals may be required for the construction and operation of the Project. The following permits and approvals from various issuing agencies that may be required include, but are not limited to, the items listed in Table 5.

**Table 5**: **List of Permits and Approvals Potentially Required for the Undertaking**

| Permit / Approval | Applicable Legislation | Issuing Body |
|---|---|---|
| Environmental Impact Assessment Certificate of Determination | *Environmental Impact Assessment Regulation (Regulation 87-83)*, per Schedule A, construction, modification, or decommissioning of a sewage disposal or treatment facility | NBDELG |
| Watercourse and Wetland Alteration (WAWA) Permit | *Clean Water Act* and *Watercourse and Wetland Alteration Regulation* (90-80) | NBDELG |
| Request for Project Review | *Fisheries Act* Application for Authorization under Paragraph 35 (2)(b) of the *Fisheries Act Regulations* | Fisheries and Oceans Canada (DFO) |
| Approval to Operate | *Clean Environment Act* and *Water Quality Regulation (82-126)* | NBDELG |

# 5 References

Atlantic Canada Conservation Data Centre (AC CDC). 2019. Data report 6320: Point Lepreau Nuclear Generating Station, Lepreau, New Brunswick. Prepared January 30, 2019.

Environment Canada. 2012. Recovery Strategy for the Piping Plover (*Charadrius melodus melodus*) in Canada. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa. v + 29 pp.

Environment and Climate Change Canada (ECCC). 2018. *General Nesting Periods of Migratory Birds in Canada*. Available online: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/general-nesting-periods.html

Hamilton, Anne. 2019. *Personal Communication*. Coordinator, Archaeological Engagement, Archaeological Services Branch, New Brunswick Department of Tourism, Heritage and Culture (NBDTHC).

Important Bird Areas (IBA) Canada. 2019. Important Bird Areas: Point Lepreau and Maces Bay, Bay of Fundy, New Brunswick. Available online: https://www.ibacanada.org/site.jsp?siteID=NB020

New Brunswick Department of Natural Resources (NBDNR). 2007. Our Landscape Heritage: The Story of Ecological Land Classification in New Brunswick. Second Edition. Available online: https://www2.gnb.ca/content/gnb/en/OurLandscapeHeritage.html.

New Brunswick Department of Tourism, Heritage and Culture (NBDTHC). 2019. Archaeological predictive model: Point Lepreau Nuclear Generating Station. Archaeological Services Branch, NBDTHC.

# 6 Limitations

This document was prepared for the party indicated herein. The material and information in the document reflect CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third-party use of this document.

# 7 Closure

Should you have any questions regarding the content of this report, please contact the undersigned.

Sincerely,

CBCL Limited

Prepared by:
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Process Engineer
Direct: (902) 492 797 ext. 2238
E-Mail: sensslin@cbcl.ca

Reviewed by:
Melissa Rutherford
Environmental Scientist

Attachments: Figures 1, 2, 3 and 4.

Project No: 222858.00


| Date | Scale | Designed | Drawn | Checked | Approved | CBCL No. | Contract |
|---|---|---|---|---|---|---|---|
| JUNE 2022 | 1:30,000 | CM | NHM | SHE | | 222858.00 | – |

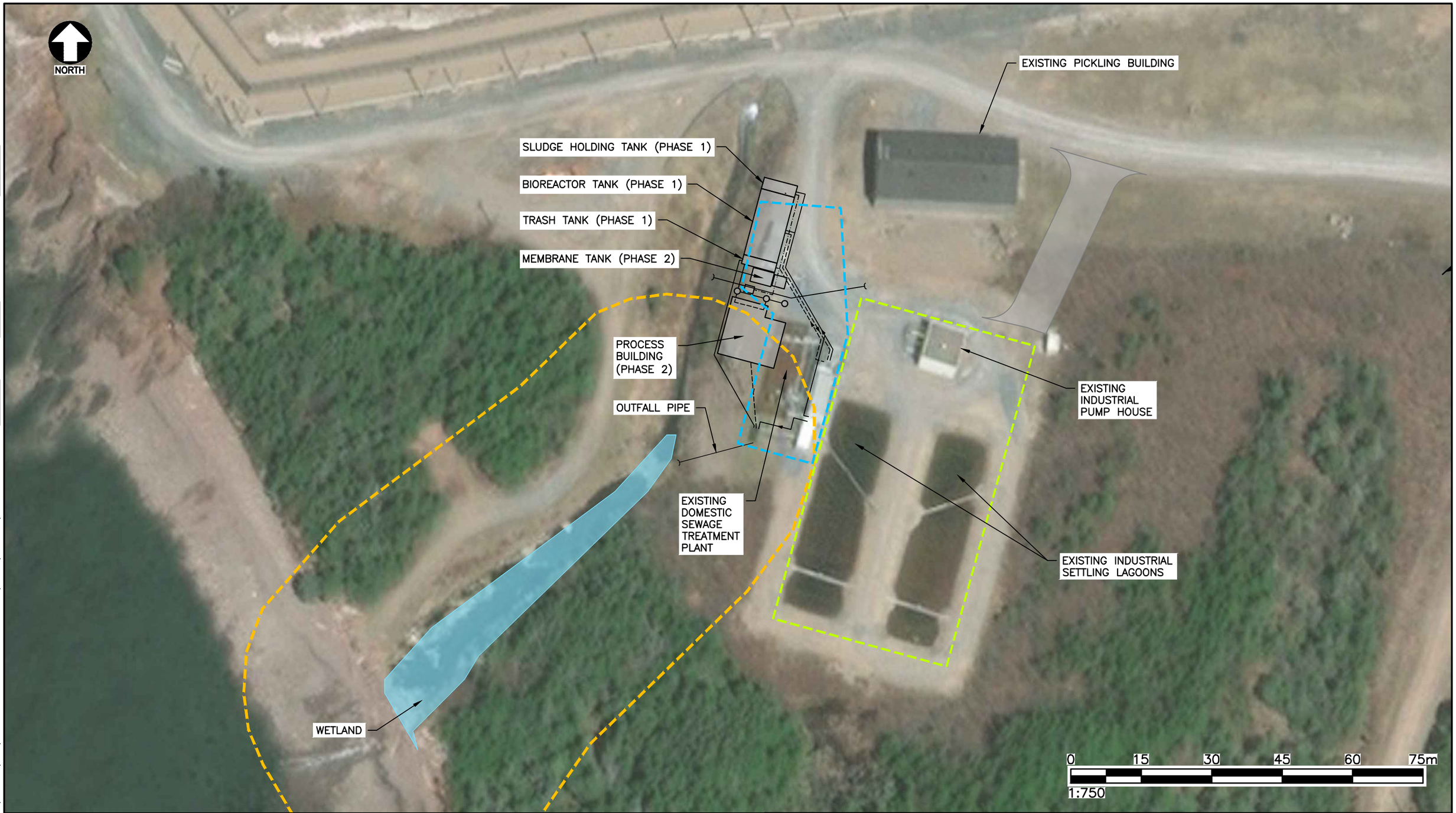
CBCL

NB POWER POINT LEPREAU NUCLEAR GENERATING STATION – DOMESTIC SEWAGE TREATMENT PLANT UPGRADE, LEPREAU, NB

SITE LOCATION PLAN

Figure 1

DRAWING NAME: Y:\SAINT JOHN\DATA\PROJECTS\2022\222858.00 PLGS BIOREACTOR REPLACEMENT\44 CAD\07 ENVIRO\222858.00_FIGURES.DWG LAYOUT NAME: FIGURE 1 PLOT DATE:June 22, 2022 9:50:05 AM CAD OPERATOR: NOELM




PROPOSED DOMESTIC SEWAGE TREATMENT PLANT

EXISTING DOMESTIC SEWAGE TREATMENT PLANT BUILDINGS / INFRASTRUCTURE

EXISTING INDUSTRIAL WASTEWATER TREATMENT PLANT BUILDINGS / INFRASTRUCTURE (WILL NOT BE MODIFIED AS PART OF PROPOSED PROJECT)

WETLAND (GEO NB WETLAND DATA CATALOG)

30m WETLAND BUFFER

| Date | Scale | Designed | Drawn | Checked | Approved | CBCL No. | Contract |
|---|---|---|---|---|---|---|---|
| JUNE 2022 | 1:750 | SHE | NHM | SHE | | 222858.00 | – |

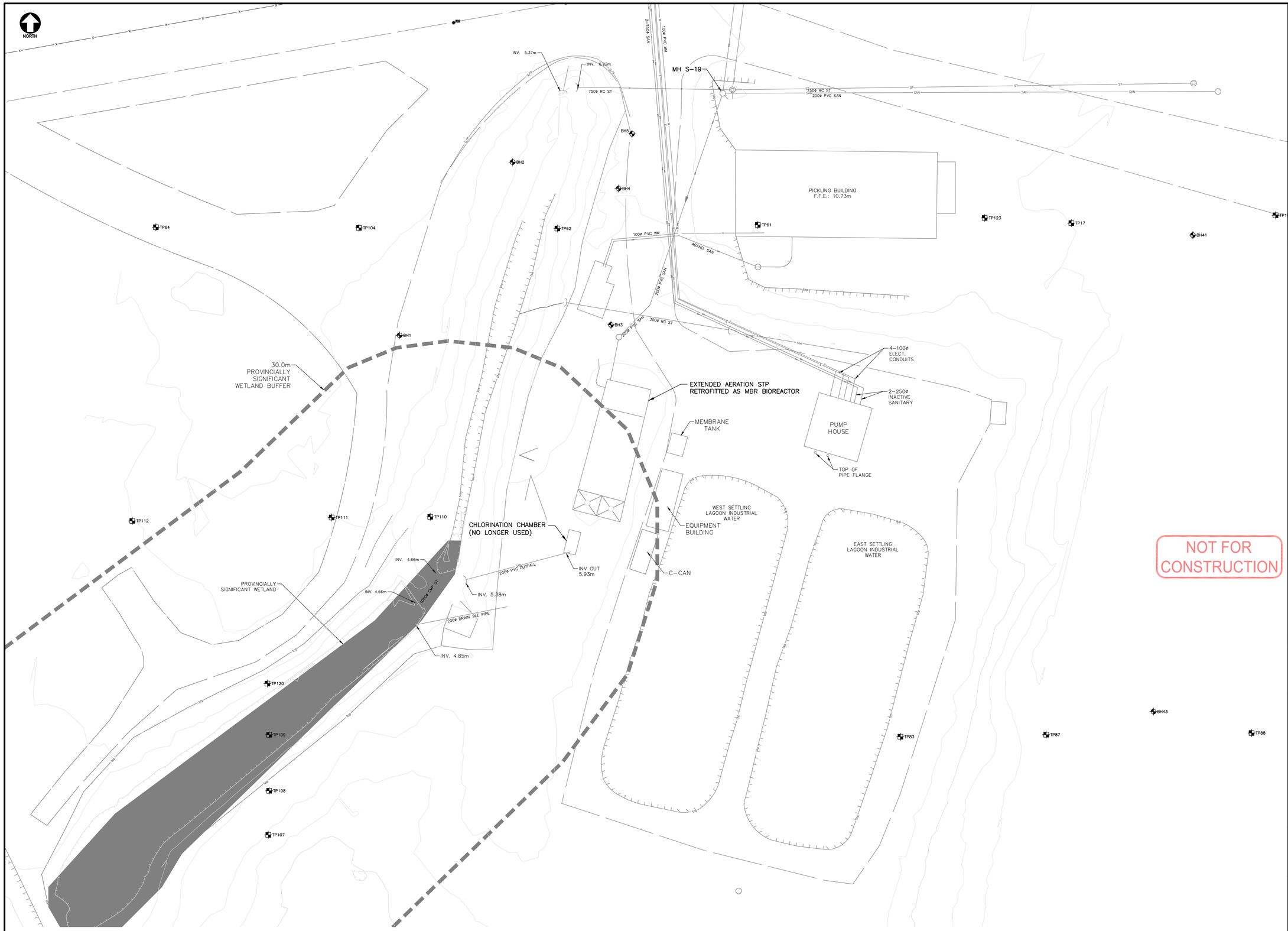
CBCL

NB POWER POINT LEPREAU NUCLEAR GENERATING STATION – DOMESTIC SEWAGE TREATMENT PLANT UPGRADE, LEPREAU, NB

GENERAL SITE PLAN – PROPOSED AND EXISTING INFRASTRUCTURE

Drawing 2

DRAWING_NAME: Y:\SAINT JOHN\DATA\PROJECTS\2022\222858.00 PLGS BIOREACTOR REPLACEMENT\44 CAD\07 ENVIRO\222858.00_FIGURES.DWG LAYOUT_NAME: FIGURE 2 PLOT_DATE:June 22, 2022 3:44:07 PM CAD_OPERATOR: NOELM




PLAN
1:250

## NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. THE HORIZONTAL DATUM UTILIZED IS NAD83 (CSRS) NEW BRUNSWICK DOUBLE STEROGRAPHIC PROJECTION.
3. ALL ELEVATIONS ARE IN GEODETIC METRES AND REFERENCED TO THE CANADIAN GEODETIC VERTICAL DATUM OF 1928 (CGVD28)
4. ALL CHAINAGES ARE IN METRES.
5. LOCATION OF EXISTING SERVICES, STRUCTURES AND BUILDINGS APPROXIMATE ONLY.
6. CONTRACTOR TO ENSURE THAT ALL MUNICIPAL INFRASTRUCTURE, PUBLIC UTILITIES, NATURAL GAS AND OTHER INFRASTRUCTURE ARE LOCATED IN THE FIELD PRIOR TO START OF EXCAVATION.
7. ALL FIELD SURVEY INFORMATION PROVIDED BY CBCL LIMITED.
8. TYPICAL TRENCH DETAIL, PIPE INSTALLATION, FITTINGS & STRUCTURES, ETC. REFER TO CITY, TOWN OR VILLAGE SPECIFICATIONS FOR DEVELOPERS.
9. SANITARY MANHOLES TO BE 1050ø UNLESS OTHERWISE NOTED.
10. ALL CATCH BASINS, MANHOLES, GATE VALVE CHAMBERS AND AIR RELEASE CHAMBERS TO HAVE MINIMUM 100mm RISER BETWEEN FRAME & CONCRETE COVER. TOP RISER TO BE MADE OF RUBBER.
11. AT ALL PIPE CONNECTIONS TO EXISTING WATER MAINS, FUTURE EXTENSIONS AND FIRE LINES, PROVIDE A 25mm (1") MAIN STOP AND SADDLE BOTH SIDES OF GATE VALVE TO FACILITATE TESTING AND CHLORINATION.
12. ALL WATER LINES LESS THAN 1.8m COVER TO BE INSULATED WITH 50mm THICK RIGID "STYROFOAM SM" BOARD.
13. ALL WATER, SANITARY AND STORM STUBS TO BE PLUGGED /CAPPED & WATER MAIN FITTINGS TO BE RESTRAINED. LOCATION TO BE MARKED WITH A 38x89 STUD FROM INVERT OF PIPE TO 300mm BELOW FINISH GRADE

## LEGEND:

| PROPOSED | | EXISTING |
|---|---|---|
| ● | SANITARY MANHOLE (SMH) | ○ |
| ■ | CATCH BASIN (CB) | □ |
| ◉ | STORM MANHOLE (STMH) | ◎ |
| SAN | SANITARY SEWER | SAN |
| FM | SANITARY FORCE MAIN | FM |
| ST | STORM SEWER | ST |
| W | WATER MAIN | W |
| CS | COMBINED SEWER | CS |
| | CULVERT | |
| | ISOLATION VALVE (BUTTERFLY/GATE) | ⊗ |
| | CURB STOP | ⊖ |
| | VALVE IN CHAMBER | ⊗ |
| | FIRE HYDRANT | |
| P/L | PROPERTY LINE | P/L |
| EAS | EASEMENT | EAS |
| E/P | EDGE OF PAVEMENT | E/P |
| | ROAD SHOULDER | |
| G/R | GUIDE RAIL | G/R |
| S/W | SIDEWALK | S/W |
| curb | CURB | curb |
| C/G | CURB & GUTTER | C/G |
| | DITCH | |
| x | FENCE | x |
| O/H | OVERHEAD UTILITIES | O/H |
| U/G | UNDERGROUND UTILITIES | U/G |
| E | UNDERGROUND ELECTRICAL | E |
| | ELECTRICAL / TELEPHONE MANHOLE | |
| | POWER, UTILITY, GUY POLES | |
| | LIGHT STANDARD | |
| | SIGN | |
| | BENCH MARK | |
| | BORE HOLE / TEST PIT | BH #1 TP #1 |
| 12.0 | CONTOUR | |
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Revision or Issue

Énergie NB Power
Nucléaire Nuclear

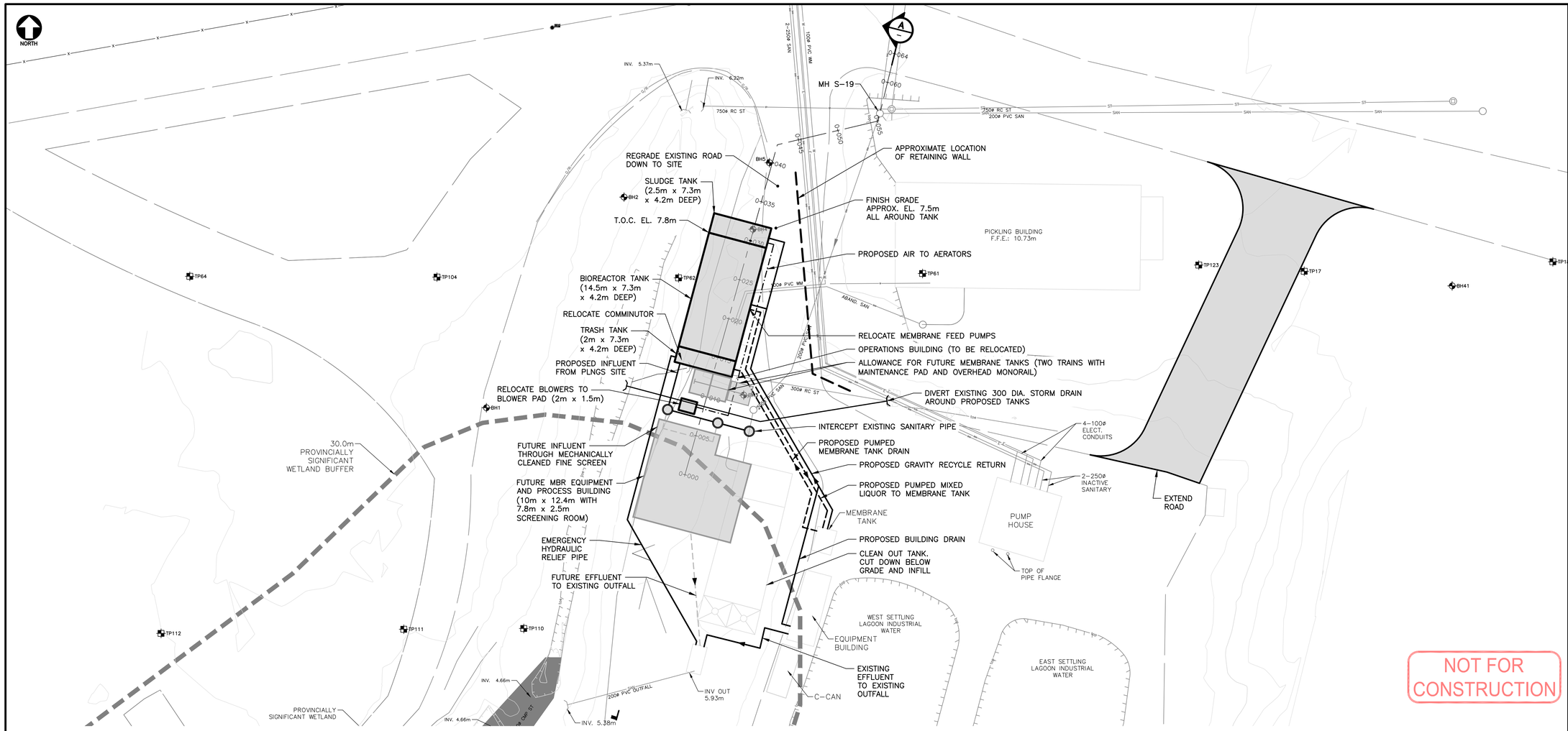
POINT LEPREAU NUCLEAR GENERATING STATION
BIOREACTOR REPLACEMENT
PRELIMINARY DESIGN

CIVIL

EXISTING SITE PLAN

CBCL

| | |
|---|---|
| CBCL No 222858.00 | Contract No - |
| Date JUN 2022 | Scale AS NOTED |
| Designed SHE | Drawn NHM |
| Checked MC | Approved |
| Sheet No 1 of 2 | |
| Drawing No 3 | |




## PLAN
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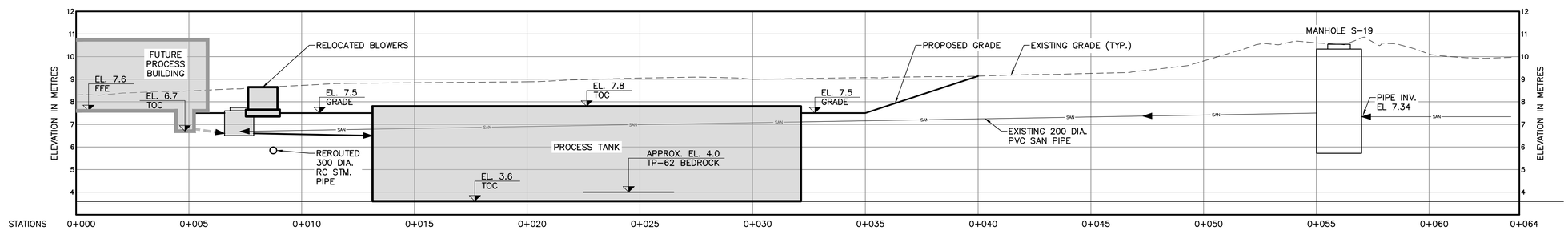


## A SECTION
H=1:100/V=1:100

NOT FOR CONSTRUCTION

## NOTES:

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## LEGEND:

| PROPOSED | | EXISTING |
|---|---|---|
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| ■ | CATCH BASIN (CB) | □ |
| ◉ | STORM MANHOLE (STMH) | ◎ |
| SAN | SANITARY SEWER | SAN |
| FM | SANITARY FORCE MAIN | FM |
| ST | STORM SEWER | ST |
| W | WATER MAIN | W |
| CS | COMBINED SEWER | CS |
| | CULVERT | |
| ⊗ | ISOLATION VALVE (BUTTERFLY/GATE) | ⊗ |
| ⊖ | CURB STOP | ⊖ |
| ⊗ | VALVE IN CHAMBER | ⊗ |
| | FIRE HYDRANT | |
| P/L | PROPERTY LINE | P/L |
| EAS | EASEMENT | EAS |
| E/P | EDGE OF PAVEMENT | E/P |
| | ROAD SHOULDER | |
| G/R | GUIDE RAIL | G/R |
| S/W | SIDEWALK | S/W |
| curb | CURB | curb |
| C/G | CURB & GUTTER | C/G |
| | DITCH | |
| X | FENCE | X |
| O/H | OVERHEAD UTILITIES | O/H |
| U/G | UNDERGROUND UTILITIES | U/G |
| E | UNDERGROUND ELECTRICAL | E |
| | ELECTRICAL / TELEPHONE MANHOLE | |
| | POWER, UTILITY, GUY POLES | |
| | LIGHT STANDARD | |
| | SIGN | |
| | BENCH MARK | |
| | BORE HOLE / TEST PIT | BH #1 TP #1 |
| 12.0 | CONTOUR | |
| | GRADE | |

| No. | Description | Date | By |
|---|---|---|---|
| A | ISSUED FOR REPORT | JUN 21/22 | SHE |

Revision or Issue

Énergie NB Power
Nucléaire Nuclear

POINT LEPREAU NUCLEAR GENERATING STATION
BIOREACTOR REPLACEMENT
PRELIMINARY DESIGN

CIVIL

PLAN AND PROFILE

CBCL

| | |
|---|---|
| CBCL No 222858.00 | Contract No - |
| Date JUN 2022 | Scale AS NOTED |
| Designed SHE | Drawn NHM |
| Checked MC | Approved |
| Sheet No 2 of 2 | |
| Drawing No 4 | |

DRAWING NAME: Y:\SAINT JOHN\DATA\PROJECTS\2022\222858.00 PLGS BIOREACTOR REPLACEMENT\44 CAD\01 CIVIL\03 DRAWING SHEETS\222858.00 SHEETS.DWG LAYOUT NAME: C02 PLOT DATE: June 22, 2022 12:22:53 PM CAD OPERATOR: NOELM

CBCL-610x914 TITLE SHEET (ARCH D)

# Appendix B

## Current Approval to Operate (S-3271)

# APPROVAL TO OPERATE

# S-3271

**Pursuant to paragraph 8(1) of the *Water Quality Regulation - Clean Environment Act*, this Approval to Operate is hereby issued to:**

## New Brunswick Power Corporation
**for the operation of the**
## Point Lepreau Nuclear Generating Station Domestic Wastewater Works

| | |
|---|---|
| Description of Source: | **This Approval covers the discharge of effluent from the locations contained in the Federal Effluent Regulatory Reporting Information System for the following system.**<br><br>**WWC: Class I / WWT: Class II** |
| Source Classification: | **Fees for Industrial Approvals Regulation - Clean Water Act** **Class 16** |
| Parcel Identifier: | **00471136, 55062640, 55062657, 55010086, 55062665, 00427138** |
| Mailing Address: | **P.O. Box 2000**<br>**515 King Street**<br>**Fredericton, NB E3B 5G4** |
| Conditions of Approval: | **See attached Schedule "A" of this Approval** |
| Supersedes Approval: | **S-3246** |
| Valid From: | **June 27, 2019** |
| Valid To: | **June 26, 2024** |

Recommended by: _____

Issued by: _____ June 27, 2019
for the Minister of Environment and Local Government — Date

## SCHEDULE "A"

## A. DEFINITIONS

1. **"Accredited"** means accreditation to ISO/IEC 17025 by the Standards Council of Canada (SCC), the Canadian Association for Laboratory Accreditation Inc. (CALA), or accreditation to ISO/IEC 17025:2005 from another body that is recognized to grant such accreditation per ISO/IEC 17011 criteria.

2. **"Acutely Lethal"** means that the effluent at 100% concentration kills, during a 96-hour period, more than 50% of the rainbow trout subjected to it.

3. **"Approval Holder"** means the name listed on the Certificate page of this Approval.

4. **"Authorization Officer"** means the Manager of the Permitting North Section of the Department of Environment and Local Government, and includes any person designated to act on the Manager's behalf.

5. **"Average Daily Volume"** means a calculation of the sum of the daily volumes of influent or effluent and dividing that sum by the number of days in that calendar year.

6. **"CBOD"** or **"Carbonaceous Biochemical Oxygen Demanding Matter"** means the carbonaceous matter that consumes, by biochemical oxidation, oxygen dissolved in water.

7. **"Certified"** means a valid certificate of qualification that states the class of the *Operator* issued by the Minister of the New Brunswick Department of Post-Secondary Education, Training and Labour.

8. **"Deleterious Substances"** means the following substances or classes of substances: carbonaceous biochemical oxygen demanding matter, suspended solids, total chlorine, and un-ionized ammonia.

9. **"Environmental Emergency"** means a situation where there has been or will be an unauthorized wastewater deposit at a location other than at the *Final Discharge Point* and/or unplanned bypasses of at least one of the treatment processes normally applied to wastewater in the system. Unauthorized deposits include wastewater overflows that are the result of excessive rainfall or snowmelt.

10. **"ERRIS"** or **"Effluent Regulatory Reporting Information System"** means the web based application developed by Environment and Climate Change Canada to facilitate the reporting of information as required under Regulations.

11. **"Final Discharge Point"** means the point, other than an *Overflow Point*, of a wastewater works beyond which the *Approval Holder* or operator no longer exercises

control over the quality of the wastewater before it is deposited as effluent to the environment.

12. **"Lagoon"** means a wastewater treatment facility where the average period during which wastewater is retained for treatment within the wastewater system is five days or more.

13. **"Operator"** means a person who directs, adjusts, inspects, tests or evaluates an operation or process that controls the effectiveness or efficiency of the wastewater works.

14. **"Overflow Point"** means a point of a wastewater work via which excess wastewater may be deposited in the environment and beyond which the *Approval Holder* or operator no longer exercises control over the quality of wastewater before it is deposited as effluent.

15. **"Point of Entry"** means any point where effluent is deposited in water frequented by fish via the *Final Discharge Point* or an *Overflow Point*.

16. **"Quarter"** in respect of a year, means any of the four periods of three months that begin on the first day of January, April, July and October.

17. **"Suspended Solids"** means any solid matter contained in effluent that is retained on a filter of 2.0 micrometre (μm) or smaller pore size.

18. **"Total Residual Chlorine"** means the sum of free chlorine and combined chlorine, including inorganic chloramines.

## B. TERMS AND CONDITIONS

EMERGENCY REPORTING

19. **Immediately** following the discovery of an *Environmental Emergency*, a designate representing the *Approval Holder* shall notify the Environment and Climate Change Canada's National Environmental Emergencies Centre (NEEC) **until personal contact is made** and provide all information, such as: location in latitude and longitudes, flow, time and a brief description known about the *Environmental Emergency*.

    The telephone number for the **Environment and Climate Change Canada's NEEC** is **1-800-565-1633**.

20. **Within five (5) days** of the time of initial notification, a copy of a Detailed Emergency Report shall be e-mailed or faxed to the Wastewater Approvals Coordinator or Engineer responsible for the regulation of the *Approval Holder*'s wastewater works. The Detailed Emergency Report shall include, as a minimum, the following: i) a description of the problem that occurred; ii) a description of the impact that occurred; iii) a description of what was done to minimize the impact; and iv) a description of what was done to prevent recurrence of the problem.

TEMPORARY BYPASS AUTHORIZATION

21. The *Approval Holder* shall apply to the *Authorization Officer* for a temporary authorization to bypass at least one of the treatment processes normally applied to wastewater in the system. An application **must be made at least 45 days before the day** on which the bypass is required, in the form and format provided in the *ERRIS*.

EFFLUENT PERFORMANCE STANDARDS

22. The *Approval Holder* shall ensure that the average concentration of contaminants in the effluent deposited via the *Final Discharge Point* of the wastewater works does not exceed the following limiting criteria. The average must be calculated by using the applicable calculating period listed in Condition 28:

    i. *$CBOD_5$*: 25 mg of $CBOD_5$/L (average); and,
    ii. *Suspended Solids*: 25 mg/L (average).

23. For a *Lagoon*, the *Approval Holder*, in the determination of the average referred to in Condition 22 is not to take into account the result of any determination of the concentration of *Suspended Solids* in a sample of effluent referred to in Condition 28 that was taken during the month of July, August, September or October, if that result was greater than 25 mg/L.

24. The *Approval Holder* shall **immediately** apply to the *Authorization Officer*, in the form and format specified by the *ERRIS* if any samples of the effluent deposited via the *Final Discharge Point* contain a calculated concentration of un-ionized ammonia that is greater than or equal to 1.25 mg/L, expressed as nitrogen (N) at 15°C ± 1°C.

25. For systems that the *Average Daily Volume* of effluent calculated in Condition 26 is greater than or equal to 5,000 $m^3$, the *Approval Holder* shall ensure the average concentration of *Total Residual Chlorine* in the effluent deposited via the *Final Discharge Point* does not exceed 0.02 mg/L if chlorine, or one of its compounds, was used in the treatment of wastewater. For all other systems, where the *Average Daily Volume* of effluent calculated in Condition 26 is less than 5,000 $m^3$, the *Approval Holder* shall ensure the average concentration of *Total Residual Chlorine* in the effluent deposited via the *Final Discharge Point* does not exceed 0.02 mg/L **by January 1st, 2021,** if chlorine, or one of its compounds, was used in the treatment of wastewater.

MONITORING AND SAMPLING

Pursuant to Section 17 of the *Water Quality Regulation*, this Approval is subject to the following conditions:

26. The *Approval Holder* shall, for each calendar year, calculate and record the *Average Daily Volume* of effluent deposited via the *Final Discharge Point*. The volume of effluent during each day must be determined by using monitoring equipment that provides:
    i. A continuous measure of the volume of influent or effluent or a measure of the rate of flow of the influent or effluent upon which that daily volume of effluent may be estimated; or,
    ii. A continuous measure of the volume of influent or effluent if the *Average Daily Volume* measured during the previous calendar year is greater than 2,500 $m^3$.

27. The *Approval Holder* shall collect monitoring samples for the following parameters in accordance with the requirements of Condition 28.
    i. The concentration of *CBOD*; and,
    ii. The concentration of *Suspended Solid.*

28. The *Approval Holder* shall collect monitoring samples at the *Final Discharge Point* of the type and at the frequency indicated below based on the *Average Daily Volume* of effluent calculated in Condition 26:

| ***Average Daily Volume*** **($m^3$)** | **Treatment Type** | **Type of Sample to be Taken** | **Monitoring Frequency** | **Calculating Period[1]** | **Reporting Frequency** |
|---|---|---|---|---|---|
| less than 2,500 | *Lagoon* | Grab or composite | Quarterly, but at least 60 days after any other sample | Annual | Annual |
| | Mechanical | Grab or composite | Monthly, but at least 10 days after any other sample | Quarterly | Quarterly |
| greater than 2,500 but less than or equal to 17,500 | *Lagoon* | Grab or Composite | Every two weeks, but at least seven days after any other sample | Quarterly | Quarterly |
| | Mechanical | Composite | | | |
| greater than 17,500 but less than or equal to 50,000 | *Lagoon* | Grab or Composite | Weekly, but at least five days after any other sample | Monthly | Quarterly |
| | Mechanical | Composite | | | |
| Greater than 50,000 | *Lagoon* | Grab or Composite | Three days per week, but at least one day after any other sample | Monthly | Quarterly |
| | Mechanical | Composite | | | |

[1]The average must be determined for *CBOD* and *Suspended Solids*

29. The *Approval Holder* shall collect a grab sample at the *Final Discharge Point* for *Acutely Lethal* Toxicity at the frequency indicated below based on the *Average Daily Volume* of effluent calculated in Condition 26:

| ***Average Daily Volume ($m^3$)*** | **Minimum Sampling Frequency** |
|---|---|
| less than or equal to 2,500 | n/a |
| greater than 2,500 but less than or equal to50,000 | Quarterly [1] |
| greater to 50,000 | Monthly[2] |

[1]At least 60 days after any other sample
[2]At least 21 days after any other sample

30. If a sample is determined to be *Acutely Lethal* at the system's *Final Discharge Point*, the *Approval Holder* shall **immediately** contact the *Authorization Officer*.

31. If the *Final Discharge Point* results are determined not *Acutely Lethal* in accordance to Condition 32, the *Approval Holder* may follow the reduced frequency indicated below, based on the *Average Daily Volume* of effluent calculated in Condition 26:

| ***Average Daily Volume*** ***($m^3$)*** | **Number of Tests Not Acutely Lethal** | **Reduced Frequency**[1] |
|---|---|---|
| less than or equal to 2,500 | n/a | n/a |
| greater than 2,500 but less than or equal to50,000 | 4 consecutive quarters | Yearly[2] |
| greater than 50,000 | 12 consecutive months | Quarterly[3] |

[1] Reduced frequency if numbers of consecutive tests of column 2 of table are passed
[2] At least 6 months after any other sample
[3] At least 60 days after any other sample

32. The *Approval Holder* shall ensure the *Acute Lethality* of the effluent be determined in accordance with Reference Method EPS 1/RM/13 or EPS 1/RM/50.

33. The *Approval Holder* shall ensure that the Effluent Monitoring Plan, based on the wastewater works' Environmental Risk Assessment, is approved by the *Authorization Officer*. The *Approval Holder* shall follow the monitoring requirements outlined in the approved Effluent Monitoring Plan.

34. The *Approval Holder* shall calibrate the flow monitoring equipment at least once in every calendar year and at least five months after a previous calibration.

35. The *Approval Holder* shall ensure that the monitoring equipment is capable to determine the volume or rate of flow with a margin of error of ±15%.

36. The *Approval Holder* shall ensure that all samples are collected using the methods described in the latest edition of the ISO 5667-10, Water quality - Sampling - Part 10: Guidance on sampling of waste waters.

37. The *Approval Holder* shall ensure that all parameters that are required to be analysed by this Approval, are analysed by *Accredited* laboratories whose accreditation includes the analytical method used to make the determination.

38. The *Approval Holder* shall ensure that all equipment used for monitoring parameters required by this Approval is calibrated in accordance with manufacturer's recommendations.

OVERFLOW MANAGEMENT

39. The *Approval Holder* shall maintain a long-term plan to reduce combined sewer overflows and reduce overflows from infiltration. The plan must follow, as a minimum, the *Authorization Officer's* CSO/SSO Long-Term Control Plan Guidelines.

40. The *Approval Holder* shall ensure that all lift stations are designed to prevent the release of floatable materials.

OPERATOR CERTIFICATION

41. Pursuant to Section 19 of the *Water Quality Regulation*, the Minister gives notice that the *Approval Holder* shall employ and have available the following *Certified Operators* based on the Class of the wastewater works listed on the Certificate page of this Approval:

| **Treatment Class** | **Wastewater Treatment (WWT) *Certified Operator*** | **Collection Class** | **Wastewater Collection (WWC) *Certified Operator*** |
|---|---|---|---|
| I | Minimum one Class I | I | None |
| II | Minimum one Class II and one Class I | II | One Class I |
| III | Minimum one Class III and one Class II | III | One Class I |
| IV | Minimum one Class IV and one Class III | IV | One Class I |

RECORD KEEPING

Pursuant to Section 17 of the *Water Quality Regulation*, this Approval is subject to the following conditions:

42. The *Approval Holder* shall record and retain for a period of five (5) years the following information and make it available to the *Authorization Officer* upon request:
    a. The date of each day when wastewater effluent was not discharged via the *Final Discharge Point* (if applicable);
    b. For those days when effluent was deposited via the *Final Discharge Point:*
        i. the daily volume deposited, in $m^3$, if that volume is yielded by a continuous measure, or
        ii. the estimated daily volume deposited, in $m^3$, in any other case, and the results of the calculation and measurement used in the estimation, as outlined in Condition 26(i);
    c. For all discharges from each *Overflow Point,* including those that were directly caused by excessive rain or snow melt:
        i. the date of each day on which effluent was deposited via the *Overflow Point,*
        ii. for each of those days, the duration or estimated duration, expressed in hours, of the deposit, along with an indication of whether it is the duration or an estimated duration,
        iii. the daily volume deposited in $m^3$ if that volume is yielded by a continuous measure, or an estimate of the daily volume, in $m^3$ in any other case;
    d. For all monitoring equipment used to determine the volume or rate of flow:
        i. A description, including the type,
        ii. The manufacturer's specifications, the year of manufacture and the model number,
        iii. the date on which the equipment was calibrated and its degree of accuracy after each calibration,
        iv. The date the equipment was installed and if applicable, the date on which it ceased to be used for monitoring and on which it was replaced;
    e. For each monitoring sample determination required by Condition 28, as well as any additional sample determinations made by an *Accredited* laboratory:
        i. the results of such determinations for each of the parameters listed in Condition 27 and Condition 29 (if applicable),
        ii. a statement as to whether the sample is a grab sample or a composite sample and the date on which the sample was taken;
    f. All monitoring sample results for each parameter taken as part of the Effluent Monitoring Plan;
    g. All monitoring sample results required by Schedule "B", if applicable; and,
    h. A list identifying the *Operator(s)* and indicating the certification level of each *Operator(s).*

REPORTING

Pursuant to Section 17 of the *Water Quality Regulation*, this Approval is subject to the following conditions:

43. If the information provided in the *ERRIS* identification report changes, the *Approval Holder* shall send a notice that provides the updated information to the *Authorization Officer* no later than **45 days after the change**.

44. The *Approval Holder* shall submit electronically to the *Authorization Officer*, in the form and format specified by the *ERRIS*, a report for the previous reporting period:
    i. **within 45 days of the end of each year**, with the period starting on the first day of January each year, for a *Lagoon* with an *Average Daily Volume* of effluent less than 2,500 $m^3$/d;
    ii. **within 45 days of the end of each *quarter***, with the first *quarter* starting on the first day of January each year, for all other wastewater works.

    The report must summarize the following:
    a. The number of days during which effluent was deposited;
    b. The volume of effluent that was deposited, expressed in $m^3$;
    c. The average *CBOD* due to the quantity of *CBOD* matter in the effluent;
    d. The average concentration of *Suspended Solids* in the effluent;
    e. The results of the *Acutely Lethal* toxicity tests; and,
    f. If a temporary bypass authorization was issued.

45. The *Approval Holder* shall submit to the *Authorization Officer* **within 45 days of the end of each year**:
    a. All test results completed as part of the approval Effluent Monitoring Plan required in Condition 33;
    b. A summary report of *Environmental Emergencies* that were reported through the Emergency Reporting procedure described in this Approval; and,
    c. All monitoring sample results required by Schedule "B", if applicable.

Prepared by: _____
Joyce Wang, EIT
Approvals Coordinator

Reviewed by: _____
Mark Glynn, P.Eng.
Manager, Permitting South
Authorizations Branch

REGISTERED PROFESSIONAL ENGINEER
Province of New Brunswick
#M4924
Mark L. Glynn
Signature
June 27, 2019
Date
Province du Nouveau-Brunswick
INGÉNIEUR IMMATRICULÉ

# Appendix C

## Site Photographs

# Site Photographs

*Photo 1* *View of Existing STP, Looking East (August 16, 2022)*

*Photo 2* *View of Proposed Process Building Location, Looking North (August 16, 2022)*

*Photo 3* *View of Project Area, Looking South (August 16, 2022)*

*Photo 4* *View of Drainage Channel, Looking North (August 16, 2022)*

*Photo 5* *View of Existing STP Outfall (August 16, 2022)*

*Photo 6* *View of Drainage Channel, Looking South (August 16, 2022)*

*Photo 7* *View of Northern Extent of Drainage Channel, Looking North (August 16, 2022)*


*Photo 8* *View of Fill Materials on Eastern Bank of Drainage Channel, Looking East (August 16, 2022)*

*Photo 9* *View of Coastal Wetland, Looking North (August 16, 2022)*

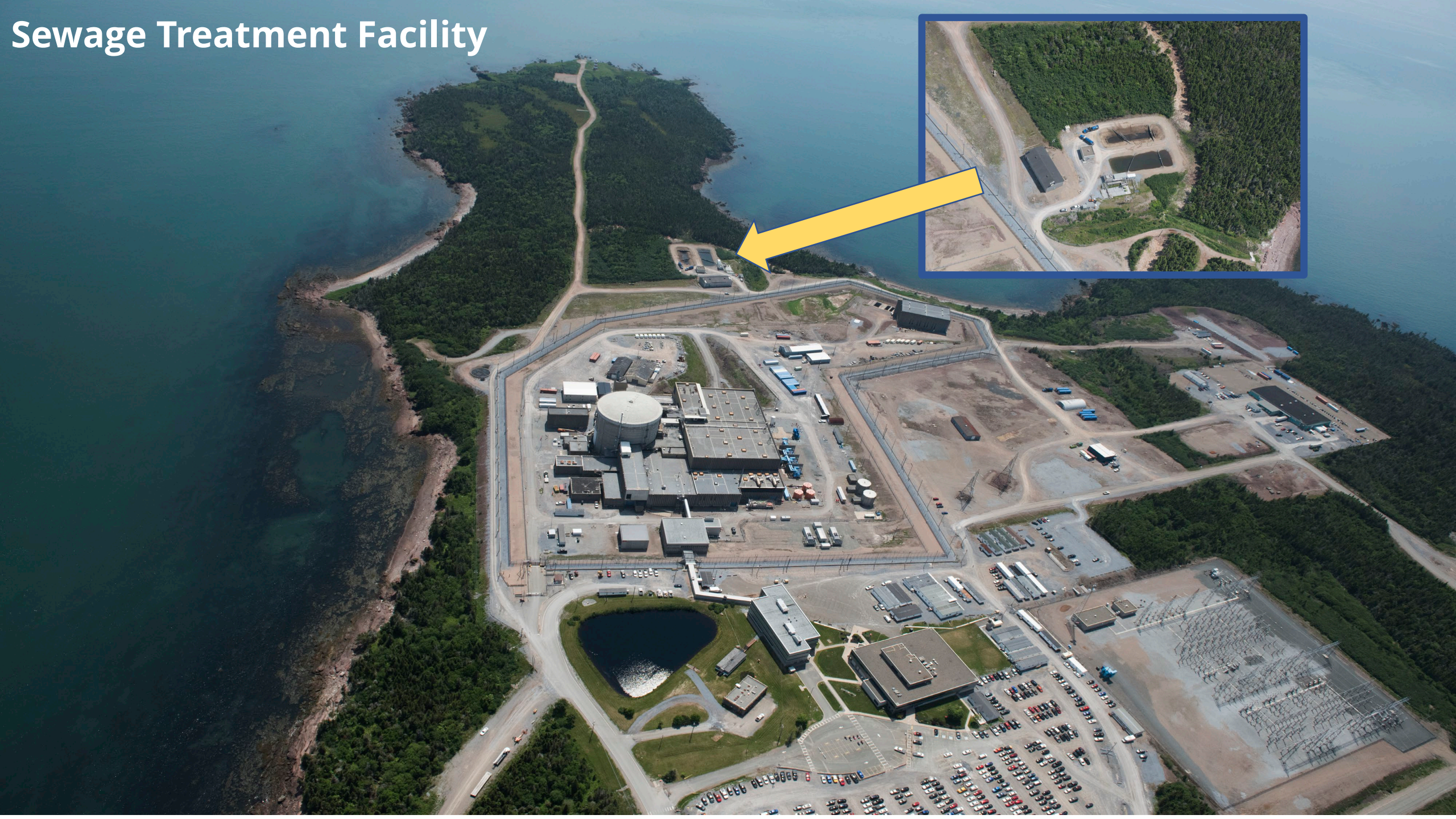
*Photo 10* *View of Cobble Beach, Looking East (August 16, 2022)*

*Photo 11* *View of Cobble Beach, Looking West (August 16, 2022)*

*Photo 12* *View of Infilled Discharge Pipe from Wetland, Looking North (August 16, 2022)*

***Photo 13*** ***View of Discharge Water from Culvert, Looking Southeast (August 16, 2022)***

# Sewage Treatment Facility




Phase 2 - Demo
old equipment
Phase 1
Inground Tank
Phase 2 MBR
Building

# Appendix D

## Wetland Survey Report

# Report for Wetland Survey – NB Power Point Lepreau Nuclear Generating Station Domestic Sewage Treatment Plant Upgrade
# October 28, 2022

**Prepared for: GHD Limited**
**466 Hodgson Rd Fredericton, NB E3C 2G5 Canada**
**Troy Small – troy.small@ghd.com, (506) 458-1248**

**Submitted by: Lyle Vicaire, Maqamigew Anqotumeg Inc**
**(506)261-5308 lylev@maqamigew.ca**

## INTRODUCTION

GHD Limited enlisted the services of Maqamigew Anqotumeg to conduct a wetland delineation for a small wetland (Figure 1), in order to confirm wetland boundaries previously described by CBCL limited. A wetland delineation report to summarize the findings had also been requested. This work is being done as part of the regulatory requirements under *The Clean Environment Act* and *Clean Water Act.* New Brunswick has a policy of no-net-loss of wetlands as described in the New Brunswick Wetland Conservation Policy. Wetlands are legally protected under the Clean Water Act and the supporting Watercourse and Wetland Alteration (WAWA) regulation. Alterations to wetlands require a WAWA permit and may also require compensation where affected wetlands are replaced at a ratio of 2:1. Under the Clean Environment Act, alterations of wetlands larger than 2 hectares may trigger the requirement for an Environmental Impact Assessment.

## METHODOLOGY

Wetland survey was conducted on a sunny Thursday September 01, 2022, by Lyle Vicaire of Maqimigew Angotumeg, an experienced field ecologist and trained wetland delineator. Lyle Vicaire was accompanied by an NB Power escort and GHD environmental technician. Wetland 1 (WL1) (Figure 1) was delineated.

The wetland delineation was conducted using the methodology developed by the *US Army Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region,* (U.S Army Corps of Engineers, 2012). This protocol has been adopted by Canadian regulators and practitioners. The wetland determination and boundary delineation is based on the use of three parameters that must all be present for a wetland determination: wetland (hydrophytic) vegetation, hydric soil, and evidence of wetland hydrology. At representative locations along the boundary, paired sampling points are placed (one within the wetland, and one in the adjacent upland) where the three parameters are measured and recorded on data forms. The wetland boundary was recorded in the field using a Garmin GPSMAP 64x, with an accuracy of (3-5 m). The completed wetland data forms and wetland photos are presented in Appendix A, including a large-scale map shown on Figure 1. This method uses paired data points (one in the wetland and one outside the wetland) to establish the vegetative boundary, which is then used to mark the edge of the wetland. The wetland determination is based on a three-part test that requires the presence of wetland vegetation, hydric soil, and signs of wetland hydrology.

## RESULTS

The Study Area (SA) is within the traditional territory of the Wolastoqey Nation, approximately 4km to the center of Maces Bay, New Brunswick, adjacent to Indian Cove in the Bay of Fundy, and part of the Point Lepreau Nuclear Generating Station complex. One wetland was delineated in the field that covers a total area of 0.06 ha. The wetland is of the non-tidal type. The wetland showed evidence of past soil disturbance, including dyking and culvert installations along the southwest and northeast ends of the wetland. The wetland shapes are shown in Figure 1, and delineation forms in Appendix A.

## WETLAND 1

Wetland 1 (WL1 – Figure 1) on PID 00471136 is a flooded herb marsh with a lush herbaceous layer, dominated by broadleaf cattail (*Typha latifolia*). The area mapped for this wetland is approximately 0.06 hectares. The wetland is bounded by anthropogenic activity on all sides of the wetland. A watercourse runs through the wetland, with culvert installations initiating flooding (5cm) within the wetland. One paired sampling site was recorded. The wetland was determined to have abnormal site conditions/hydrology within it. Under typical circumstances, constant inundation throughout the wetland would not exist. The upland vegetation community around the wetland is mature boreal forest.

In the wetland, the dominant vegetation is an extensive understory layer, mainly of broadleaf cattail (*Typha latifolia*), and adequate amounts of bluejoint grass (*Calamagrostis canadensis*), and lesser amounts of curly dock (*Rumex crispus*) and coltsfoot (*Tussilago farfara*). The transition zone is marked by sharp slopes on all boundaries. Northeast and southwest edges of the wetland had gravel laid and a culvert previously installed. The topography is mostly flat within the wetland and sharp inclines on all boundaries. The Prevalence Index (PI) was observed to be 1.63. A texture could not be determined with the constant freshwater inundation of the wetland. A soil pit to determine the soil profile was also not used due to a restrictive layer of water at the surface.

The immediately adjacent upland consists of a sloped boreal forest to the south, road to the north and a culvert on the southwest and northeast edges. The forest is a mature boreal wood stand. The dominant vegetation is balsam fir (*Abies balsamea*), with lesser amounts of white spruce (*Picea glauca*) and paper birch (*Betula papyrifera*). A moderate understory of grey alder (*Alnus* incana) low-bush blueberry (*Vaccinium* angustifolium), bunchberry (*Cornus canadensis*), twinflower (*Linnea borealis*), and a small amount of balsam fir saplings. The PI was observed to be 2.89. The soil is a well-drained sandy silt with somewhat light colors (11-25cm/7.5 YR 5/3, 26-40cm/7/5YR/3/3). With a prevalence index slightly less than 3, some dark/light colors, and no presence of hydrology, the area was determined to not be a wetland.

The wetland boundary was established utilizing changes in topography and noting signs of hydrology.

Wetland 1 did present surface inflow and outflow. The wetland receives surface water through a culvert on the northern boundary, and some groundwater input from the upgradient forest and surface runoff from the adjacent road. Surface outflow at the southern boundary into the Bay of Fundy. No Species At at Risk (SAR) were observed in the wetland or adjacent forest.

## LANDUSE

Wetland 1 is adjacent to the NB Power Point LePreau Nuclear Generating station domestic wastewater treatment building. Field observations indicate the wetland may have previously been a marine influenced wetland, however, current conditions do not allow for tidal waters to enter, and the wetland continues to function without tidal waters.

## CLOSURE

We appreciate the opportunity to submit this wetland survey report and have endeavored to be thorough in our assessment of the Study Area for NB Power Nuclear Generating Station wastewater treatment upgrade wetland assessment of PID 00471136. Should you have any questions, would like to clarify anything within this report or require any additional information, please do not hesitate to contact the undersigned.

Regards,

**Maqamigew Anqotumeg Inc**

Lyle Vicaire, Terrestrial Biologist, CEO/President, Maqamigew Anqotumeg Inc

## References

Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U. S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.

U.S. Army Corps of Engineers. 2008. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Draft), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

Figure 1 – Wetland and plot points for NB Power Nuclear Generating Station Domestic Sewage Treatment Plant Upgrade

Photo 1 – Typical wetland vegetation for WL1

Photo 2 – Typical wetland vegetation for WL1

Photo 3 – Displaying constant inundation on surface layer

Photo 4 – Typical upland vegetation surrounding WL1

Photo 5 – Typical upland vegetation surrounding WL1

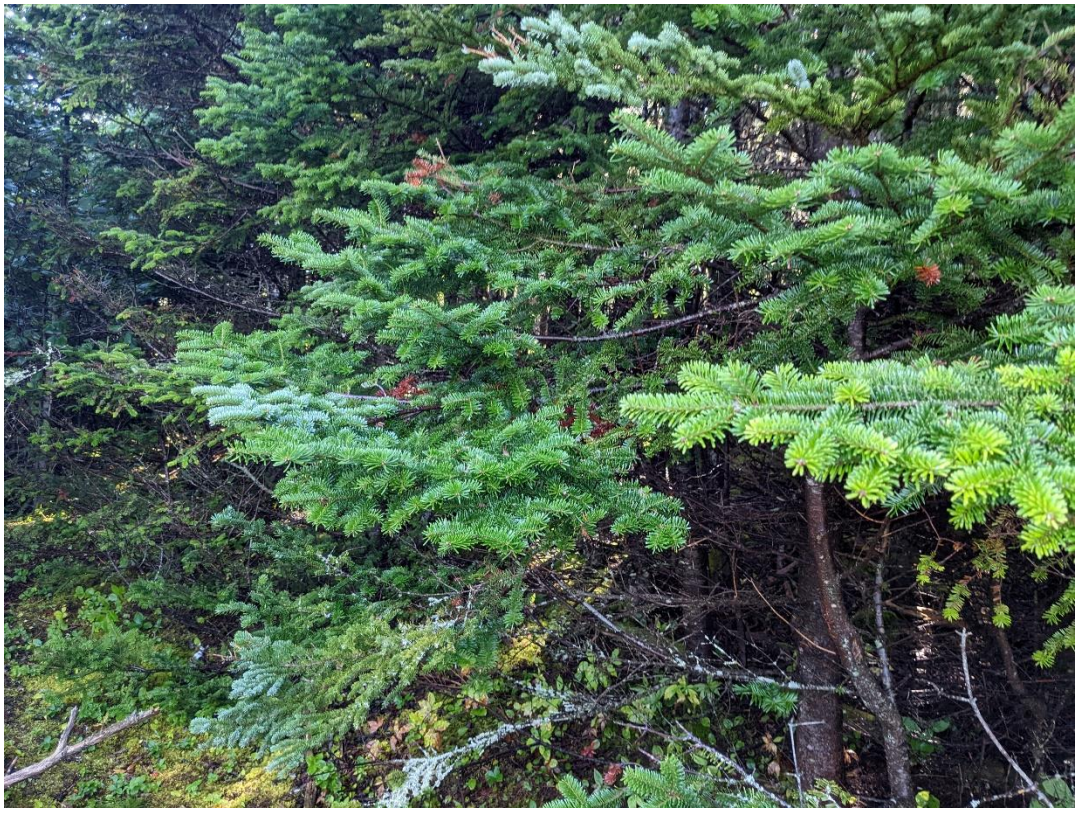


Photo 6 – Typical upland vegetation surrounding WL1

# APPENDIX A – WETLAND DELINEATION FORMS

# WETLAND DELINEATION DATA FORM – NEW BRUNSWICK

Project/Site: Point Lepreau Nuclear Generating Station Municipality/County: LePreau, New Brunswick Sampling Date: Sept 01, 2022

Applicant/Owner: GHD Limited Sampling Point: 1 of 2

Investigator(s): Lyle Vicaire Affiliation: Magamigew Angotumeg Landform (hillslope, terrace, etc.): _____

Local relief (concave, convex, none): _____ Slope (%): _____ X coord: -66.4579620 Y coord 45.0654680

Datum: WGS 1984 Soil Map Unit Name/Type: _____ Wetland Type: Basin herb marsh

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation X, Soil X, or Hydrology X significantly disturbed? Are "Normal Circumstances" present? Yes _____ No X

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No _____ | **Is the Sampled Area within a Wetland?** **Yes X No _____** |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | If yes, optional Wetland Site ID: _____ |

Remarks: (Explain alternative procedures here or in a separate report.)

## VEGETATION – Use scientific names of plants.

| Tree Stratum ( Plot size: 15 ) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. NA | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| | = Total Cover | | |

| Sapling/Shrub Stratum ( Plot size: 5 ) | | | |
|---|---|---|---|
| 1. NA | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| | = Total Cover | | |

| Herb Stratum ( Plot size: 1m ) | | | |
|---|---|---|---|
| 1. *Rumex crispus* | 05 | Y | FAC |
| 2. *Typha latifolia* | 50 | Y | OBL |
| 3. *Calamagrostis canadensis* | 30 | Y | FACW |
| 4. *Tussilago farfara* | 10 | Y | FAC |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| 9. | | | |
| 10. | | | |
| 95 | = Total Cover | | |

| Woody Vine Stratum ( Plot size: _____ ) | | | |
|---|---|---|---|
| 1. No woody vines | | | |
| 2. | | | |
| | = Total Cover | | |

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 1 (A/B)

**Prevalence Index worksheet:**

| | Total % Cover of: | Multiply by: | |
|---|---|---|---|
| OBL species | 50 | x 1 = | 50 |
| FACW species | 30 | x 2 = | 60 |
| FAC species | 15 | x 3 = | 45 |
| FACU species | | x 4 = | |
| UPL species | | x 5 = | |
| Column Totals: | 95 (A) | | 155 (B) |

Prevalence Index = B/A = 1.63

**Hydrophytic Vegetation Indicators:**

X Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

**Hydrophytic Vegetation Present? Yes X _____ No _____**

Remarks: (Include photo numbers here or on a separate sheet.)

## SOIL

Sampling Point: 1 of 2

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (cm) | Matrix Color (moist) | % | Redox Features Color (moist) | % | Type[1] | Loc[2] | Texture | Remarks |
|---|---|---|---|---|---|---|---|---|
| NA | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

**Hydric Soil Indicators:**

- X Histosol (A1)
- X Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surfaces (S7)
- ___ Polyvalue Below Surface (S8)
- ___ Thin Dark Surface (S9)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

**Indicators for Problematic Hydric Soils[3]:**

- ___ Coast Prairie Redox (A16)
- ___ 5 c Mucky Peat or Peat (S3)
- ___ Iron-Manganese Masses (F12)
- ___ Piedmont Floodplain Soils (F19)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if observed):**

Type: **Water**

Depth (cm): **0**

**Hydric Soil Present? Yes X No ___**

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes X No ___ Depth (cm): 5

Water Table Present? Yes ___ No X Depth (cm): ___

Saturation Present? Yes X No ___ Depth (cm): 0 (includes capillary fringe)

**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Adapted from U.S. Army Corps of Engineers form for North Central and North East Region (Version 2.0), and Field Indicators for Identifying Hydric Soils in New England (Version 4.0) Supplement for use in New Brunswick (2019)

# Appendix E

## Atlantic Canada Conservation Data Centre (ACCDC) Report, 2022

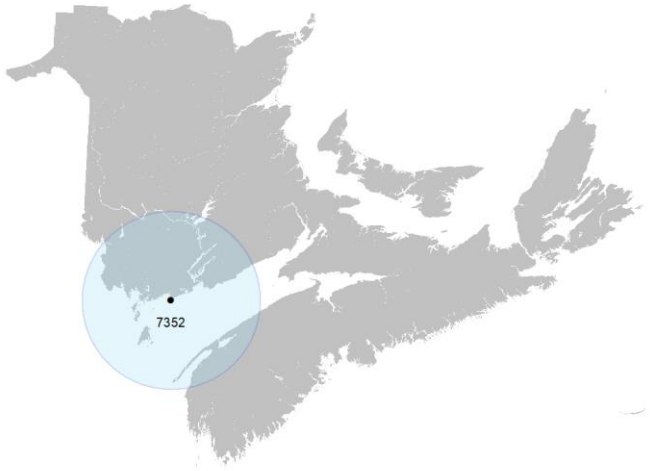
Atlantic Canada Conservation Data Centre
Centre de données sur la conservation du Canada atlantique

# DATA REPORT 7352: Maces Bay, NB

Prepared 19 July 2022
by J. Churchill, Data Manager

**CONTENTS OF REPORT**






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

## 1.0 PREFACE

The Atlantic Canada Conservation Data Centre (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:

| Filename | Contents |
|---|---|
| MacesByNB_7352ob.xls | Rare or legally-protected Flora and Fauna in your study area |
| MacesByNB_7352ob100km.xls | A list of Rare and legally protected Flora and Fauna within 100 km of your study area |
| MacesByNB_7352msa.xls | Managed and Biologically Significant Areas in your study area |

### 1.2 RESTRICTIONS

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

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

### 1.3 ADDITIONAL INFORMATION

The accompanying Data Dictionary provides metadata for the data provided.

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

| | | | | |
|---|---|---|---|---|
| **Plants, Lichens, Ranking Methods, All other Inquiries** | Sean Blaney | Senior Scientist / Executive Director | (506) 364-2658 | sean.blaney@accdc.ca |
| **Animals (Fauna)** | John Klymko | Zoologist | (506) 364-2660 | john.klymko@accdc.ca |
| **Data Management, GIS** | James Churchill | Conservation Data Analyst / Field Biologist | | james.churchill@accdc.ca |
| **Billing** | Jean Breau | Financial Manager / Executive Assistant | (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.

**New Brunswick**. For information about rare taxa, protected areas, game animals, deer yards, old growth forests, archeological sites, fish habitat etc., or to determine if location-sensitive species (section 4.3) occur near your study site, please contact Hubert Askanas, Energy and Resource Development: (506) 453-5873.

**Nova Scotia**. For information about Species at Risk or general questions about Nova Scotia location-sensitive species please contact the Biodiversity Program at biodiversity@novascotia.ca. For questions about protected areas, game animals, deer yards, old growth forests, archeological sites, fish habitat etc., or to determine if location-sensitive species (section 4.3) occur near your study site please contact a Regional Biologist:

| | | | |
|---|---|---|---|
| **DIGB, ANNA, KING** | Emma Vost | (902) 670-8187 | Emma.Vost@novascotia.ca |
| **SHEL, YARM** | Sian Wilson | (902) 930-2978 | Sian.Wilson@novascotia.ca |
| **QUEE, LUNE** | Peter Kydd | (902) 523-0969 | Peter.Kydd@novascotia.ca |
| **HALI, HANT** | Shavonne Meyer | (902) 893-0816 | Shavonne.Meyer@novascotia.ca |
| **Central Region** | Jolene Laverty | (902) 324-8953 | Jolene.Laverty@novascotia.ca |
| **COLC, CUMB** | Kimberly George | (902) 890-1046 | Kimberly.George@novascotia.ca |
| **ANTI, GUYS** | Harrison Moore | (902) 497-4119 | Harrison.Moore@novascotia.ca |
| **INVE, VICT** | Maureen Cameron-MacMillan | (902) 295-2554 | Maureen.Cameron-MacMillan@novascotia.ca |
| **CAPE, RICH, PICT** | Elizabeth Walsh | (902) 563-3370 | Elizabeth.Walsh@novascotia.ca |

**Prince Edward Island**. For information about rare taxa, protected areas, game animals, fish habitat etc., please contact Garry Gregory, PEI Department of Environment, Energy and Climate Action: (902) 569-7595.

# 2.0 RARE AND ENDANGERED SPECIES

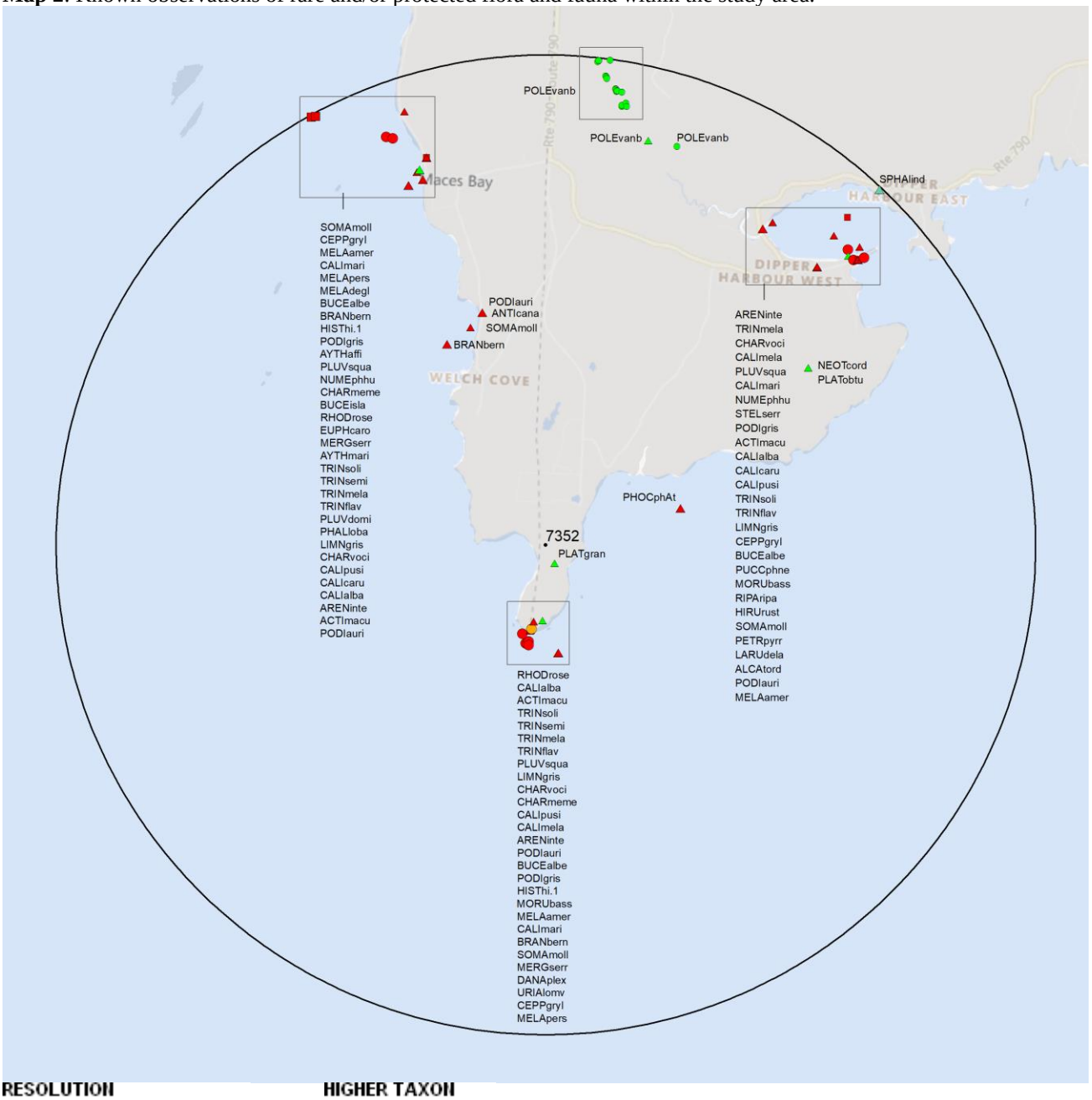
## 2.1 FLORA

The study area contains 29 records of 6 vascular, 1 record of 1 nonvascular flora (Map 2 and attached: *ob.xls).

## 2.2 FAUNA

The study area contains 669 records of 43 vertebrate, 1 record of 1 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.



# 3.0 SPECIAL AREAS

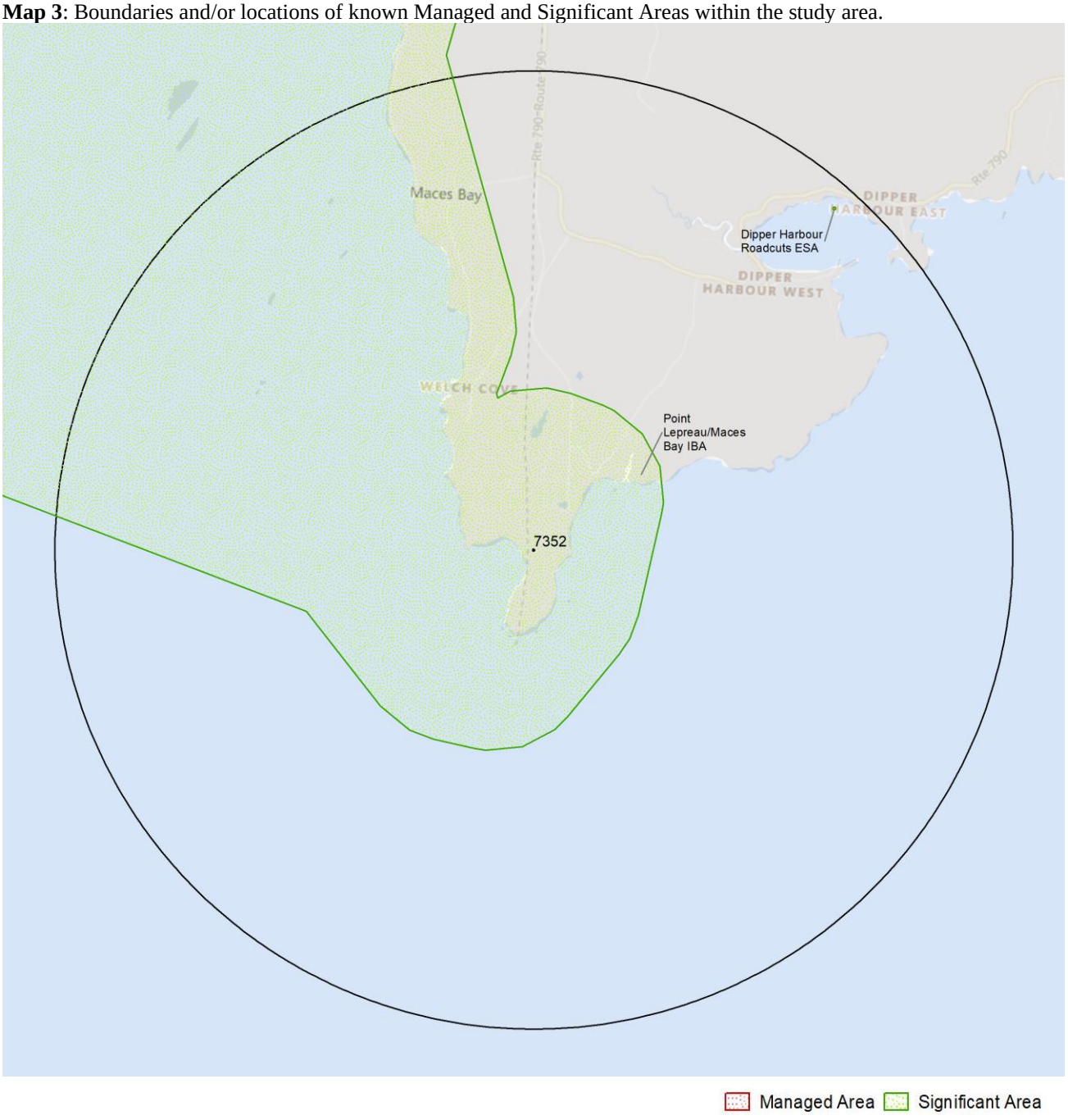
### 3.1 MANAGED AREAS

The GIS scan identified no managed areas in the vicinity of the study area (Map 3).

### 3.2 SIGNIFICANT AREAS

The GIS scan identified 2 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.



# 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 (± the precision, in km, of the record). [P] = vascular plant, [N] = nonvascular plant, [A] = vertebrate animal, [I] = invertebrate animal, [C] = community. Note: records are from attached files *ob.xls/*ob.shp only.

## 4.1 FLORA

| | Scientific *Name* | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) |
|---|---|---|---|---|---|---|---|---|
| N | *Sphagnum lindbergii* | Lindberg's Peat Moss | | | | S2 | 1 | 5.0 ± 1.0 |
| P | *Polemonium vanbruntiae* | Van Brunt's Jacob's-ladder | Threatened | Threatened | Threatened | S1 | 19 | 4.3 ± 0.0 |
| P | *Puccinellia phryganodes ssp. neoarctica* | Creeping Alkali Grass | | | | S2S3 | 1 | 4.3 ± 0.0 |
| P | *Rhodiola rosea* | Roseroot | | | | S3 | 5 | 0.8 ± 0.0 |
| P | *Platanthera grandiflora* | Large Purple Fringed Orchid | | | | S3 | 2 | 0.2 ± 0.0 |
| P | *Neottia cordata* | Heart-leaved Twayblade | | | | S3S4 | 1 | 3.2 ± 0.0 |
| P | *Platanthera obtusata* | Blunt-leaved Orchid | | | | S3S4 | 1 | 3.2 ± 0.0 |

## 4.2 FAUNA

| | Scientific *Name* | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) |
|---|---|---|---|---|---|---|---|---|
| A | *Charadrius melodus melodus* | Piping Plover melodus subspecies | Endangered | Endangered | Endangered | S1B | 3 | 0.8 ± 0.0 |
| A | *Riparia riparia* | Bank Swallow | Threatened | Threatened | | S2B | 1 | 4.4 ± 0.0 |
| A | *Tringa flavipes* | Lesser Yellowlegs | Threatened | | | S3M | 45 | 0.8 ± 0.0 |
| A | *Histrionicus histrionicus pop. 1* | Harlequin Duck - Eastern population | Special Concern | Special Concern | Endangered | S1B,S1S2N,S2M | 56 | 0.9 ± 0.0 |
| A | *Hirundo rustica* | Barn Swallow | Special Concern | Threatened | Threatened | S2B | 2 | 4.3 ± 0.0 |
| A | *Euphagus carolinus* | Rusty Blackbird | Special Concern | Special Concern | Special Concern | S2S3B,S3M | 1 | 3.9 ± 1.0 |
| A | *Bucephala islandica* | Barrow's Goldeneye | Special Concern | Special Concern | Special Concern | S2S3N,S3M | 1 | 3.9 ± 2.0 |
| A | *Phalaropus lobatus* | Red-necked Phalarope | Special Concern | Special Concern | | S3M | 1 | 4.0 ± 0.0 |
| A | *Podiceps auritus* | Horned Grebe | Special Concern | Special Concern | Special Concern | S3N | 23 | 0.9 ± 0.0 |
| A | *Phocoena phocoena* | Harbour Porpoise | Special Concern | | Spec.Concern | S4 | 1 | 1.4 ± 1.0 |
| A | *Podiceps grisegena* | Red-necked Grebe | Not At Risk | | | S2N,S3M | 14 | 0.9 ± 0.0 |
| A | *Calidris canutus rufa* | Red Knot rufa subspecies - Tierra del Fuego / Patagonia wintering population | E,SC | Endangered | Endangered | S2M | 3 | 4.0 ± 0.0 |
| A | *Tringa melanoleuca* | Greater Yellowlegs | | | | S1?B,S4S5M | 63 | 0.8 ± 0.0 |
| A | *Grus canadensis* | Sandhill Crane | | | | S1B | 1 | 2.3 ± 0.0 |
| A | *Alca torda* | Razorbill | | | | S1B | 1 | 4.3 ± 2.0 |
| A | *Aythya marila* | Greater Scaup | | | | S1B,S2N,S4M | 2 | 3.9 ± 1.0 |
| A | *Aythya affinis* | Lesser Scaup | | | | S1B,S4M | 1 | 4.1 ± 5.0 |
| A | *Branta bernicla* | Brant | | | | S1N,S2S3M | 10 | 0.9 ± 0.0 |
| A | *Calidris alba* | Sanderling | | | | S1N,S3S4M | 29 | 0.8 ± 0.0 |
| A | *Stelgidopteryx serripennis* | Northern Rough-winged Swallow | | | | S1S2B | 1 | 4.5 ± 7.0 |
| A | *Melanitta americana* | American Scoter | | | | S1S2N,S3M | 23 | 0.9 ± 0.0 |
| A | *Petrochelidon pyrrhonota* | Cliff Swallow | | | | S2B | 1 | 4.4 ± 0.0 |
| A | *Tringa solitaria* | Solitary Sandpiper | | | | S2B,S4S5M | 11 | 0.8 ± 0.0 |
| A | *Melanitta perspicillata* | Surf Scoter | | | | S2N,S4M | 5 | 1.0 ± 0.0 |
| A | *Melanitta deglandi* | White-winged Scoter | | | | S2N,S4M | 2 | 5.0 ± 17.0 |
| A | *Somateria mollissima* | Common Eider | | | | S2S3B,S2S3N,S4M | 31 | 1.0 ± 0.0 |
| A | *Larus delawarensis* | Ring-billed Gull | | | | S2S3B,S4N,S5M | 2 | 4.3 ± 0.0 |
| A | *Pluvialis dominica* | American Golden-Plover | | | | S2S3M | 4 | 4.0 ± 0.0 |
| A | *Charadrius vociferus* | Killdeer | | | | S3B | 25 | 0.8 ± 0.0 |
| A | *Tringa semipalmata* | Willet | | | | S3B | 3 | 0.8 ± 0.0 |
| A | *Cepphus grylle* | Black Guillemot | | | | S3B | 6 | 1.1 ± 1.0 |
| A | *Mergus serrator* | Red-breasted Merganser | | | | S3B,S4S5N,S5M | 2 | 1.0 ± 0.0 |
| A | *Numenius phaeopus hudsonicus* | Whimbrel | | | | S3M | 7 | 4.0 ± 0.0 |
| A | *Arenaria interpres* | Ruddy Turnstone | | | | S3M | 40 | 0.8 ± 0.0 |

| | Scientific *Name* | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) |
|---|---|---|---|---|---|---|---|---|
| A | *Calidris pusilla* | Semipalmated Sandpiper | | | | S3M | 49 | 0.8 ± 0.0 |
| A | *Calidris melanotos* | Pectoral Sandpiper | | | | S3M | 2 | 0.8 ± 0.0 |
| A | *Limnodromus griseus* | Short-billed Dowitcher | | | | S3M | 32 | 0.8 ± 0.0 |
| A | *Bucephala albeola* | Bufflehead | | | | S3N | 37 | 0.9 ± 0.0 |
| A | *Calidris maritima* | Purple Sandpiper | | | | S3N | 50 | 0.8 ± 0.0 |
| A | *Uria lomvia* | Thick-billed Murre | | | | S3N,S3M | 1 | 1.1 ± 1.0 |
| A | *Actitis macularius* | Spotted Sandpiper | | | | S3S4B,S4M | 26 | 0.8 ± 0.0 |
| A | *Pluvialis squatarola* | Black-bellied Plover | | | | S3S4M | 46 | 0.8 ± 0.0 |
| A | *Morus bassanus* | Northern Gannet | | | | SHB | 5 | 0.9 ± 0.0 |
| I | *Danaus plexippus* | Monarch | Endangered | Special Concern | Special Concern | S2S3?B | 1 | 0.9 ± 0.0 |

## 4.3 LOCATION SENSITIVE SPECIES

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

### New Brunswick

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

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

## 4.4 SOURCE BIBLIOGRAPHY

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

| # recs | CITATION |
|---|---|
| 417 | Morrison, Guy. 2011. Maritime Shorebird Survey (MSS) database. Canadian Wildlife Service, Ottawa, 15939 surveys. 86171 recs. |
| 131 | eBird. 2014. eBird Basic Dataset. Version: EBD_relNov-2014. Ithaca, New York. Nov 2014. Cornell Lab of Ornithology, 25036 recs. |
| 54 | Boyne, A.W. 2000. Tern Surveys. Canadian Wildlife Service, Sackville, unpublished data. 168 recs. |
| 43 | Hicks, Andrew. 2009. Coastal Waterfowl Surveys Database, 2000-08. Canadian Wildlife Service, Sackville, 46488 recs (11149 non-zero). |
| 17 | Blaney, C.S.; Mazerolle, D.M. 2012. Fieldwork 2012. Atlantic Canada Conservation Data Centre, 13,278 recs. |
| 10 | Bateman, M.C. 2001. Coastal Waterfowl Surveys Database, 1965-2001. Canadian Wildlife Service, Sackville, 667 recs. |
| 7 | iNaturalist. 2020. iNaturalist Data Export 2020. iNaturalist.org and iNaturalist.ca, Web site: 128728 recs. |
| 3 | Benedict, B. Connell Herbarium Specimens (Data) . University New Brunswick, Fredericton. 2003. |
| 3 | Clayden, S.R. 1998. NBM Science Collections databases: vascular plants. New Brunswick Museum, Saint John NB, 19759 recs. |
| 2 | Benedict, B. Connell Herbarium Specimens. University New Brunswick, Fredericton. 2003. |
| 2 | Blaney, C.S.; Mazerolle, D.M. 2009. Fieldwork 2009. Atlantic Canada Conservation Data Centre. Sackville NB, 13395 recs. |
| 2 | Honeyman, K. 2019. Unique Areas Database, 2018. J.D. Irving Ltd. |
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# 5.0 RARE SPECIES WITHIN 100 KM

A 100 km buffer around the study area contains 44827 records of 160 vertebrate and 1407 records of 68 invertebrate fauna; 7517 records of 323 vascular, 1581 records of 167 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 (± the precision, in km, of the record).

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| A | *Myotis lucifugus* | Little Brown Myotis | Endangered | Endangered | Endangered | S1 | 148 | 33.2 ± 1.0 | NB |
| A | *Myotis septentrionalis* | Northern Myotis | Endangered | Endangered | Endangered | S1 | 33 | 34.5 ± 1.0 | NB |
| A | *Perimyotis subflavus* | Tricolored Bat | Endangered | Endangered | Endangered | S1 | 39 | 34.9 ± 0.0 | NB |
| A | *Eubalaena glacialis* | North Atlantic Right Whale | Endangered | Endangered | Endangered | S1 | 8 | 25.8 ± 0.0 | NB |
| A | *Osmerus mordax pop. 2* | Rainbow Smelt - Lake Utopia Large-bodied population | Endangered | Threatened | Threatened | S1 | 2 | 28.7 ± 10.0 | NB |
| A | *Charadrius melodus melodus* | Piping Plover melodus subspecies | Endangered | Endangered | Endangered | S1B | 27 | 0.8 ± 0.0 | NB |
| A | *Sterna dougallii* | Roseate Tern | Endangered | Endangered | Endangered | S1B | 35 | 31.6 ± 0.0 | NB |
| A | *Dermochelys coriacea pop. 2* | Leatherback Sea Turtle - Atlantic population | Endangered | Endangered | Endangered | S1S2N | 5 | 6.5 ± 0.0 | NB |
| A | *Salmo salar pop. 1* | Atlantic Salmon - Inner Bay of Fundy population | Endangered | Endangered | Endangered | S2 | 19 | 15.2 ± 0.0 | NB |
| A | *Salmo salar pop. 7* | Atlantic Salmon - Outer Bay of Fundy population | Endangered | | Endangered | SNR | 356 | 9.6 ± 1.0 | NB |
| A | *Rangifer tarandus pop. 2* | Caribou - Atlantic-Gasp ├⌐sie population | Endangered | Endangered | Extirpated | SX | 4 | 48.2 ± 1.0 | NB |
| A | *Lanius ludovicianus* | Loggerhead Shrike | Endangered | Endangered | | SXB | 1 | 54.3 ± 1.0 | NB |
| A | *Sturnella magna* | Eastern Meadowlark | Threatened | Threatened | Threatened | S1B | 31 | 44.8 ± 7.0 | NB |
| A | *Asio flammeus* | Short-eared Owl | Threatened | Special Concern | Special Concern | S1S2B | 17 | 44.7 ± 0.0 | NB |
| A | *Ixobrychus exilis* | Least Bittern | Threatened | Threatened | Threatened | S1S2B | 18 | 15.7 ± 4.0 | NB |
| A | *Hylocichla mustelina* | Wood Thrush | Threatened | Threatened | Threatened | S1S2B | 159 | 12.5 ± 7.0 | NB |
| A | *Hydrobates leucorhous* | Leach's Storm-Petrel | Threatened | | | S1S2B | 148 | 22.0 ± 0.0 | NB |
| A | *Antrostomus vociferus* | Eastern Whip-Poor-Will | Threatened | Threatened | Threatened | S2B | 65 | 19.0 ± 7.0 | NB |
| A | *Catharus bicknelli* | Bicknell's Thrush | Threatened | Threatened | Threatened | S2B | 22 | 25.2 ± 7.0 | NB |
| A | *Riparia riparia* | Bank Swallow | Threatened | Threatened | | S2B | 1140 | 4.4 ± 0.0 | NB |
| A | *Glyptemys insculpta* | Wood Turtle | Threatened | Threatened | Threatened | S2S3 | 873 | 27.5 ± 0.0 | NB |
| A | *Chaetura pelagica* | Chimney Swift | Threatened | Threatened | Threatened | S2S3B,S2M | 624 | 25.2 ± 7.0 | NB |
| A | *Acipenser oxyrinchus* | Atlantic Sturgeon | Threatened | | Threatened | S3B,S3N | 2 | 62.0 ± 1.0 | NB |
| A | *Tringa flavipes* | Lesser Yellowlegs | Threatened | | | S3M | 706 | 0.8 ± 0.0 | NB |
| A | *Limosa haemastica* | Hudsonian Godwit | Threatened | | | S3M | 95 | 17.7 ± 0.0 | NB |
| A | *Anguilla rostrata* | American Eel | Threatened | | Threatened | S4N | 67 | 14.9 ± 0.0 | NB |
| A | *Coturnicops noveboracensis* | Yellow Rail | Special Concern | Special Concern | Special Concern | S1?B,SUM | 3 | 85.3 ± 7.0 | NB |
| A | *Histrionicus histrionicus pop. 1* | Harlequin Duck - Eastern population | Special Concern | Special Concern | Endangered | S1B,S1S2N,S2M | 211 | 0.9 ± 0.0 | NB |
| A | *Hirundo rustica* | Barn Swallow | Special Concern | Threatened | Threatened | S2B | 1359 | 4.3 ± 0.0 | NB |
| A | *Balaenoptera physalus* | Fin Whale | Special Concern | Special Concern | | S2S3 | 19 | 20.2 ± 1.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| A | *Euphagus carolinus* | Rusty Blackbird | Special Concern | Special Concern | Special Concern | S2S3B,S3M | 145 | 3.9 ± 1.0 | NB |
| A | *Bucephala islandica* | Barrow's Goldeneye | Special Concern | Special Concern | Special Concern | S2S3N,S3M | 45 | 3.9 ± 2.0 | NB |
| A | *Acipenser brevirostrum* | Shortnose Sturgeon | Special Concern | Special Concern | Special Concern | S3 | 11 | 35.4 ± 10.0 | NB |
| A | *Chelydra serpentina* | Snapping Turtle | Special Concern | Special Concern | Special Concern | S3 | 117 | 12.4 ± 1.0 | NB |
| A | *Contopus virens* | Eastern Wood-Pewee | Special Concern | Special Concern | Special Concern | S3B | 708 | 5.1 ± 7.0 | NB |
| A | *Contopus cooperi* | Olive-sided Flycatcher | Special Concern | Threatened | Threatened | S3B | 297 | 9.4 ± 0.0 | NB |
| A | *Dolichonyx oryzivorus* | Bobolink | Special Concern | Threatened | Threatened | S3B | 1308 | 12.5 ± 7.0 | NB |
| A | *Coccothraustes vespertinus* | Evening Grosbeak | Special Concern | Special Concern | | S3B,S3S4N,SUM | 232 | 5.1 ± 7.0 | NB |
| A | *Chordeiles minor* | Common Nighthawk | Special Concern | Threatened | Threatened | S3B,S4M | 299 | 12.7 ± 7.0 | NB |
| A | *Phalaropus lobatus* | Red-necked Phalarope | Special Concern | Special Concern | | S3M | 230 | 4.0 ± 0.0 | NB |
| A | *Podiceps auritus* | Horned Grebe | Special Concern | Special Concern | Special Concern | S3N | 270 | 0.9 ± 0.0 | NB |
| A | *Cardellina canadensis* | Canada Warbler | Special Concern | Threatened | Threatened | S3S4B | 1151 | 5.1 ± 7.0 | NB |
| A | *Phocoena phocoena* | Harbour Porpoise | Special Concern | | Spec.Concern | S4 | 246 | 1.4 ± 1.0 | NB |
| A | *Chrysemys picta picta* | Eastern Painted Turtle | Special Concern | Special Concern | | S4 | 119 | 19.9 ± 0.0 | NB |
| A | *Anarhichas lupus* | Atlantic Wolffish | Special Concern | Special Concern | Special Concern | SNR | 1 | 44.5 ± 0.0 | NB |
| A | *Hemidactylium scutatum* | Four-toed Salamander | Not At Risk | | | S1? | 8 | 92.5 ± 0.0 | NS |
| A | *Fulica americana* | American Coot | Not At Risk | | | S1B | 12 | 25.2 ± 7.0 | NB |
| A | *Falco peregrinus pop. 1* | Peregrine Falcon - anatum/tundrius | Not At Risk | Special Concern | Endangered | S1B,S3M | 613 | 5.4 ± 7.0 | NB |
| A | *Falco peregrinus* | Peregrine Falcon | Not At Risk | Special Concern | | S1B,S3M | 1 | 46.1 ± 0.0 | NB |
| A | *Bubo scandiacus* | Snowy Owl | Not At Risk | | | S1N,S2S3M | 32 | 35.2 ± 6.0 | NB |
| A | *Accipiter cooperii* | Cooper's Hawk | Not At Risk | | | S1S2B | 19 | 47.1 ± 0.0 | NB |
| A | *Buteo lineatus* | Red-shouldered Hawk | Not At Risk | | | S1S2B | 54 | 36.7 ± 0.0 | NB |
| A | *Aegolius funereus* | Boreal Owl | Not At Risk | | | S1S2B,SUM | 5 | 44.2 ± 1.0 | NB |
| A | *Sorex dispar* | Long-tailed Shrew | Not At Risk | | | S2 | 2 | 51.3 ± 1.0 | NB |
| A | *Chlidonias niger* | Black Tern | Not At Risk | | | S2B | 347 | 56.2 ± 4.0 | NB |
| A | *Podiceps grisegena* | Red-necked Grebe | Not At Risk | | | S2N,S3M | 727 | 0.9 ± 19.0 | NB |
| A | *Globicephala melas* | Long-finned Pilot Whale | Not At Risk | | | S2S3 | 3 | 9.6 ± 1.0 | NB |
| A | *Desmognathus fuscus pop. 2* | Northern Dusky Salamander - Quebec / New Brunswick population | Not At Risk | | | S3 | 40 | 31.2 ± 1.0 | NB |
| A | *Megaptera novaeangliae* | Humpback Whale | Not At Risk | | | S3 | 39 | 24.5 ± 0.0 | NB |
| A | *Sterna hirundo* | Common Tern | Not At Risk | | | S3B,SUM | 366 | 25.8 ± 0.0 | NB |
| A | *Lagenorhynchus acutus* | Atlantic White-sided Dolphin | Not At Risk | | | S3S4 | 3 | 40.2 ± 1.0 | NB |
| A | *Haliaeetus leucocephalus* | Bald Eagle | Not At Risk | | Endangered | S4 | 1615 | 0.8 ± 0.0 | NB |
| A | *Lynx canadensis* | Canada Lynx | Not At Risk | | Endangered | S4 | 8 | 41.0 ± 50.0 | NB |
| A | *Canis lupus* | Grey Wolf | Not At Risk | | Extirpated | SX | 3 | 27.3 ± 1.0 | NB |
| A | *Puma concolor pop. 1* | Cougar - Eastern population | Data Deficient | | Endangered | SU | 43 | 13.3 ± 1.0 | NB |
| A | *Calidris canutus rufa* | Red Knot rufa subspecies - Tierra del Fuego / Patagonia wintering population | E,SC | Endangered | Endangered | S2M | 410 | 4.0 ± 0.0 | NB |
| A | *Morone saxatilis* | Striped Bass | E,SC | | | S3S4B,S3S4N | 12 | 36.5 ± 0.0 | NB |
| A | *Odobenus rosmarus pop. 5* | Atlantic Walrus - Nova Scotia - Newfoundland - Gulf of St Lawrence population | X | | | SX | 1 | 81.7 ± 5.0 | NS |
| A | *Thryothorus ludovicianus* | Carolina Wren | | | | S1 | 30 | 18.8 ± 7.0 | NB |
| A | *Vireo flavifrons* | Yellow-throated Vireo | | | | S1?B | 11 | 23.4 ± 0.0 | NB |
| A | *Tringa melanoleuca* | Greater Yellowlegs | | | | S1?B,S4S5M | 1408 | 0.8 ± 0.0 | NB |
| A | *Aythya americana* | Redhead | | | | S1B | 8 | 17.7 ± 0.0 | NB |
| A | *Gallinula galeata* | Common Gallinule | | | | S1B | 25 | 16.5 ± 0.0 | NB |
| A | *Grus canadensis* | Sandhill Crane | | | | S1B | 14 | 2.3 ± 0.0 | NB |
| A | *Bartramia longicauda* | Upland Sandpiper | | | | S1B | 54 | 15.3 ± 7.0 | NB |
| A | *Phalaropus tricolor* | Wilson's Phalarope | | | | S1B | 61 | 18.0 ± 7.0 | NB |
| A | *Leucophaeus atricilla* | Laughing Gull | | | | S1B | 90 | 27.3 ± 0.0 | NB |
| A | *Rissa tridactyla* | Black-legged Kittiwake | | | | S1B | 63 | 5.4 ± 7.0 | NB |
| A | *Uria aalge* | Common Murre | | | | S1B | 154 | 25.8 ± 0.0 | NB |
| A | *Alca torda* | Razorbill | | | | S1B | 193 | 4.3 ± 2.0 | NB |
| A | *Fratercula arctica* | Atlantic Puffin | | | | S1B | 190 | 19.2 ± 0.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| A | *Progne subis* | Purple Martin | | | | S1B | 194 | 34.9 ± 7.0 | NB |
| A | *Histrionicus histrionicus* | Harlequin Duck | | | | S1B,S1S2N,S2M | 1 | 46.0 ± 0.0 | NB |
| A | *Aythya marila* | Greater Scaup | | | | S1B,S2N,S4M | 43 | 3.9 ± 2.0 | NB |
| A | *Oxyura jamaicensis* | Ruddy Duck | | | | S1B,S2S3M | 49 | 11.5 ± 0.0 | NB |
| A | *Aythya affinis* | Lesser Scaup | | | | S1B,S4M | 196 | 4.1 ± 5.0 | NB |
| A | *Eremophila alpestris* | Horned Lark | | | | S1B,S4N,S5M | 29 | 5.4 ± 7.0 | NB |
| A | *Sterna paradisaea* | Arctic Tern | | | | S1B,SUM | 164 | 27.8 ± 1.0 | NB |
| A | *Chroicocephalus ridibundus* | Black-headed Gull | | | | S1N,S2M | 42 | 27.3 ± 0.0 | NB |
| A | *Branta bernicla* | Brant | | | | S1N,S2S3M | 547 | 0.9 ± 19.0 | NB |
| A | *Calidris alba* | Sanderling | | | | S1N,S3S4M | 1002 | 0.8 ± 0.0 | NB |
| A | *Butorides virescens* | Green Heron | | | | S1S2B | 31 | 30.3 ± 0.0 | NB |
| A | *Nycticorax nycticorax* | Black-crowned Night-heron | | | | S1S2B | 66 | 28.4 ± 1.0 | NB |
| A | *Empidonax traillii* | Willow Flycatcher | | | | S1S2B | 109 | 20.0 ± 2.0 | NB |
| A | *Stelgidopteryx serripennis* | Northern Rough-winged Swallow | | | | S1S2B | 23 | 4.5 ± 7.0 | NB |
| A | *Troglodytes aedon* | House Wren | | | | S1S2B | 29 | 32.9 ± 7.0 | NB |
| A | *Calidris bairdii* | Baird's Sandpiper | | | | S1S2M | 174 | 30.1 ± 1.0 | NB |
| A | *Melanitta americana* | American Scoter | | | | S1S2N,S3M | 813 | 0.9 ± 0.0 | NB |
| A | *Petrochelidon pyrrhonota* | Cliff Swallow | | | | S2B | 497 | 4.4 ± 0.0 | NB |
| A | *Cistothorus palustris* | Marsh Wren | | | | S2B | 367 | 16.1 ± 0.0 | NB |
| A | *Mimus polyglottos* | Northern Mockingbird | | | | S2B | 152 | 15.3 ± 7.0 | NB |
| A | *Pooecetes gramineus* | Vesper Sparrow | | | | S2B | 66 | 12.5 ± 7.0 | NB |
| A | *Mareca strepera* | Gadwall | | | | S2B,S3M | 171 | 12.5 ± 7.0 | NB |
| A | *Tringa solitaria* | Solitary Sandpiper | | | | S2B,S4S5M | 280 | 0.8 ± 0.0 | NB |
| A | *Pinicola enucleator* | Pine Grosbeak | | | | S2B,S4S5N,S4S5M | 33 | 35.0 ± 7.0 | NB |
| A | *Phalacrocorax carbo* | Great Cormorant | | | | S2N | 335 | 9.4 ± 3.0 | NB |
| A | *Somateria spectabilis* | King Eider | | | | S2N | 57 | 16.2 ± 9.0 | NB |
| A | *Larus hyperboreus* | Glaucous Gull | | | | S2N | 146 | 5.7 ± 0.0 | NB |
| A | *Melanitta perspicillata* | Surf Scoter | | | | S2N,S4M | 121 | 1.0 ± 0.0 | NB |
| A | *Melanitta deglandi* | White-winged Scoter | | | | S2N,S4M | 54 | 5.0 ± 17.0 | NB |
| A | *Asio otus* | Long-eared Owl | | | | S2S3 | 17 | 22.5 ± 6.0 | NB |
| A | *Picoides dorsalis* | American Three-toed Woodpecker | | | | S2S3 | 7 | 38.1 ± 7.0 | NB |
| A | *Toxostoma rufum* | Brown Thrasher | | | | S2S3B | 74 | 5.1 ± 7.0 | NB |
| A | *Icterus galbula* | Baltimore Oriole | | | | S2S3B | 183 | 16.1 ± 0.0 | NB |
| A | *Somateria mollissima* | Common Eider | | | | S2S3B,S2S3N,S4M | 2113 | 1.0 ± 0.0 | NB |
| A | *Larus delawarensis* | Ring-billed Gull | | | | S2S3B,S4N,S5M | 276 | 4.3 ± 0.0 | NB |
| A | *Pluvialis dominica* | American Golden-Plover | | | | S2S3M | 304 | 4.0 ± 0.0 | NB |
| A | *Calcarius lapponicus* | Lapland Longspur | | | | S2S3N,SUM | 38 | 27.9 ± 1.0 | NB |
| A | *Larus marinus* | Great Black-backed Gull | | | | S3 | 587 | 5.0 ± 0.0 | NB |
| A | *Picoides arcticus* | Black-backed Woodpecker | | | | S3 | 42 | 26.4 ± 7.0 | NB |
| A | *Loxia curvirostra* | Red Crossbill | | | | S3 | 119 | 11.8 ± 0.0 | NB |
| A | *Spinus pinus* | Pine Siskin | | | | S3 | 252 | 5.1 ± 7.0 | NB |
| A | *Prosopium cylindraceum* | Round Whitefish | | | | S3 | 2 | 91.4 ± 10.0 | NB |
| A | *Salvelinus namaycush* | Lake Trout | | | | S3 | 4 | 27.6 ± 0.0 | NB |
| A | *Sorex maritimensis* | Maritime Shrew | | | | S3 | 1 | 89.0 ± 0.0 | NS |
| A | *Spatula clypeata* | Northern Shoveler | | | | S3B | 148 | 16.8 ± 0.0 | NB |
| A | *Charadrius vociferus* | Killdeer | | | | S3B | 836 | 0.8 ± 0.0 | NB |
| A | *Tringa semipalmata* | Willet | | | | S3B | 277 | 0.8 ± 0.0 | NB |
| A | *Cepphus grylle* | Black Guillemot | | | | S3B | 826 | 1.1 ± 1.0 | NB |
| A | *Coccyzus erythropthalmus* | Black-billed Cuckoo | | | | S3B | 186 | 15.7 ± 6.0 | NB |
| A | *Myiarchus crinitus* | Great Crested Flycatcher | | | | S3B | 295 | 15.3 ± 7.0 | NB |
| A | *Piranga olivacea* | Scarlet Tanager | | | | S3B | 115 | 27.7 ± 7.0 | NB |
| A | *Pheucticus ludovicianus* | Rose-breasted Grosbeak | | | | S3B | 652 | 5.1 ± 7.0 | NB |
| A | *Passerina cyanea* | Indigo Bunting | | | | S3B | 110 | 5.4 ± 7.0 | NB |
| A | *Molothrus ater* | Brown-headed Cowbird | | | | S3B | 238 | 5.1 ± 7.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| A | *Setophaga tigrina* | Cape May Warbler | | | | S3B,S4S5M | 120 | 12.5 ± 7.0 | NB |
| A | *Mergus serrator* | Red-breasted Merganser | | | | S3B,S4S5N,S5M | 402 | 1.0 ± 0.0 | NB |
| A | *Anas acuta* | Northern Pintail | | | | S3B,S5M | 55 | 17.6 ± 1.0 | NB |
| A | *Anser caerulescens* | Snow Goose | | | | S3M | 6 | 32.1 ± 1.0 | NB |
| A | *Numenius phaeopus hudsonicus* | Whimbrel | | | | S3M | 486 | 4.0 ± 0.0 | NB |
| A | *Arenaria interpres* | Ruddy Turnstone | | | | S3M | 794 | 0.8 ± 0.0 | NB |
| A | *Calidris pusilla* | Semipalmated Sandpiper | | | | S3M | 2730 | 0.8 ± 0.0 | NB |
| A | *Calidris melanotos* | Pectoral Sandpiper | | | | S3M | 373 | 0.8 ± 0.0 | NB |
| A | *Limnodromus griseus* | Short-billed Dowitcher | | | | S3M | 924 | 0.8 ± 0.0 | NB |
| A | *Phalaropus fulicarius* | Red Phalarope | | | | S3M | 132 | 31.5 ± 15.0 | NB |
| A | *Bucephala albeola* | Bufflehead | | | | S3N | 1140 | 0.9 ± 0.0 | NB |
| A | *Calidris maritima* | Purple Sandpiper | | | | S3N | 285 | 0.8 ± 0.0 | NB |
| A | *Uria lomvia* | Thick-billed Murre | | | | S3N,S3M | 67 | 1.1 ± 1.0 | NB |
| A | *Perisoreus canadensis* | Canada Jay | | | | S3S4 | 235 | 5.1 ± 7.0 | NB |
| A | *Poecile hudsonicus* | Boreal Chickadee | | | | S3S4 | 222 | 5.1 ± 7.0 | NB |
| A | *Eptesicus fuscus* | Big Brown Bat | | | | S3S4 | 31 | 16.3 ± 0.0 | NB |
| A | *Synaptomys cooperi* | Southern Bog Lemming | | | | S3S4 | 18 | 54.1 ± 1.0 | NB |
| A | *Tyrannus tyrannus* | Eastern Kingbird | | | | S3S4B | 545 | 12.5 ± 7.0 | NB |
| A | *Vireo gilvus* | Warbling Vireo | | | | S3S4B | 233 | 19.1 ± 7.0 | NB |
| A | *Actitis macularius* | Spotted Sandpiper | | | | S3S4B,S4M | 1145 | 0.8 ± 0.0 | NB |
| A | *Melospiza lincolnii* | Lincoln's Sparrow | | | | S3S4B,S4M | 258 | 5.1 ± 7.0 | NB |
| A | *Gallinago delicata* | Wilson's Snipe | | | | S3S4B,S5M | 888 | 16.3 ± 1.0 | NB |
| A | *Setophaga striata* | Blackpoll Warbler | | | | S3S4B,S5M | 111 | 12.5 ± 7.0 | NB |
| A | *Pluvialis squatarola* | Black-bellied Plover | | | | S3S4M | 1201 | 0.8 ± 0.0 | NB |
| A | *Morus bassanus* | Northern Gannet | | | | SHB | 854 | 0.9 ± 0.0 | NB |
| C | *Quercus macrocarpa - Acer rubrum / Onoclea sensibilis - Carex arcta Forest* | Bur Oak - Red Maple / Sensitive Fern - Northern Clustered Sedge Forest | | | | S2 | 1 | 92.8 ± 0.0 | NB |
| C | *Acer saccharinum / Onoclea sensibilis - Lysimachia terrestris Forest* | Silver Maple / Sensitive Fern - Swamp Yellow Loosestrife Forest | | | | S3 | 1 | 68.3 ± 0.0 | NB |
| C | *Acer saccharum - Fraxinus americana / Polystichum acrostichoides Forest* | Sugar Maple - White Ash / Christmas Fern Forest | | | | S3S4 | 1 | 62.8 ± 0.0 | NB |
| I | *Bombus bohemicus* | Ashton Cuckoo Bumble Bee | Endangered | Endangered | | S1 | 13 | 38.0 ± 5.0 | NB |
| I | *Danaus plexippus* | Monarch | Endangered | Special Concern | Special Concern | S2S3?B | 250 | 0.9 ± 0.0 | NB |
| I | *Bombus suckleyi* | Suckley's Cuckoo Bumble Bee | Threatened | | | SH | 1 | 43.1 ± 5.0 | NB |
| I | *Gomphurus ventricosus* | Skillet Clubtail | Special Concern | Endangered | Endangered | S2 | 92 | 82.2 ± 0.0 | NB |
| I | *Cicindela marginipennis* | Cobblestone Tiger Beetle | Special Concern | Endangered | Endangered | S2S3 | 115 | 91.7 ± 0.0 | NB |
| I | *Ophiogomphus howei* | Pygmy Snaketail | Special Concern | Special Concern | Special Concern | S2S3 | 17 | 34.8 ± 0.0 | NB |
| I | *Alasmidonta varicosa* | Brook Floater | Special Concern | Special Concern | Special Concern | S3 | 1 | 84.6 ± 0.0 | NB |
| I | *Lampsilis cariosa* | Yellow Lampmussel | Special Concern | Special Concern | Special Concern | S3 | 72 | 60.8 ± 1.0 | NB |
| I | *Bombus terricola* | Yellow-banded Bumble Bee | Special Concern | Special Concern | | S4 | 102 | 23.2 ± 0.0 | NB |
| I | *Coccinella transversoguttata richardsoni* | Transverse Lady Beetle | Special Concern | | | SH | 16 | 35.2 ± 0.0 | NB |
| I | *Appalachina sayana sayana* | Spike-lip Crater Snail | Not At Risk | | | S3? | 1 | 45.6 ± 1.0 | NB |
| I | *Conotrachelus juglandis* | Butternut Curculio | | | | S1 | 3 | 96.5 ± 0.0 | NB |
| I | *Haematopota rara* | Shy Cleg | | | | S1 | 1 | 98.0 ± 1.0 | NB |
| I | *Tharsalea dorcas* | Dorcas Copper | | | | S1 | 1 | 62.6 ± 0.0 | NB |
| I | *Erora laeta* | Early Hairstreak | | | | S1 | 4 | 71.6 ± 2.0 | NS |
| I | *Polites origenes* | Crossline Skipper | | | | S1? | 7 | 77.0 ± 0.0 | NB |
| I | *Icaricia saepiolus* | Greenish Blue | | | | S1S2 | 4 | 32.9 ± 0.0 | NB |
| I | *Pachydiplax longipennis* | Blue Dasher | | | | S1S2 | 3 | 10.4 ± 0.0 | NB |
| I | *Scaphinotus viduus* | Bereft Snail-eating Beetle | | | | S2 | 1 | 67.1 ± 0.0 | NB |
| I | *Brachyleptura circumdata* | Dark-shouldered Long-horned Beetle | | | | S2 | 6 | 92.6 ± 0.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| I | *Satyrium calanus* | Banded Hairstreak | | | | S2 | 12 | 39.2 ± 0.0 | NB |
| I | *Satyrium calanus falacer* | Falacer Hairstreak | | | | S2 | 1 | 99.1 ± 1.0 | NB |
| I | *Strymon melinus* | Gray Hairstreak | | | | S2 | 7 | 16.3 ± 2.0 | NB |
| I | *Tabanus vivax* | Vivacious Horse Fly | | | | S2S3 | 1 | 84.2 ± 0.0 | NB |
| I | *Ophiogomphus colubrinus* | Boreal Snaketail | | | | S2S3 | 36 | 9.4 ± 1.0 | NB |
| I | *Sphaeroderus nitidicollis* | Polished Snail-eating Beetle | | | | S3 | 1 | 93.3 ± 0.0 | NB |
| I | *Lepturopsis biforis* | Two-spotted Long-horned Beetle | | | | S3 | 1 | 39.3 ± 1.0 | NB |
| I | *Orthosoma brunneum* | Moist Long-horned Beetle | | | | S3 | 3 | 89.3 ± 0.0 | NS |
| I | *Elaphrus americanus* | Boreal Elaphrus Beetle | | | | S3 | 1 | 92.7 ± 0.0 | NB |
| I | *Semanotus terminatus* | Light Long-horned Beetle | | | | S3 | 1 | 89.8 ± 0.0 | NB |
| I | *Desmocerus palliatus* | Elderberry Borer | | | | S3 | 7 | 39.3 ± 1.0 | NB |
| I | *Agonum excavatum* | Excavated Harp Ground Beetle | | | | S3 | 1 | 92.7 ± 0.0 | NB |
| I | *Clivina americana* | America Pedunculate Ground Beetle | | | | S3 | 1 | 92.7 ± 0.0 | NB |
| I | *Olisthopus parmatus* | Tawny-bordered Harp Ground Beetle | | | | S3 | 1 | 93.3 ± 0.0 | NB |
| I | *Tachys scitulus* | Handsome Riverbank Ground Beetle | | | | S3 | 1 | 92.7 ± 0.0 | NB |
| I | *Carabus maeander* | Meander Ground Beetle | | | | S3 | 1 | 53.0 ± 0.0 | NB |
| I | *Coccinella hieroglyphica kirbyi* | a Ladybird Beetle | | | | S3 | 1 | 39.3 ± 1.0 | NB |
| I | *Hippodamia parenthesis* | Parenthesis Lady Beetle | | | | S3 | 4 | 39.3 ± 1.0 | NB |
| I | *Stenocorus vittiger* | Shrub Long-horned Beetle | | | | S3 | 1 | 92.6 ± 0.0 | NB |
| I | *Gnathacmaeops pratensis* | Meadow Flower Longhorn Beetle | | | | S3 | 5 | 39.3 ± 1.0 | NB |
| I | *Pogonocherus mixtus* | Mixed-spotted Flatface Sawyer | | | | S3 | 1 | 39.3 ± 1.0 | NB |
| I | *Badister neopulchellus* | Red-black Spotted Beetle | | | | S3 | 1 | 92.7 ± 0.0 | NB |
| I | *Gonotropis dorsalis* | Birch Fungus Weevil | | | | S3 | 1 | 89.7 ± 0.0 | NB |
| I | *Naemia seriata* | Seaside Lady Beetle | | | | S3 | 7 | 20.5 ± 0.0 | NB |
| I | *Saperda lateralis* | Red-edged Long-horned Beetle | | | | S3 | 2 | 34.5 ± 0.0 | NB |
| I | *Epargyreus clarus* | Silver-spotted Skipper | | | | S3 | 15 | 35.5 ± 0.0 | NB |
| I | *Hesperia sassacus* | Indian Skipper | | | | S3 | 18 | 29.4 ± 1.0 | NB |
| I | *Euphyes bimacula* | Two-spotted Skipper | | | | S3 | 20 | 20.1 ± 0.0 | NB |
| I | *Satyrium acadica* | Acadian Hairstreak | | | | S3 | 16 | 38.9 ± 2.0 | NB |
| I | *Plebejus idas* | Northern Blue | | | | S3 | 2 | 7.4 ± 0.0 | NB |
| I | *Plebejus idas empetri* | Crowberry Blue | | | | S3 | 25 | 6.7 ± 0.0 | NB |
| I | *Argynnis aphrodite* | Aphrodite Fritillary | | | | S3 | 16 | 22.1 ± 0.0 | NB |
| I | *Boloria bellona* | Meadow Fritillary | | | | S3 | 47 | 33.0 ± 4.0 | NB |
| I | *Nymphalis l-album* | Compton Tortoiseshell | | | | S3 | 27 | 27.3 ± 2.0 | NB |
| I | *Gomphurus vastus* | Cobra Clubtail | | | | S3 | 111 | 67.4 ± 0.0 | NB |
| I | *Celithemis martha* | Martha's Pennant | | | | S3 | 11 | 28.6 ± 0.0 | NB |
| I | *Ladona exusta* | White Corporal | | | | S3 | 13 | 38.5 ± 0.0 | NB |
| I | *Enallagma pictum* | Scarlet Bluet | | | | S3 | 10 | 44.3 ± 0.0 | NB |
| I | *Ischnura kellicotti* | Lilypad Forktail | | | | S3 | 17 | 38.6 ± 0.0 | NB |
| I | *Arigomphus furcifer* | Lilypad Clubtail | | | | S3 | 24 | 80.0 ± 0.0 | NB |
| I | *Alasmidonta undulata* | Triangle Floater | | | | S3 | 27 | 37.5 ± 1.0 | NB |
| I | *Atlanticoncha ochracea* | Tidewater Mucket | | | | S3 | 128 | 36.7 ± 1.0 | NB |
| I | *Striatura ferrea* | Black Striate Snail | | | | S3 | 1 | 97.8 ± 1.0 | NB |
| I | *Neohelix albolabris* | Whitelip Snail | | | | S3 | 2 | 91.0 ± 0.0 | NB |
| I | *Spurwinkia salsa* | Saltmarsh Hydrobe | | | | S3 | 34 | 32.9 ± 0.0 | NB |
| I | *Pantala hymenaea* | Spot-Winged Glider | | | | S3B | 12 | 11.5 ± 0.0 | NB |
| I | *Somatochlora forcipata* | Forcipate Emerald | | | | S3S4 | 14 | 39.2 ± 1.0 | NB |
| I | *Somatochlora tenebrosa* | Clamp-Tipped Emerald | | | | S3S4 | 8 | 73.6 ± 1.0 | NB |
| N | *Erioderma pedicellatum* | Boreal Felt Lichen - Atlantic | Endangered | Endangered | Endangered | SH | 1 | 42.3 ± 1.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| | *(Atlantic pop.)* | pop. | | | | | | | |
| N | *Pannaria lurida* | Wrinkled Shingle Lichen | Threatened | Threatened | | S1? | 167 | 32.4 ± 0.0 | NB |
| N | *Anzia colpodes* | Black-foam Lichen | Threatened | Threatened | | S1S2 | 13 | 47.8 ± 1.0 | NB |
| N | *Fuscopannaria leucosticta* | White-rimmed Shingle Lichen | Threatened | | | S2 | 172 | 50.1 ± 13.0 | NB |
| N | *Pectenia plumbea* | Blue Felt Lichen | Special Concern | Special Concern | Special Concern | S1 | 453 | 41.1 ± 5.0 | NB |
| N | *Pseudevernia cladonia* | Ghost Antler Lichen | Not At Risk | | | S2S3 | 19 | 8.0 ± 0.0 | NB |
| N | *Imbribryum muehlenbeckii* | Muehlenbeck's Bryum Moss | | | | S1 | 1 | 37.5 ± 1.0 | NB |
| N | *Sphagnum macrophyllum* | Sphagnum | | | | S1 | 6 | 22.7 ± 0.0 | NB |
| N | *Coscinodon cribrosus* | Sieve-Toothed Moss | | | | S1 | 1 | 36.4 ± 0.0 | NB |
| N | *Sticta fuliginosa* | Peppered Moon Lichen | | | | S1 | 3 | 85.1 ± 0.0 | NS |
| N | *Leptogium hirsutum* | Jellyskin Lichen | | | | S1 | 26 | 78.1 ± 0.0 | NB |
| N | *Coccocarpia palmicola* | Salted Shell Lichen | | | | S1 | 9 | 31.8 ± 0.0 | NB |
| N | *Peltigera collina* | Tree Pelt Lichen | | | | S1 | 3 | 49.7 ± 10.0 | NB |
| N | *Peltigera malacea* | Veinless Pelt Lichen | | | | S1 | 1 | 70.7 ± 0.0 | NS |
| N | *Atrichum angustatum* | Lesser Smoothcap Moss | | | | S1? | 1 | 78.6 ± 3.0 | NS |
| N | *Pseudocalliergon trifarium* | Three-ranked Spear Moss | | | | S1? | 1 | 29.1 ± 0.0 | NB |
| N | *Dichelyma falcatum* | a Moss | | | | S1? | 1 | 44.1 ± 1.0 | NB |
| N | *Dicranum bonjeanii* | Bonjean's Broom Moss | | | | S1? | 1 | 99.4 ± 1.0 | NB |
| N | *Oxyrrhynchium hians* | Light Beaked Moss | | | | S1? | 1 | 82.9 ± 0.0 | NS |
| N | *Plagiothecium latebricola* | Alder Silk Moss | | | | S1? | 1 | 31.6 ± 0.0 | NB |
| N | *Niphotrichum ericoides* | Dense Rock Moss | | | | S1? | 1 | 80.1 ± 3.0 | NB |
| N | *Platylomella lescurii* | a Moss | | | | S1? | 1 | 54.8 ± 1.0 | NB |
| N | *Euopsis granatina* | Lesser Rockbud Lichen | | | | S1? | 1 | 97.7 ± 1.0 | NS |
| N | *Heterodermia squamulosa* | Scaly Fringe Lichen | | | | S1? | 9 | 36.7 ± 0.0 | NB |
| N | *Pilophorus fibula* | New England Matchstick Lichen | | | | S1? | 1 | 20.6 ± 0.0 | NB |
| N | *Spilonema revertens* | Rock Hairball Lichen | | | | S1? | 4 | 95.0 ± 0.0 | NS |
| N | *Peltigera venosa* | Fan Pelt Lichen | | | | S1? | 2 | 53.3 ± 0.0 | NB |
| N | *Cladonia oricola* | Cladonia Lichen | | | | S1? | 2 | 15.4 ± 0.0 | NB |
| N | *Pallavicinia lyellii* | Lyell's Ribbonwort | | | | S1S2 | 3 | 47.0 ± 1.0 | NB |
| N | *Reboulia hemisphaerica* | Purple-margined Liverwort | | | | S1S2 | 1 | 53.7 ± 1.0 | NB |
| N | *Solenostoma obovatum* | Egg Flapwort | | | | S1S2 | 1 | 50.7 ± 0.0 | NB |
| N | *Brachythecium acuminatum* | Acuminate Ragged Moss | | | | S1S2 | 2 | 78.6 ± 3.0 | NS |
| N | *Ptychostomum salinum* | Saltmarsh Bryum | | | | S1S2 | 1 | 8.0 ± 1.0 | NB |
| N | *Tortula obtusifolia* | a Moss | | | | S1S2 | 1 | 80.3 ± 0.0 | NB |
| N | *Ditrichum pallidum* | Pale Cow-hair Moss | | | | S1S2 | 2 | 84.7 ± 3.0 | NS |
| N | *Drummondia prorepens* | a Moss | | | | S1S2 | 1 | 92.0 ± 0.0 | NS |
| N | *Sphagnum platyphyllum* | Flat-leaved Peat Moss | | | | S1S2 | 2 | 82.3 ± 0.0 | NB |
| N | *Timmia norvegica* | a moss | | | | S1S2 | 1 | 91.6 ± 0.0 | NB |
| N | *Tomentypnum falcifolium* | Sickle-leaved Golden Moss | | | | S1S2 | 1 | 8.8 ± 1.0 | NB |
| N | *Pseudotaxiphyllum distichaceum* | a Moss | | | | S1S2 | 1 | 8.0 ± 1.0 | NB |
| N | *Hamatocaulis vernicosus* | a Moss | | | | S1S2 | 3 | 61.7 ± 100.0 | NB |
| N | *Haplocladium microphyllum* | Tiny-leaved Haplocladium Moss | | | | S1S2 | 1 | 84.7 ± 3.0 | NS |
| N | *Pilophorus cereolus* | Powdered Matchstick Lichen | | | | S1S2 | 2 | 20.6 ± 0.0 | NB |
| N | *Calypogeia neesiana* | Nees' Pouchwort | | | | S1S3 | 1 | 62.1 ± 1.0 | NB |
| N | *Fuscocephaloziopsis connivens* | Forcipated Pincerwort | | | | S1S3 | 1 | 51.1 ± 0.0 | NB |
| N | *Cephaloziella elachista* | Spurred Threadwort | | | | S1S3 | 1 | 28.9 ± 5.0 | NB |
| N | *Porella pinnata* | Pinnate Scalewort | | | | S1S3 | 2 | 68.3 ± 1.0 | NB |
| N | *Amphidium mougeotii* | a Moss | | | | S2 | 3 | 50.2 ± 1.0 | NB |
| N | *Anomodon viticulosus* | a Moss | | | | S2 | 6 | 35.9 ± 1.0 | NB |
| N | *Cynodontium strumiferum* | Strumose Dogtooth Moss | | | | S2 | 1 | 55.2 ± 8.0 | NB |
| N | *Dicranella palustris* | Drooping-Leaved Fork Moss | | | | S2 | 3 | 84.5 ± 100.0 | NB |
| N | *Didymodon ferrugineus* | Rusty Beard Moss | | | | S2 | 1 | 60.9 ± 1.0 | NB |
| N | *Ditrichum flexicaule* | Flexible Cow-hair Moss | | | | S2 | 1 | 50.2 ± 1.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| N | *Anomodon tristis* | a Moss | | | | S2 | 1 | 76.8 ± 1.0 | NB |
| N | *Hypnum pratense* | Meadow Plait Moss | | | | S2 | 1 | 32.0 ± 0.0 | NB |
| N | *Isothecium myosuroides* | Slender Mouse-tail Moss | | | | S2 | 15 | 8.9 ± 0.0 | NB |
| N | *Meesia triquetra* | Three-ranked Cold Moss | | | | S2 | 2 | 77.1 ± 0.0 | NS |
| N | *Physcomitrium immersum* | a Moss | | | | S2 | 1 | 68.3 ± 1.0 | NB |
| N | *Platydictya jungermannioides* | False Willow Moss | | | | S2 | 1 | 8.9 ± 0.0 | NB |
| N | *Seligeria calcarea* | Chalk Brittle Moss | | | | S2 | 1 | 50.2 ± 1.0 | NB |
| N | *Sphagnum lindbergii* | Lindberg's Peat Moss | | | | S2 | 8 | 5.0 ± 1.0 | NB |
| N | *Tayloria serrata* | Serrate Trumpet Moss | | | | S2 | 1 | 67.4 ± 1.0 | NB |
| N | *Tetraplodon mnioides* | Entire-leaved Nitrogen Moss | | | | S2 | 3 | 8.0 ± 1.0 | NB |
| N | *Thamnobryum alleghaniense* | a Moss | | | | S2 | 1 | 91.5 ± 0.0 | NB |
| N | *Tortula mucronifolia* | Mucronate Screw Moss | | | | S2 | 1 | 36.3 ± 0.0 | NB |
| N | *Ulota phyllantha* | a Moss | | | | S2 | 8 | 8.0 ± 1.0 | NB |
| N | *Anomobryum julaceum* | Slender Silver Moss | | | | S2 | 1 | 87.4 ± 0.0 | NB |
| N | *Usnea ceratina* | Warty Beard Lichen | | | | S2 | 1 | 35.1 ± 0.0 | NB |
| N | *Leptogium corticola* | Blistered Jellyskin Lichen | | | | S2 | 30 | 72.0 ± 0.0 | NS |
| N | *Leptogium milligranum* | Stretched Jellyskin Lichen | | | | S2 | 8 | 81.4 ± 0.0 | NB |
| N | *Nephroma laevigatum* | Mustard Kidney Lichen | | | | S2 | 13 | 49.7 ± 10.0 | NB |
| N | *Peltigera lepidophora* | Scaly Pelt Lichen | | | | S2 | 3 | 53.2 ± 0.0 | NB |
| N | *Andreaea rothii* | Dusky Rock Moss | | | | S2? | 1 | 55.1 ± 0.0 | NB |
| N | *Ptychostomum pallescens* | Tall Clustered Bryum | | | | S2? | 2 | 36.9 ± 1.0 | NB |
| N | *Dichelyma capillaceum* | Hairlike Dichelyma Moss | | | | S2? | 2 | 81.1 ± 2.0 | NB |
| N | *Dicranum spurium* | Spurred Broom Moss | | | | S2? | 3 | 13.4 ± 0.0 | NB |
| N | *Schistostega pennata* | Luminous Moss | | | | S2? | 1 | 84.5 ± 100.0 | NB |
| N | *Seligeria diversifolia* | a Moss | | | | S2? | 2 | 87.4 ± 0.0 | NB |
| N | *Sphagnum angermanicum* | a Peatmoss | | | | S2? | 2 | 10.4 ± 10.0 | NB |
| N | *Plagiomnium rostratum* | Long-beaked Leafy Moss | | | | S2? | 2 | 88.8 ± 3.0 | NS |
| N | *Imshaugia placorodia* | Eyed Starburst Lichen | | | | S2? | 1 | 80.1 ± 0.0 | NS |
| N | *Ptychostomum cernuum* | Swamp Bryum | | | | S2S3 | 2 | 42.9 ± 0.0 | NB |
| N | *Buxbaumia aphylla* | Brown Shield Moss | | | | S2S3 | 2 | 55.2 ± 8.0 | NB |
| N | *Calliergonella cuspidata* | Common Large Wetland Moss | | | | S2S3 | 13 | 35.9 ± 1.0 | NB |
| N | *Drepanocladus polygamus* | Polygamous Hook Moss | | | | S2S3 | 1 | 97.0 ± 1.0 | NB |
| N | *Palustriella falcata* | Curled Hook Moss | | | | S2S3 | 1 | 50.2 ± 1.0 | NB |
| N | *Didymodon rigidulus* | Rigid Screw Moss | | | | S2S3 | 3 | 36.6 ± 0.0 | NB |
| N | *Fissidens bushii* | Bush's Pocket Moss | | | | S2S3 | 4 | 36.6 ± 0.0 | NB |
| N | *Neckera complanata* | a Moss | | | | S2S3 | 4 | 36.6 ± 0.0 | NB |
| N | *Orthotrichum elegans* | Showy Bristle Moss | | | | S2S3 | 2 | 42.5 ± 2.0 | NB |
| N | *Codriophorus fascicularis* | Clustered Rock Moss | | | | S2S3 | 1 | 47.7 ± 0.0 | NB |
| N | *Bucklandiella affinis* | Lesser Rock Moss | | | | S2S3 | 1 | 66.3 ± 0.0 | NS |
| N | *Scorpidium scorpioides* | Hooked Scorpion Moss | | | | S2S3 | 4 | 29.1 ± 0.0 | NB |
| N | *Seligeria campylopoda* | a Moss | | | | S2S3 | 1 | 61.7 ± 100.0 | NB |
| N | *Sphagnum centrale* | Central Peat Moss | | | | S2S3 | 2 | 69.2 ± 5.0 | NS |
| N | *Sphagnum subfulvum* | a Peatmoss | | | | S2S3 | 5 | 8.8 ± 1.0 | NB |
| N | *Taxiphyllum deplanatum* | Imbricate Yew-leaved Moss | | | | S2S3 | 1 | 8.0 ± 1.0 | NB |
| N | *Zygodon viridissimus* | a Moss | | | | S2S3 | 3 | 46.9 ± 3.0 | NB |
| N | *Schistidium agassizii* | Elf Bloom Moss | | | | S2S3 | 2 | 42.5 ± 2.0 | NB |
| N | *Loeskeobryum brevirostre* | a Moss | | | | S2S3 | 6 | 50.2 ± 1.0 | NB |
| N | *Sphaerophorus globosus* | Northern Coral Lichen | | | | S2S3 | 10 | 44.1 ± 0.0 | NB |
| N | *Polychidium muscicola* | Eyed Mossthorns Woollybear Lichen | | | | S2S3 | 4 | 53.1 ± 0.0 | NB |
| N | *Cynodontium tenellum* | Delicate Dogtooth Moss | | | | S3 | 1 | 8.0 ± 1.0 | NB |
| N | *Hypnum curvifolium* | Curved-leaved Plait Moss | | | | S3 | 4 | 52.1 ± 5.0 | NB |
| N | *Schistidium maritimum* | a Moss | | | | S3 | 7 | 8.0 ± 1.0 | NB |
| N | *Hymenostylium recurvirostrum* | Curve-beak Beardless Moss | | | | S3 | 1 | 99.2 ± 0.0 | NS |
| N | *Solorina saccata* | Woodland Owl Lichen | | | | S3 | 1 | 53.2 ± 0.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| N | *Ahtiana aurescens* | Eastern Candlewax Lichen | | | | S3 | 2 | 80.5 ± 0.0 | NB |
| N | *Normandina pulchella* | Rimmed Elf-ear Lichen | | | | S3 | 11 | 67.1 ± 0.0 | NS |
| N | *Cladonia strepsilis* | Olive Cladonia Lichen | | | | S3 | 4 | 48.1 ± 2.0 | NB |
| N | *Hypotrachyna catawbiensis* | Powder-tipped Antler Lichen | | | | S3 | 31 | 48.1 ± 2.0 | NB |
| N | *Scytinium lichenoides* | Tattered Jellyskin Lichen | | | | S3 | 2 | 53.3 ± 0.0 | NB |
| N | *Leptogium laceroides* | Short-bearded Jellyskin Lichen | | | | S3 | 4 | 82.8 ± 0.0 | NB |
| N | *Peltigera membranacea* | Membranous Pelt Lichen | | | | S3 | 6 | 64.0 ± 0.0 | NB |
| N | *Cladonia botrytes* | Wooden Soldiers Lichen | | | | S3 | 1 | 81.0 ± 0.0 | NB |
| N | *Cladonia deformis* | Lesser Sulphur-cup Lichen | | | | S3 | 1 | 48.1 ± 2.0 | NB |
| N | *Aulacomnium androgynum* | Little Groove Moss | | | | S3? | 10 | 8.9 ± 0.0 | NB |
| N | *Ptychostomum inclinatum* | Blunt-tooth Thread Moss | | | | S3? | 1 | 84.7 ± 3.0 | NS |
| N | *Rhytidiadelphus loreus* | Lanky Moss | | | | S3? | 2 | 58.7 ± 10.0 | NB |
| N | *Sphagnum lescurii* | a Peatmoss | | | | S3? | 4 | 51.2 ± 0.0 | NB |
| N | *Sphagnum inundatum* | a Sphagnum | | | | S3? | 2 | 65.7 ± 0.0 | NB |
| N | *Cystocoleus ebeneus* | Rockgossamer Lichen | | | | S3? | 1 | 97.7 ± 0.0 | NS |
| N | *Scytinium subtile* | Appressed Jellyskin Lichen | | | | S3? | 2 | 48.1 ± 2.0 | NB |
| N | *Anomodon rugelii* | Rugel's Anomodon Moss | | | | S3S4 | 2 | 78.6 ± 3.0 | NS |
| N | *Barbula convoluta* | Lesser Bird's-claw Beard Moss | | | | S3S4 | 1 | 93.7 ± 8.0 | NB |
| N | *Brachytheciastrum velutinum* | Velvet Ragged Moss | | | | S3S4 | 3 | 50.2 ± 0.0 | NB |
| N | *Dicranella cerviculata* | a Moss | | | | S3S4 | 3 | 8.0 ± 1.0 | NB |
| N | *Dicranum majus* | Greater Broom Moss | | | | S3S4 | 8 | 8.0 ± 1.0 | NB |
| N | *Fissidens bryoides* | Lesser Pocket Moss | | | | S3S4 | 2 | 61.1 ± 5.0 | NB |
| N | *Elodium blandowii* | Blandow's Bog Moss | | | | S3S4 | 1 | 41.4 ± 0.0 | NB |
| N | *Heterocladium dimorphum* | Dimorphous Tangle Moss | | | | S3S4 | 1 | 42.5 ± 2.0 | NB |
| N | *Isopterygiopsis muelleriana* | a Moss | | | | S3S4 | 5 | 50.2 ± 1.0 | NB |
| N | *Myurella julacea* | Small Mouse-tail Moss | | | | S3S4 | 3 | 50.2 ± 1.0 | NB |
| N | *Orthotrichum speciosum* | Showy Bristle Moss | | | | S3S4 | 1 | 92.0 ± 0.0 | NS |
| N | *Physcomitrium pyriforme* | Pear-shaped Urn Moss | | | | S3S4 | 4 | 84.7 ± 3.0 | NS |
| N | *Pogonatum dentatum* | Mountain Hair Moss | | | | S3S4 | 2 | 8.0 ± 1.0 | NB |
| N | *Sphagnum torreyanum* | a Peatmoss | | | | S3S4 | 6 | 22.5 ± 0.0 | NB |
| N | *Sphagnum austinii* | Austin's Peat Moss | | | | S3S4 | 2 | 23.1 ± 1.0 | NB |
| N | *Sphagnum contortum* | Twisted Peat Moss | | | | S3S4 | 1 | 47.9 ± 0.0 | NB |
| N | *Sphagnum quinquefarium* | Five-ranked Peat Moss | | | | S3S4 | 2 | 50.2 ± 1.0 | NB |
| N | *Splachnum rubrum* | Red Collar Moss | | | | S3S4 | 1 | 60.8 ± 1.0 | NB |
| N | *Tetraphis geniculata* | Geniculate Four-tooth Moss | | | | S3S4 | 5 | 8.0 ± 1.0 | NB |
| N | *Tetraplodon angustatus* | Toothed-leaved Nitrogen Moss | | | | S3S4 | 2 | 8.0 ± 1.0 | NB |
| N | *Weissia controversa* | Green-Cushioned Weissia | | | | S3S4 | 4 | 50.6 ± 1.0 | NB |
| N | *Abietinella abietina* | Wiry Fern Moss | | | | S3S4 | 2 | 47.4 ± 0.0 | NB |
| N | *Trichostomum tenuirostre* | Acid-Soil Moss | | | | S3S4 | 5 | 36.6 ± 0.0 | NB |
| N | *Rauiella scita* | Smaller Fern Moss | | | | S3S4 | 1 | 83.2 ± 1.0 | NB |
| N | *Pannaria rubiginosa* | Brown-eyed Shingle Lichen | | | | S3S4 | 21 | 67.6 ± 0.0 | NB |
| N | *Pseudocyphellaria holarctica* | Yellow Specklebelly Lichen | | | | S3S4 | 74 | 31.9 ± 0.0 | NB |
| N | *Hypogymnia vittata* | Slender Monk's Hood Lichen | | | | S3S4 | 2 | 85.0 ± 0.0 | NS |
| N | *Scytinium teretiusculum* | Curly Jellyskin Lichen | | | | S3S4 | 1 | 88.1 ± 0.0 | NS |
| N | *Cladonia terrae-novae* | Newfoundland Reindeer Lichen | | | | S3S4 | 5 | 10.1 ± 0.0 | NB |
| N | *Cladonia floerkeana* | Gritty British Soldiers Lichen | | | | S3S4 | 1 | 69.4 ± 0.0 | NB |
| N | *Cladonia parasitica* | Fence-rail Lichen | | | | S3S4 | 1 | 80.4 ± 0.0 | NB |
| N | *Nephroma parile* | Powdery Kidney Lichen | | | | S3S4 | 17 | 31.9 ± 0.0 | NB |
| N | *Nephroma resupinatum* | a lichen | | | | S3S4 | 1 | 94.0 ± 0.0 | NS |
| N | *Protopannaria pezizoides* | Brown-gray Moss-shingle Lichen | | | | S3S4 | 20 | 5.3 ± 0.0 | NB |
| N | *Parmelia fertilis* | Fertile Shield Lichen | | | | S3S4 | 1 | 62.6 ± 0.0 | NB |
| N | *Usnea strigosa* | Bushy Beard Lichen | | | | S3S4 | 8 | 49.9 ± 0.0 | NB |
| N | *Fuscopannaria sorediata* | a Lichen | | | | S3S4 | 8 | 69.6 ± 0.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| N | *Pannaria conoplea* | Mealy-rimmed Shingle Lichen | | | | S3S4 | 72 | 66.1 ± 0.0 | NS |
| N | *Physcia tenella* | Fringed Rosette Lichen | | | | S3S4 | 1 | 65.1 ± 0.0 | NB |
| N | *Anaptychia palmulata* | Shaggy Fringed Lichen | | | | S3S4 | 41 | 47.8 ± 0.0 | NB |
| N | *Peltigera neopolydactyla* | Undulating Pelt Lichen | | | | S3S4 | 1 | 48.1 ± 2.0 | NB |
| N | *Grimmia anodon* | Toothless Grimmia Moss | | | | SH | 2 | 38.7 ± 10.0 | NB |
| N | *Leucodon brachypus* | a Moss | | | | SH | 4 | 46.9 ± 100.0 | NB |
| N | *Thelia hirtella* | a Moss | | | | SH | 2 | 78.6 ± 3.0 | NS |
| P | *Juglans cinerea* | Butternut | Endangered | Endangered | Endangered | S1 | 78 | 29.5 ± 0.0 | NB |
| P | *Polemonium vanbruntiae* | Van Brunt's Jacob's-ladder | Threatened | Threatened | Threatened | S1 | 74 | 4.3 ± 0.0 | NB |
| P | *Fraxinus nigra* | Black Ash | Threatened | | | S3S4 | 382 | 10.4 ± 0.0 | NB |
| P | *Isoetes prototypus* | Prototype Quillwort | Special Concern | Special Concern | Endangered | S1 | 28 | 47.4 ± 0.0 | NB |
| P | *Symphyotrichum anticostense* | Anticosti Aster | Special Concern | Special Concern | Endangered | S3 | 2 | 33.6 ± 0.0 | NB |
| P | *Antennaria parlinii ssp. fallax* | Parlin's Pussytoes | | | | S1 | 7 | 65.1 ± 0.0 | NB |
| P | *Antennaria howellii ssp. petaloidea* | Pussy-Toes | | | | S1 | 4 | 36.0 ± 1.0 | NB |
| P | *Bidens discoidea* | Swamp Beggarticks | | | | S1 | 3 | 93.0 ± 0.0 | NB |
| P | *Pseudognaphalium obtusifolium* | Eastern Cudweed | | | | S1 | 1 | 99.5 ± 0.0 | NS |
| P | *Hieracium paniculatum* | Panicled Hawkweed | | | | S1 | 16 | 65.9 ± 0.0 | NS |
| P | *Senecio pseudoarnica* | Seabeach Ragwort | | | | S1 | 18 | 50.2 ± 0.0 | NB |
| P | *Betula michauxii* | Michaux's Dwarf Birch | | | | S1 | 13 | 90.5 ± 0.0 | NS |
| P | *Barbarea orthoceras* | American Yellow Rocket | | | | S1 | 3 | 47.7 ± 10.0 | NB |
| P | *Cardamine parviflora* | Small-flowered Bittercress | | | | S1 | 13 | 36.3 ± 1.0 | NB |
| P | *Cardamine concatenata* | Cut-leaved Toothwort | | | | S1 | 3 | 55.8 ± 0.0 | NB |
| P | *Draba arabisans* | Rock Whitlow-Grass | | | | S1 | 7 | 45.8 ± 0.0 | NB |
| P | *Draba glabella* | Rock Whitlow-Grass | | | | S1 | 8 | 37.8 ± 1.0 | NB |
| P | *Mononeuria groenlandica* | Greenland Stitchwort | | | | S1 | 6 | 31.2 ± 0.0 | NB |
| P | *Chenopodiastrum simplex* | Maple-leaved Goosefoot | | | | S1 | 3 | 57.6 ± 1.0 | NB |
| P | *Blitum capitatum* | Strawberry-Blite | | | | S1 | 4 | 39.1 ± 1.0 | NB |
| P | *Callitriche terrestris* | Terrestrial Water-Starwort | | | | S1 | 1 | 82.7 ± 0.0 | NB |
| P | *Hypericum virginicum* | Virginia St. John's-wort | | | | S1 | 4 | 44.1 ± 0.0 | NB |
| P | *Viburnum acerifolium* | Maple-leaved Viburnum | | | | S1 | 11 | 67.1 ± 1.0 | NB |
| P | *Corema conradii* | Broom Crowberry | | | | S1 | 2 | 36.7 ± 10.0 | NB |
| P | *Vaccinium boreale* | Northern Blueberry | | | | S1 | 1 | 22.3 ± 0.0 | NB |
| P | *Vaccinium corymbosum* | Highbush Blueberry | | | | S1 | 10 | 63.9 ± 5.0 | NB |
| P | *Vaccinium uliginosum* | Alpine Bilberry | | | | S1 | 3 | 90.6 ± 0.0 | NS |
| P | *Euphorbia polygonifolia* | Seaside Spurge | | | | S1 | 10 | 46.0 ± 0.0 | NB |
| P | *Hylodesmum glutinosum* | Large Tick-trefoil | | | | S1 | 1 | 75.1 ± 1.0 | NB |
| P | *Lespedeza capitata* | Round-headed Bush-clover | | | | S1 | 9 | 96.7 ± 0.0 | NB |
| P | *Gentiana rubricaulis* | Purple-stemmed Gentian | | | | S1 | 18 | 36.8 ± 0.0 | NB |
| P | *Lomatogonium rotatum* | Marsh Felwort | | | | S1 | 3 | 25.7 ± 0.0 | NB |
| P | *Proserpinaca pectinata* | Comb-leaved Mermaidweed | | | | S1 | 3 | 20.0 ± 0.0 | NB |
| P | *Lycopus virginicus* | Virginia Bugleweed | | | | S1 | 2 | 58.8 ± 0.0 | NB |
| P | *Pycnanthemum virginianum* | Virginia Mountain Mint | | | | S1 | 4 | 70.1 ± 0.0 | NB |
| P | *Decodon verticillatus* | Swamp Loosestrife | | | | S1 | 1 | 97.0 ± 1.0 | NS |
| P | *Lysimachia hybrida* | Lowland Yellow Loosestrife | | | | S1 | 17 | 68.3 ± 0.0 | NB |
| P | *Lysimachia quadrifolia* | Whorled Yellow Loosestrife | | | | S1 | 16 | 37.0 ± 1.0 | NB |
| P | *Primula laurentiana* | Laurentian Primrose | | | | S1 | 11 | 67.5 ± 0.0 | NS |
| P | *Crataegus jonesiae* | Jones' Hawthorn | | | | S1 | 5 | 46.3 ± 0.0 | NB |
| P | *Potentilla canadensis* | Canada Cinquefoil | | | | S1 | 1 | 32.4 ± 0.0 | NB |
| P | *Rubus flagellaris* | Northern Dewberry | | | | S1 | 2 | 8.7 ± 0.0 | NB |
| P | *Galium brevipes* | Limestone Swamp Bedstraw | | | | S1 | 2 | 36.6 ± 0.0 | NB |
| P | *Saxifraga paniculata ssp. laestadii* | Laestadius' Saxifrage | | | | S1 | 8 | 50.2 ± 1.0 | NB |
| P | *Agalinis tenuifolia* | Slender Agalinis | | | | S1 | 7 | 96.1 ± 0.0 | NB |
| P | *Gratiola lutea* | Golden Hedge-hyssop | | | | S1 | 6 | 23.1 ± 5.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Pedicularis canadensis* | Canada Lousewort | | | | S1 | 21 | 44.4 ± 0.0 | NB |
| P | *Viola sagittata var. ovata* | Arrow-Leaved Violet | | | | S1 | 25 | 44.9 ± 0.0 | NB |
| P | *Carex atlantica ssp. atlantica* | Atlantic Sedge | | | | S1 | 3 | 90.7 ± 0.0 | NS |
| P | *Carex merritt-fernaldii* | Merritt Fernald's Sedge | | | | S1 | 2 | 49.7 ± 0.0 | NB |
| P | *Carex salina* | Saltmarsh Sedge | | | | S1 | 2 | 34.8 ± 1.0 | NB |
| P | *Carex waponahkikensis* | Dawn-land Sedge | | | | S1 | 2 | 45.7 ± 0.0 | NB |
| P | *Carex grisea* | Inflated Narrow-leaved Sedge | | | | S1 | 11 | 74.9 ± 0.0 | NB |
| P | *Carex saxatilis* | Russet Sedge | | | | S1 | 14 | 37.0 ± 10.0 | NB |
| P | *Cyperus diandrus* | Low Flatsedge | | | | S1 | 4 | 95.9 ± 1.0 | NB |
| P | *Eleocharis flavescens var. olivacea* | Bright-green Spikerush | | | | S1 | 4 | 70.5 ± 1.0 | NB |
| P | *Sisyrinchium angustifolium* | Narrow-leaved Blue-eyed-grass | | | | S1 | 11 | 37.1 ± 1.0 | NB |
| P | *Juncus greenei* | Greene's Rush | | | | S1 | 1 | 17.6 ± 0.0 | NB |
| P | *Juncus subtilis* | Creeping Rush | | | | S1 | 1 | 74.5 ± 5.0 | NB |
| P | *Allium canadense* | Canada Garlic | | | | S1 | 1 | 70.3 ± 0.0 | NB |
| P | *Goodyera pubescens* | Downy Rattlesnake-Plantain | | | | S1 | 7 | 97.4 ± 0.0 | NS |
| P | *Malaxis monophyllos var. brachypoda* | North American White Adder's-mouth | | | | S1 | 3 | 48.8 ± 10.0 | NB |
| P | *Platanthera flava var. herbiola* | Pale Green Orchid | | | | S1 | 13 | 49.7 ± 0.0 | NB |
| P | *Platanthera macrophylla* | Large Round-Leaved Orchid | | | | S1 | 5 | 51.7 ± 0.0 | NB |
| P | *Bromus pubescens* | Hairy Wood Brome Grass | | | | S1 | 6 | 92.6 ± 0.0 | NB |
| P | *Cinna arundinacea* | Sweet Wood Reed Grass | | | | S1 | 55 | 66.7 ± 0.0 | NB |
| P | *Danthonia compressa* | Flattened Oat Grass | | | | S1 | 9 | 75.2 ± 0.0 | NS |
| P | *Dichanthelium dichotomum* | Forked Panic Grass | | | | S1 | 20 | 61.6 ± 1.0 | NB |
| P | *Glyceria obtusa* | Atlantic Manna Grass | | | | S1 | 10 | 34.6 ± 0.0 | NB |
| P | *Potamogeton friesii* | Fries' Pondweed | | | | S1 | 4 | 35.8 ± 5.0 | NB |
| P | *Potamogeton nodosus* | Long-leaved Pondweed | | | | S1 | 8 | 86.4 ± 0.0 | NB |
| P | *Potamogeton strictifolius* | Straight-leaved Pondweed | | | | S1 | 2 | 56.9 ± 0.0 | NB |
| P | *Xyris difformis* | Bog Yellow-eyed-grass | | | | S1 | 9 | 22.2 ± 0.0 | NB |
| P | *Asplenium ruta-muraria var. cryptolepis* | Wallrue Spleenwort | | | | S1 | 4 | 49.8 ± 0.0 | NB |
| P | *Huperzia selago* | Northern Firmoss | | | | S1 | 3 | 91.4 ± 5.0 | NS |
| P | *Sceptridium oneidense* | Blunt-lobed Moonwort | | | | S1 | 4 | 66.9 ± 0.0 | NB |
| P | *Sceptridium rugulosum* | Rugulose Grapefern | | | | S1 | 1 | 68.0 ± 1.0 | NB |
| P | *Selaginella rupestris* | Rock Spikemoss | | | | S1 | 29 | 64.9 ± 7.0 | NS |
| P | *Cuscuta campestris* | Field Dodder | | | | S1? | 3 | 98.7 ± 10.0 | NB |
| P | *Polygonum aviculare ssp. neglectum* | Narrow-leaved Knotweed | | | | S1? | 5 | 64.9 ± 0.0 | NB |
| P | *Alisma subcordatum* | Southern Water Plantain | | | | S1? | 5 | 66.9 ± 0.0 | NB |
| P | *Carex laxiflora* | Loose-Flowered Sedge | | | | S1? | 1 | 82.0 ± 5.0 | NS |
| P | *Wolffia columbiana* | Columbian Watermeal | | | | S1? | 6 | 88.6 ± 0.0 | NB |
| P | *Euphrasia farlowii* | Farlow's Eyebright | | | | S1S2 | 1 | 36.2 ± 1.0 | NB |
| P | *Spiranthes ochroleuca* | Yellow Ladies'-tresses | | | | S1S2 | 11 | 48.1 ± 0.0 | NB |
| P | *Potamogeton bicupulatus* | Snailseed Pondweed | | | | S1S2 | 5 | 31.1 ± 0.0 | NB |
| P | *Spiranthes cernua* | Nodding Ladies'-Tresses | | | | S1S3 | 30 | 17.6 ± 0.0 | NB |
| P | *Spiranthes arcisepala* | Appalachian Ladies'-tresses | | | | S1S3 | 6 | 40.6 ± 0.0 | NB |
| P | *Neottia bifolia* | Southern Twayblade | | | Endangered | S2 | 14 | 88.1 ± 0.0 | NB |
| P | *Sanicula trifoliata* | Large-Fruited Sanicle | | | | S2 | 1 | 71.8 ± 5.0 | NB |
| P | *Atriplex glabriuscula var. franktonii* | Frankton's Saltbush | | | | S2 | 5 | 36.2 ± 1.0 | NB |
| P | *Hypericum x dissimulatum* | Disguised St. John's-wort | | | | S2 | 8 | 23.0 ± 1.0 | NB |
| P | *Viburnum dentatum* | Southern Arrow-Wood | | | | S2 | 1 | 82.7 ± 1.0 | NS |
| P | *Viburnum dentatum var. lucidum* | Northern Arrow-Wood | | | | S2 | 187 | 29.8 ± 0.0 | NB |
| P | *Astragalus eucosmus* | Elegant Milk-vetch | | | | S2 | 4 | 60.9 ± 0.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Quercus macrocarpa* | Bur Oak | | | | S2 | 136 | 36.6 ± 0.0 | NB |
| P | *Nuphar x rubrodisca* | Red-disk Yellow Pond-lily | | | | S2 | 9 | 37.9 ± 1.0 | NB |
| P | *Polygaloides paucifolia* | Fringed Milkwort | | | | S2 | 13 | 33.3 ± 1.0 | NB |
| P | *Persicaria amphibia var. emersa* | Long-root Smartweed | | | | S2 | 55 | 29.8 ± 0.0 | NB |
| P | *Scrophularia lanceolata* | Lance-leaved Figwort | | | | S2 | 3 | 57.1 ± 5.0 | NB |
| P | *Carex albicans var. emmonsii* | White-tinged Sedge | | | | S2 | 5 | 26.0 ± 0.0 | NB |
| P | *Cyperus lupulinus ssp. macilentus* | Hop Flatsedge | | | | S2 | 55 | 91.8 ± 0.0 | NB |
| P | *Calypso bulbosa var. americana* | Calypso | | | | S2 | 4 | 44.7 ± 0.0 | NB |
| P | *Coeloglossum viride* | Long-bracted Frog Orchid | | | | S2 | 5 | 72.9 ± 5.0 | NB |
| P | *Cypripedium parviflorum var. makasin* | Small Yellow Lady's-Slipper | | | | S2 | 5 | 33.0 ± 1.0 | NB |
| P | *Platanthera huronensis* | Fragrant Green Orchid | | | | S2 | 2 | 76.1 ± 1.0 | NB |
| P | *Puccinellia nutkaensis* | Alaska Alkaligrass | | | | S2 | 10 | 25.3 ± 1.0 | NB |
| P | *Schizaea pusilla* | Little Curlygrass Fern | | | | S2 | 40 | 10.3 ± 0.0 | NB |
| P | *Coryphopteris simulata* | Bog Fern | | | | S2 | 6 | 90.5 ± 0.0 | NS |
| P | *Toxicodendron radicans var. radicans* | Eastern Poison Ivy | | | | S2? | 10 | 60.6 ± 0.0 | NB |
| P | *Symphyotrichum novi-belgii var. crenifolium* | New York Aster | | | | S2? | 10 | 30.8 ± 0.0 | NB |
| P | *Humulus lupulus var. lupuloides* | Common Hop | | | | S2? | 3 | 95.2 ± 0.0 | NB |
| P | *Rubus x recurvicaulis* | arching dewberry | | | | S2? | 5 | 49.1 ± 5.0 | NB |
| P | *Osmorhiza longistylis* | Smooth Sweet Cicely | | | | S2S3 | 1 | 49.2 ± 0.0 | NB |
| P | *Symphyotrichum racemosum* | Small White Aster | | | | S2S3 | 10 | 72.2 ± 0.0 | NB |
| P | *Alnus serrulata* | Smooth Alder | | | | S2S3 | 39 | 67.1 ± 1.0 | NB |
| P | *Cuscuta cephalanthi* | Buttonbush Dodder | | | | S2S3 | 2 | 35.7 ± 1.0 | NB |
| P | *Hedeoma pulegioides* | American False Pennyroyal | | | | S2S3 | 62 | 35.0 ± 0.0 | NB |
| P | *Aphyllon uniflorum* | One-flowered Broomrape | | | | S2S3 | 22 | 8.8 ± 0.0 | NB |
| P | *Persicaria careyi* | Carey's Smartweed | | | | S2S3 | 7 | 40.7 ± 10.0 | NB |
| P | *Hepatica americana* | Round-lobed Hepatica | | | | S2S3 | 8 | 53.6 ± 1.0 | NB |
| P | *Ranunculus sceleratus* | Cursed Buttercup | | | | S2S3 | 7 | 30.4 ± 0.0 | NB |
| P | *Cephalanthus occidentalis* | Common Buttonbush | | | | S2S3 | 49 | 66.7 ± 0.0 | NB |
| P | *Galium obtusum* | Blunt-leaved Bedstraw | | | | S2S3 | 4 | 36.6 ± 0.0 | NB |
| P | *Euphrasia randii* | Rand's Eyebright | | | | S2S3 | 38 | 8.5 ± 0.0 | NB |
| P | *Dirca palustris* | Eastern Leatherwood | | | | S2S3 | 1 | 96.8 ± 1.0 | NB |
| P | *Viola novae-angliae* | New England Violet | | | | S2S3 | 16 | 21.3 ± 15.0 | NB |
| P | *Carex comosa* | Bearded Sedge | | | | S2S3 | 5 | 76.7 ± 0.0 | NS |
| P | *Carex rostrata* | Narrow-leaved Beaked Sedge | | | | S2S3 | 2 | 44.9 ± 0.0 | NB |
| P | *Carex vacillans* | Estuarine Sedge | | | | S2S3 | 4 | 35.5 ± 1.0 | NB |
| P | *Scirpus atrovirens* | Dark-green Bulrush | | | | S2S3 | 2 | 80.8 ± 0.0 | NB |
| P | *Juncus ranarius* | Seaside Rush | | | | S2S3 | 1 | 36.6 ± 0.0 | NB |
| P | *Allium tricoccum* | Wild Leek | | | | S2S3 | 29 | 61.8 ± 0.0 | NB |
| P | *Corallorhiza maculata var. occidentalis* | Spotted Coralroot | | | | S2S3 | 3 | 49.7 ± 0.0 | NB |
| P | *Corallorhiza maculata var. maculata* | Spotted Coralroot | | | | S2S3 | 4 | 84.2 ± 1.0 | NB |
| P | *Elymus canadensis* | Canada Wild Rye | | | | S2S3 | 3 | 36.6 ± 0.0 | NB |
| P | *Piptatheropsis canadensis* | Canada Ricegrass | | | | S2S3 | 6 | 67.1 ± 1.0 | NB |
| P | *Puccinellia phryganodes ssp. neoarctica* | Creeping Alkali Grass | | | | S2S3 | 18 | 4.3 ± 0.0 | NB |
| P | *Poa glauca* | Glaucous Blue Grass | | | | S2S3 | 1 | 36.4 ± 2.0 | NB |
| P | *Potamogeton vaseyi* | Vasey's Pondweed | | | | S2S3 | 5 | 35.6 ± 1.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Isoetes tuckermanii ssp. acadiensis* | Acadian Quillwort | | | | S2S3 | 9 | 34.4 ± 0.0 | NB |
| P | *Botrychium tenebrosum* | Swamp Moonwort | | | | S2S3 | 1 | 73.1 ± 0.0 | NB |
| P | *Panax trifolius* | Dwarf Ginseng | | | | S3 | 3 | 41.5 ± 0.0 | NB |
| P | *Artemisia campestris ssp. caudata* | Tall Wormwood | | | | S3 | 92 | 36.6 ± 0.0 | NB |
| P | *Artemisia campestris* | Field Wormwood | | | | S3 | 1 | 96.6 ± 0.0 | NB |
| P | *Nabalus racemosus* | Glaucous Rattlesnakeroot | | | | S3 | 70 | 34.2 ± 0.0 | NB |
| P | *Solidago racemosa* | Racemose Goldenrod | | | | S3 | 1 | 80.8 ± 0.0 | NB |
| P | *Tanacetum bipinnatum ssp. huronense* | Lake Huron Tansy | | | | S3 | 14 | 46.5 ± 1.0 | NB |
| P | *Pseudognaphalium macounii* | Macoun's Cudweed | | | | S3 | 8 | 36.4 ± 0.0 | NB |
| P | *Turritis glabra* | Tower Mustard | | | | S3 | 1 | 36.6 ± 0.0 | NB |
| P | *Arabis pycnocarpa* | Cream-flowered Rockcress | | | | S3 | 8 | 36.4 ± 0.0 | NB |
| P | *Cardamine maxima* | Large Toothwort | | | | S3 | 16 | 36.6 ± 0.0 | NB |
| P | *Boechera stricta* | Drummond's Rockcress | | | | S3 | 5 | 36.4 ± 1.0 | NB |
| P | *Sagina nodosa* | Knotted Pearlwort | | | | S3 | 45 | 9.0 ± 1.0 | NB |
| P | *Sagina nodosa ssp. borealis* | Knotted Pearlwort | | | | S3 | 2 | 18.4 ± 0.0 | NB |
| P | *Stellaria humifusa* | Saltmarsh Starwort | | | | S3 | 7 | 9.8 ± 1.0 | NB |
| P | *Stellaria longifolia* | Long-leaved Starwort | | | | S3 | 7 | 31.0 ± 0.0 | NB |
| P | *Oxybasis rubra* | Red Goosefoot | | | | S3 | 4 | 36.0 ± 0.0 | NB |
| P | *Hudsonia tomentosa* | Woolly Beach-heath | | | | S3 | 4 | 26.7 ± 0.0 | NB |
| P | *Cornus obliqua* | Silky Dogwood | | | | S3 | 203 | 61.3 ± 0.0 | NB |
| P | *Lonicera oblongifolia* | Swamp Fly Honeysuckle | | | | S3 | 22 | 22.6 ± 6.0 | NB |
| P | *Viburnum lentago* | Nannyberry | | | | S3 | 92 | 66.8 ± 0.0 | NB |
| P | *Rhodiola rosea* | Roseroot | | | | S3 | 63 | 0.8 ± 0.0 | NB |
| P | *Astragalus alpinus* | Alpine Milk-vetch | | | | S3 | 1 | 36.6 ± 0.0 | NB |
| P | *Oxytropis campestris var. johannensis* | Field Locoweed | | | | S3 | 1 | 49.4 ± 50.0 | NB |
| P | *Bartonia paniculata* | Branched Bartonia | | | | S3 | 1 | 80.2 ± 0.0 | NS |
| P | *Bartonia paniculata ssp. iodandra* | Branched Bartonia | | | | S3 | 21 | 10.4 ± 0.0 | NB |
| P | *Gentianella amarella ssp. acuta* | Northern Gentian | | | | S3 | 6 | 36.4 ± 5.0 | NB |
| P | *Geranium bicknellii* | Bicknell's Crane's-bill | | | | S3 | 7 | 33.0 ± 5.0 | NB |
| P | *Myriophyllum farwellii* | Farwell's Water Milfoil | | | | S3 | 33 | 29.6 ± 0.0 | NB |
| P | *Myriophyllum humile* | Low Water Milfoil | | | | S3 | 11 | 62.4 ± 0.0 | NB |
| P | *Myriophyllum quitense* | Andean Water Milfoil | | | | S3 | 71 | 36.1 ± 0.0 | NB |
| P | *Proserpinaca palustris* | Marsh Mermaidweed | | | | S3 | 44 | 24.3 ± 7.0 | NB |
| P | *Utricularia resupinata* | Inverted Bladderwort | | | | S3 | 19 | 22.6 ± 0.0 | NB |
| P | *Fraxinus pennsylvanica* | Red Ash | | | | S3 | 121 | 33.6 ± 0.0 | NB |
| P | *Rumex pallidus* | Seabeach Dock | | | | S3 | 17 | 10.5 ± 1.0 | NB |
| P | *Rumex occidentalis* | Western Dock | | | | S3 | 1 | 92.6 ± 1.0 | NB |
| P | *Podostemum ceratophyllum* | Horn-leaved Riverweed | | | | S3 | 24 | 53.5 ± 0.0 | NB |
| P | *Primula mistassinica* | Mistassini Primrose | | | | S3 | 11 | 31.5 ± 1.0 | NB |
| P | *Pyrola minor* | Lesser Pyrola | | | | S3 | 3 | 5.2 ± 0.0 | NB |
| P | *Clematis occidentalis* | Purple Clematis | | | | S3 | 9 | 36.6 ± 0.0 | NB |
| P | *Ranunculus flabellaris* | Yellow Water Buttercup | | | | S3 | 21 | 31.0 ± 0.0 | NB |
| P | *Amelanchier canadensis* | Canada Serviceberry | | | | S3 | 17 | 23.4 ± 1.0 | NB |
| P | *Crataegus scabrida* | Rough Hawthorn | | | | S3 | 5 | 49.8 ± 0.0 | NB |
| P | *Rubus occidentalis* | Black Raspberry | | | | S3 | 9 | 36.3 ± 0.0 | NB |
| P | *Salix candida* | Sage Willow | | | | S3 | 2 | 99.8 ± 1.0 | NB |
| P | *Salix myricoides* | Bayberry Willow | | | | S3 | 1 | 44.2 ± 0.0 | NB |
| P | *Salix nigra* | Black Willow | | | | S3 | 143 | 35.7 ± 1.0 | NB |
| P | *Salix interior* | Sandbar Willow | | | | S3 | 15 | 36.6 ± 0.0 | NB |
| P | *Comandra umbellata* | Bastard's Toadflax | | | | S3 | 1 | 36.6 ± 0.0 | NB |
| P | *Agalinis purpurea var. parviflora* | Small-flowered Purple False Foxglove | | | | S3 | 6 | 59.9 ± 1.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Valeriana uliginosa* | Swamp Valerian | | | | S3 | 1 | 66.7 ± 1.0 | NB |
| P | *Viola adunca* | Hooked Violet | | | | S3 | 6 | 36.6 ± 0.0 | NB |
| P | *Symplocarpus foetidus* | Eastern Skunk Cabbage | | | | S3 | 128 | 24.3 ± 7.0 | NB |
| P | *Carex adusta* | Lesser Brown Sedge | | | | S3 | 4 | 36.6 ± 0.0 | NB |
| P | *Carex arcta* | Northern Clustered Sedge | | | | S3 | 37 | 36.6 ± 0.0 | NB |
| P | *Carex conoidea* | Field Sedge | | | | S3 | 38 | 20.5 ± 1.0 | NB |
| P | *Carex garberi* | Garber's Sedge | | | | S3 | 4 | 56.6 ± 1.0 | NB |
| P | *Carex granularis* | Limestone Meadow Sedge | | | | S3 | 2 | 62.6 ± 0.0 | NB |
| P | *Carex gynocrates* | Northern Bog Sedge | | | | S3 | 4 | 74.6 ± 0.0 | NB |
| P | *Carex hirtifolia* | Pubescent Sedge | | | | S3 | 2 | 78.1 ± 0.0 | NB |
| P | *Carex livida* | Livid Sedge | | | | S3 | 2 | 36.4 ± 2.0 | NB |
| P | *Carex ormostachya* | Necklace Spike Sedge | | | | S3 | 4 | 82.8 ± 0.0 | NB |
| P | *Carex plantaginea* | Plantain-Leaved Sedge | | | | S3 | 1 | 98.2 ± 0.0 | NB |
| P | *Carex prairea* | Prairie Sedge | | | | S3 | 1 | 67.4 ± 5.0 | NS |
| P | *Carex rosea* | Rosy Sedge | | | | S3 | 29 | 36.6 ± 0.0 | NB |
| P | *Carex sprengelii* | Longbeak Sedge | | | | S3 | 2 | 99.9 ± 0.0 | NB |
| P | *Carex tenuiflora* | Sparse-Flowered Sedge | | | | S3 | 17 | 50.7 ± 1.0 | NB |
| P | *Carex vaginata* | Sheathed Sedge | | | | S3 | 15 | 69.9 ± 6.0 | NB |
| P | *Cyperus esculentus* | Perennial Yellow Nutsedge | | | | S3 | 1 | 96.3 ± 0.0 | NB |
| P | *Cyperus esculentus var. leptostachyus* | Perennial Yellow Nutsedge | | | | S3 | 67 | 36.6 ± 0.0 | NB |
| P | *Cyperus squarrosus* | Awned Flatsedge | | | | S3 | 41 | 68.6 ± 0.0 | NB |
| P | *Eriophorum gracile* | Slender Cottongrass | | | | S3 | 8 | 38.6 ± 0.0 | NB |
| P | *Blysmopsis rufa* | Red Bulrush | | | | S3 | 4 | 36.6 ± 0.0 | NB |
| P | *Elodea nuttallii* | Nuttall's Waterweed | | | | S3 | 9 | 62.4 ± 0.0 | NB |
| P | *Juncus vaseyi* | Vasey Rush | | | | S3 | 1 | 28.4 ± 0.0 | NB |
| P | *Najas gracillima* | Thread-Like Naiad | | | | S3 | 11 | 29.3 ± 0.0 | NB |
| P | *Cypripedium reginae* | Showy Lady's-Slipper | | | | S3 | 24 | 32.5 ± 0.0 | NB |
| P | *Neottia auriculata* | Auricled Twayblade | | | | S3 | 9 | 31.7 ± 1.0 | NB |
| P | *Platanthera grandiflora* | Large Purple Fringed Orchid | | | | S3 | 60 | 0.2 ± 1.0 | NB |
| P | *Platanthera orbiculata* | Small Round-leaved Orchid | | | | S3 | 18 | 36.6 ± 0.0 | NB |
| P | *Spiranthes lucida* | Shining Ladies'-Tresses | | | | S3 | 11 | 56.5 ± 1.0 | NB |
| P | *Agrostis mertensii* | Northern Bent Grass | | | | S3 | 1 | 36.2 ± 1.0 | NB |
| P | *Bromus latiglumis* | Broad-Glumed Brome | | | | S3 | 1 | 60.1 ± 0.0 | NB |
| P | *Dichanthelium linearifolium* | Narrow-leaved Panic Grass | | | | S3 | 10 | 53.6 ± 0.0 | NB |
| P | *Leersia virginica* | White Cut Grass | | | | S3 | 34 | 73.5 ± 0.0 | NB |
| P | *Schizachyrium scoparium* | Little Bluestem | | | | S3 | 15 | 62.0 ± 0.0 | NB |
| P | *Zizania aquatica* | Southern Wild Rice | | | | S3 | 1 | 36.6 ± 0.0 | NB |
| P | *Zizania aquatica var. aquatica* | Eastern Wild Rice | | | | S3 | 3 | 79.6 ± 0.0 | NB |
| P | *Adiantum pedatum* | Northern Maidenhair Fern | | | | S3 | 7 | 26.0 ± 0.0 | NB |
| P | *Asplenium trichomanes* | Maidenhair Spleenwort | | | | S3 | 18 | 36.0 ± 0.0 | NB |
| P | *Anchistea virginica* | Virginia chain fern | | | | S3 | 40 | 76.2 ± 1.0 | NB |
| P | *Woodsia alpina* | Alpine Cliff Fern | | | | S3 | 6 | 50.2 ± 1.0 | NB |
| P | *Woodsia glabella* | Smooth Cliff Fern | | | | S3 | 1 | 65.0 ± 1.0 | NB |
| P | *Isoetes tuckermanii ssp. tuckermanii* | Tuckerman's Quillwort | | | | S3 | 27 | 17.3 ± 0.0 | NB |
| P | *Diphasiastrum x sabinifolium* | Savin-leaved Ground-cedar | | | | S3 | 7 | 34.8 ± 1.0 | NB |
| P | *Huperzia appressa* | Mountain Firmoss | | | | S3 | 3 | 39.5 ± 1.0 | NB |
| P | *Sceptridium dissectum* | Dissected Moonwort | | | | S3 | 24 | 33.8 ± 0.0 | NB |
| P | *Botrychium lanceolatum ssp. angustisegmentum* | Narrow Triangle Moonwort | | | | S3 | 4 | 35.2 ± 0.0 | NB |
| P | *Botrychium simplex* | Least Moonwort | | | | S3 | 5 | 40.6 ± 0.0 | NB |
| P | *Ophioglossum pusillum* | Northern Adder's-tongue | | | | S3 | 7 | 35.1 ± 1.0 | NB |
| P | *Selaginella selaginoides* | Low Spikemoss | | | | S3 | 6 | 8.9 ± 0.0 | NB |
| P | *Crataegus submollis* | Quebec Hawthorn | | | | S3? | 15 | 33.5 ± 1.0 | NB |
| P | *Platanthera hookeri* | Hooker's Orchid | | | | S3? | 24 | 36.6 ± 0.0 | NB |
| P | *Bidens hyperborea* | Estuary Beggarticks | | | | S3S4 | 1 | 36.6 ± 0.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Solidago altissima* | Tall Goldenrod | | | | S3S4 | 3 | 60.3 ± 1.0 | NB |
| P | *Symphyotrichum boreale* | Boreal Aster | | | | S3S4 | 19 | 30.0 ± 0.0 | NB |
| P | *Betula pumila* | Bog Birch | | | | S3S4 | 25 | 36.6 ± 0.0 | NB |
| P | *Mertensia maritima* | Sea Lungwort | | | | S3S4 | 58 | 7.0 ± 10.0 | NB |
| P | *Subularia aquatica ssp. americana* | American Water Awlwort | | | | S3S4 | 12 | 30.8 ± 0.0 | NB |
| P | *Lobelia cardinalis* | Cardinal Flower | | | | S3S4 | 385 | 24.3 ± 7.0 | NB |
| P | *Callitriche hermaphroditica* | Northern Water-starwort | | | | S3S4 | 7 | 57.1 ± 0.0 | NB |
| P | *Viburnum edule* | Squashberry | | | | S3S4 | 4 | 36.6 ± 0.0 | NB |
| P | *Crassula aquatica* | Water Pygmyweed | | | | S3S4 | 12 | 50.3 ± 0.0 | NB |
| P | *Penthorum sedoides* | Ditch Stonecrop | | | | S3S4 | 73 | 29.6 ± 0.0 | NB |
| P | *Elatine americana* | American Waterwort | | | | S3S4 | 8 | 36.4 ± 1.0 | NB |
| P | *Hedysarum americanum* | Alpine Hedysarum | | | | S3S4 | 3 | 36.6 ± 0.0 | NB |
| P | *Fagus grandifolia* | American Beech | | | | S3S4 | 199 | 23.9 ± 1.0 | NB |
| P | *Geranium robertianum* | Herb Robert | | | | S3S4 | 35 | 36.6 ± 0.0 | NB |
| P | *Stachys hispida* | Smooth Hedge-Nettle | | | | S3S4 | 4 | 62.7 ± 0.0 | NB |
| P | *Stachys pilosa* | Hairy Hedge-Nettle | | | | S3S4 | 5 | 36.6 ± 0.0 | NB |
| P | *Teucrium canadense* | Canada Germander | | | | S3S4 | 6 | 48.0 ± 1.0 | NB |
| P | *Utricularia radiata* | Little Floating Bladderwort | | | | S3S4 | 70 | 18.5 ± 0.0 | NB |
| P | *Utricularia gibba* | Humped Bladderwort | | | | S3S4 | 35 | 22.5 ± 0.0 | NB |
| P | *Fraxinus americana* | White Ash | | | | S3S4 | 142 | 23.9 ± 1.0 | NB |
| P | *Epilobium strictum* | Downy Willowherb | | | | S3S4 | 21 | 20.5 ± 1.0 | NB |
| P | *Fallopia scandens* | Climbing False Buckwheat | | | | S3S4 | 32 | 34.9 ± 0.0 | NB |
| P | *Rumex persicarioides* | Peach-leaved Dock | | | | S3S4 | 3 | 53.5 ± 0.0 | NB |
| P | *Littorella americana* | American Shoreweed | | | | S3S4 | 35 | 28.2 ± 5.0 | NB |
| P | *Thalictrum confine* | Northern Meadow-rue | | | | S3S4 | 75 | 36.6 ± 0.0 | NB |
| P | *Drymocallis arguta* | Tall Wood Beauty | | | | S3S4 | 13 | 36.6 ± 0.0 | NB |
| P | *Rosa palustris* | Swamp Rose | | | | S3S4 | 165 | 23.1 ± 0.0 | NB |
| P | *Rubus pensilvanicus* | Pennsylvania Blackberry | | | | S3S4 | 16 | 41.8 ± 0.0 | NB |
| P | *Galium boreale* | Northern Bedstraw | | | | S3S4 | 7 | 36.6 ± 0.0 | NB |
| P | *Galium labradoricum* | Labrador Bedstraw | | | | S3S4 | 18 | 21.8 ± 1.0 | NB |
| P | *Salix pedicellaris* | Bog Willow | | | | S3S4 | 63 | 21.7 ± 1.0 | NB |
| P | *Geocaulon lividum* | Northern Comandra | | | | S3S4 | 13 | 9.5 ± 1.0 | NB |
| P | *Parnassia glauca* | Fen Grass-of-Parnassus | | | | S3S4 | 2 | 36.6 ± 0.0 | NB |
| P | *Agalinis neoscotica* | Nova Scotia Agalinis | | | | S3S4 | 79 | 22.3 ± 0.0 | NB |
| P | *Limosella australis* | Southern Mudwort | | | | S3S4 | 11 | 48.3 ± 0.0 | NB |
| P | *Ulmus americana* | White Elm | | | | S3S4 | 129 | 30.8 ± 0.0 | NB |
| P | *Boehmeria cylindrica* | Small-spike False-nettle | | | | S3S4 | 150 | 24.3 ± 7.0 | NB |
| P | *Juniperus horizontalis* | Creeping Juniper | | | | S3S4 | 45 | 10.1 ± 0.0 | NB |
| P | *Carex capillaris* | Hairlike Sedge | | | | S3S4 | 6 | 36.4 ± 2.0 | NB |
| P | *Carex eburnea* | Bristle-leaved Sedge | | | | S3S4 | 1 | 65.7 ± 0.0 | NB |
| P | *Carex exilis* | Coastal Sedge | | | | S3S4 | 111 | 9.9 ± 0.0 | NB |
| P | *Carex haydenii* | Hayden's Sedge | | | | S3S4 | 82 | 11.7 ± 1.0 | NB |
| P | *Carex lupulina* | Hop Sedge | | | | S3S4 | 112 | 57.2 ± 0.0 | NB |
| P | *Carex tenera* | Tender Sedge | | | | S3S4 | 58 | 36.6 ± 0.0 | NB |
| P | *Carex wiegandii* | Wiegand's Sedge | | | | S3S4 | 34 | 9.8 ± 0.0 | NB |
| P | *Carex recta* | Estuary Sedge | | | | S3S4 | 8 | 21.7 ± 0.0 | NB |
| P | *Carex atratiformis* | Scabrous Black Sedge | | | | S3S4 | 2 | 36.4 ± 0.0 | NB |
| P | *Cladium mariscoides* | Smooth Twigrush | | | | S3S4 | 73 | 15.5 ± 0.0 | NB |
| P | *Cyperus dentatus* | Toothed Flatsedge | | | | S3S4 | 126 | 23.9 ± 0.0 | NB |
| P | *Eleocharis quinqueflora* | Few-flowered Spikerush | | | | S3S4 | 10 | 47.7 ± 0.0 | NB |
| P | *Rhynchospora capitellata* | Small-headed Beakrush | | | | S3S4 | 21 | 55.8 ± 0.0 | NB |
| P | *Trichophorum clintonii* | Clinton's Clubrush | | | | S3S4 | 26 | 28.3 ± 0.0 | NB |
| P | *Bolboschoenus fluviatilis* | River Bulrush | | | | S3S4 | 59 | 37.7 ± 0.0 | NB |
| P | *Triglochin gaspensis* | Gasp ├⌐ Arrowgrass | | | | S3S4 | 21 | 8.4 ± 0.0 | NB |
| P | *Lilium canadense* | Canada Lily | | | | S3S4 | 84 | 34.1 ± 0.0 | NB |
| P | *Triantha glutinosa* | Sticky False-Asphodel | | | | S3S4 | 6 | 36.6 ± 0.0 | NB |
| P | *Corallorhiza maculata* | Spotted Coralroot | | | | S3S4 | 15 | 29.9 ± 0.0 | NB |

| Taxonomic Group | Scientific Name | Common Name | COSEWIC | SARA | Prov Legal Prot | Prov Rarity Rank | # recs | Distance (km) | Prov |
|---|---|---|---|---|---|---|---|---|---|
| P | *Liparis loeselii* | Loesel's Twayblade | | | | S3S4 | 18 | 9.9 ± 0.0 | NB |
| P | *Neottia cordata* | Heart-leaved Twayblade | | | | S3S4 | 21 | 3.2 ± 0.0 | NB |
| P | *Platanthera obtusata* | Blunt-leaved Orchid | | | | S3S4 | 41 | 3.2 ± 0.0 | NB |
| P | *Platanthera obtusata ssp. obtusata* | Blunt-leaved Orchid | | | | S3S4 | 1 | 58.4 ± 0.0 | NB |
| P | *Calamagrostis pickeringii* | Pickering's Reed Grass | | | | S3S4 | 121 | 8.9 ± 0.0 | NB |
| P | *Calamagrostis stricta* | Slim-stemmed Reed Grass | | | | S3S4 | 3 | 35.9 ± 2.0 | NB |
| P | *Eragrostis pectinacea* | Tufted Love Grass | | | | S3S4 | 10 | 36.6 ± 0.0 | NB |
| P | *Stuckenia filiformis* | Thread-leaved Pondweed | | | | S3S4 | 7 | 36.4 ± 2.0 | NB |
| P | *Potamogeton praelongus* | White-stemmed Pondweed | | | | S3S4 | 12 | 36.4 ± 1.0 | NB |
| P | *Potamogeton richardsonii* | Richardson's Pondweed | | | | S3S4 | 28 | 36.4 ± 1.0 | NB |
| P | *Xyris montana* | Northern Yellow-Eyed-Grass | | | | S3S4 | 29 | 10.4 ± 0.0 | NB |
| P | *Cryptogramma stelleri* | Steller's Rockbrake | | | | S3S4 | 3 | 36.6 ± 0.0 | NB |
| P | *Asplenium viride* | Green Spleenwort | | | | S3S4 | 16 | 31.2 ± 0.0 | NB |
| P | *Dryopteris fragrans* | Fragrant Wood Fern | | | | S3S4 | 4 | 36.1 ± 0.0 | NB |
| P | *Equisetum palustre* | Marsh Horsetail | | | | S3S4 | 7 | 44.2 ± 0.0 | NB |
| P | *Polypodium appalachianum* | Appalachian Polypody | | | | S3S4 | 12 | 30.8 ± 1.0 | NB |
| P | *Polygonum oxyspermum ssp. raii* | Ray's Knotweed | | | | SH | 1 | 90.2 ± 5.0 | NS |
| P | *Montia fontana* | Water Blinks | | | | SH | 4 | 23.3 ± 1.0 | NB |
| P | *Solidago caesia* | Blue-stemmed Goldenrod | | | | SX | 2 | 39.1 ± 1.0 | NB |
| P | *Celastrus scandens* | Climbing Bittersweet | | | | SX | 1 | 98.1 ± 100.0 | NB |
| P | *Carex swanii* | Swan's Sedge | | | | SX | 76 | 49.3 ± 1.0 | NB |

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# Appendix F

## NB Power Corporate Procedure for the Accidental Discovery of Archaeological Resources and Human Remains

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|---|---|---|---|
| **Process Owner:** | Christina LaFlamme | **Final Approver:** | Chantal St-Pierre |
| **Title:** | EIA Specialist | **Title:** | Director of Environment |
| **Signature:** | APPROVED | **Signature:** | APPROVED |

**Purpose:**

The purpose of this procedure is to:

- provide guidelines that must be followed in the event of the accidental discovery of archaeological resources or human remains at a New Brunswick Power Corporation (NB Power) work site

**Scope:**

This procedure applies to all Divisions at NB Power, including contractors and subcontractors performing work for NB Power.

At the discretion of the EMS Coordinator(s) within each Division, additional information may be included in site specific documentation. Given the regulatory oversight by the Canadian Nuclear Safety Commission, and associated requirements, Point Lepreau may have other documented procedures and/or processes above and beyond the requirements of this document.

**References:**

- Project Specific Environmental Management Plan (PSEMP) – created uniquely for each project
- First Nations Cultural Awareness and Orientation Training – provided to give broad understanding of New Brunswick Indigenous Culture, History, and World View.
- Appendix A: Accidental Discovery of Human Remains Flowchart
- Appendix B: Accidental Discovery of Archaeological Resources Flowchart

**Definitions:**

**Archaeological field research** is any activity carried out on, above or under land or water for the purpose of obtaining and documenting data or recovering archaeological objects, burial objects or human remains or any other evidence of past human use or activities, and includes monitoring, assessing, exploring, surveying, recovering and excavating.

**Archaeological resource** is a pre-contact and/or historical artifacts archaeological features or sites.

**Archaeological site** is an area where one or more archaeological resources have been identified.

**Artifacts** is an object made or altered by human activity.

**Burial ground** is a place that has been used for the placement of human remains or burial objects, but does not include a cemetery.

**Features** is evidence of human activities at a site which are visible as disturbances in the soil. Something of human manufacture other than an easily excavated tool or other object, such as a wall, drain, well, or fire hearth.

**First Nation** is an Indigenous People sharing a common traditional territory and having a common traditional language, culture and lands.

**Historic (Post-Contact)** refers to the time period in New Brunswick after European contact (post 1604). (French Acadians, English, Loyalists, Post-Loyalists, and Euro-Canadians).

**Human remains** are the skeletal, cremated or any other traces of human bodies.

**Kopit Lodge** is a Mi'kmaq Not for Profit conservation group from Elsipogtog First Nation.

**Mi'gmawe'l Tplu'taqnn Incorporated** (MTI) represents eight of nine Mi'kmaq communities in New Brunswick in all consultative matter.

**Peskotomuhkati** is the Peskotomuhkati Nation at Skutik.

**Pre-Contact (Pre-Historic)** refers to the time period in New Brunswick prior to European contact (pre 1604). (Native Aboriginal Peoples -First Nations).

**Structures** refer to dwellings, buildings, bridges, and fences.

**Wolastoquey Nation in New Brunswick** (WNNB) represents the six Wolastoquey Nations in New Brunswick in all consultative matters.

**Responsibilities:**

The ***Project Manager, Construction Manager and/or Superintendent*** are responsible for:

- issuing and revoking temporary stop work order
- notifying the Local Police Agency and NB Power Communications
- coordinating with Local Police Agency during evidence recovery phase and Archaeological Services Unit (ASU)/ archaeologist during field study
- coordinating with local First Nations (if required)

The ***Job Supervisor*** is responsible for:

- immediately stopping all work at the discovery site
- cordoning off the work site and designating it "No Entry Zone"
- ensuring that remains are covered properly and that all employees exit via common route
- assisting Local Police Agency and/or ASU or licensed archaeologist, as required
- overseeing the return to work conditions

The ***Environmental Monitor*** is responsible for:

- immediately ceasing all work and following instruction of Job Supervisor
- assisting Local Police Agency and/or ASU or licensed archaeologist, as required
- overseeing the return to work conditions

The ***Indigenous Monitor*** is responsible for:
- immediately ceasing all work and following instruction of Job Supervisor
- assisting Local Police Agency and/or ASU or licensed archaeologist, as required
- communicating with the First Nations consultative body
- overseeing the return to work conditions

***Site Workers and Labourers*** are responsible for:
- immediately ceasing all work and following instruction of Job Supervisor
- exiting work site via common route and assembling at muster area
- returning to work when instructed

**Introduction:**

Ground disturbance activities associated with any undertakings NB Power is involved in, through planning of Projects, maintenance of existing infrastructure (including emergencies) or carrying out day-to-day business have the potential to lead to the accidental discovery of archaeological resources. Archaeological resources vary substantially from tools/materials (stone, metal, etc.) at the lower end of the scale through to more substantial finds such as human remains. Although the latter is extremely rare in occurrence, this procedure has been developed to assist and guide personnel on steps to be taken should resources be unearthed.

Key features of this procedure include the immediate cessation of all work within thirty metres (30 m) of the discovery and the requirement for the Site Superintendent (or their designate) to contact the local Police Agency should the identification of human remains be made. The ensuing investigation will determine whether the human remains are the result of criminal activity and a matter for the Department of Justice or rather historical/ archaeological in nature.

In instances whereby culturally significant material is identified, temporary cessation of the activity will commence with proper notification and involvement of First Nations in determining next steps, in collaboration with the Archaeological Services Unit (ASU) of the Archaeology and Heritage Branch.

**Procedure:**

This procedure is divided into several sections depending on the nature of the discovery (i.e., archaeological resource or human remains). The first section outlines the general steps taken regardless of the discovery at an NB Power work site.

**Indigenous or Enviro. Monitor or Construction Manager**

1. Immediately Notify the Project Manager of the discovery.

**Construction or Project Manager**

2. Stop all work at the discovery site and secure/designate the site as “No Entry Zone”. NOTE: In the event human remains are identified, they are not to be disturbed (regardless of location) and are to be covered with a cloth or non-plastic tarp to preserve the integrity

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| | of the scene. Should the remains be discovered in the bucket of an excavator, the equipment must be left "as is" and not emptied. |
| | 3. Ensure non-essential personnel exit the site via a common path and assemble at the closest muster area to await further instructions. |
| **Construction Manager** | 4. Issue a temporary written stop work order for any activities within thirty metres (30 m) of the discovery site. |
| **Construction/ Project Manager** | 5. Notify Corporate First Nation Affairs Department to ensure First Nations are advised of the discovery. In the event the discovery is human remains, notify local Police Agency (RCMP or Municipal Force) immediately of the discovery and arrange for a site visit to assess whether the human remains are the result of criminal activity and a matter for the Justice Department or historical/archaeological in origin and under the jurisdiction of the Archaeological Services Unit. |
| | 6. Notify NB Power Communications at Head Office and provide available information on the discovery. |
| **Local Police Agency** | Depending on the nature of the discovery, refer to the appreciate section for next steps: |
| | **A. HUMAN REMAINS RESULT OF CRIMINAL ACTIVITY** |
| **NB Power Personnel** | 1. Assume care, custody, and control of the site at all times. |
| **Local Police Agency** | 2. Collect evidence, conduct field interviews, and gather other relevant information with assistance from other Departments as required (i.e. Coroner; Anthropologist; Archaeologist). |
| **Project/Construction Manager/ Superintendent** | 3. Assist Local Policy Agency, if requested. |
| **Construction Manager** | 4. Once field work is complete, remove human remains and return custody of the work site to the Project or Construction Manager/ Superintendent. |
| **ASU** | 5. Revoke "Stop Work Order" and resume work at the discovery site. |
| | **B. HUMAN REMAINS ARE HISTORICAL/ARCHAEOLOGICAL IN ORIGIN** |
| | 1. Contacts ASU and make arrangements for field study. |
| | 2. Upon arrival on-site, review the protection measures and excavation plan. |
| | 3. Notifies WNNB, MTI, Peskotomuhkati and Kopit Lodge of the discovery (if appropriate). These representatives would in turn notify the closest First Nation of the discovery and invite them to attend the site. |

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| **NB Power, ASU, and Field Archaeologist** | 4. Collect and catalogue the discovery (with the assistance of an Elder from the closest First Nation if appropriate). Removal of the human remains would proceed only under the direction of the ASU representative. |
| **Project /Construction Manager** | 5. Make a determination regarding the status of the stop work order and inform the Project Manager /Construction Manager. |
| **ASU/Field Archaeologist** | 6. Revoke stop work order and resume construction activities as per normal operating procedures. |
| **Construction Manager** | 7. Prepare assessment report and provide copies to NB Power as well as WNNB, MTI, Peskotomuhkati and Kopit Lodge and the closest First Nation (if appropriate). |
| | **C. PRE-CONTACT ARCHAEOLOGICAL RESOURCE** |
| **ASU/First Nations Field Monitor** | 1. Contact the First Nation Affairs Field Monitor and ASU. |
| | 2. Upon arrival on-site, review the protection measures and excavation plan. |
| **ASU/Field Archaeologist** | 3. Notify WNNB, MTI, Peskotomuhkati, and Kopit Lodge of the discovery (if appropriate). These representatives would in turn notify the closest First Nation of the discovery and invite them to attend the site |
| **Project/ Construction Manager** | 4. Collect and catalogue the discovery (with the assistance of an Elder from the closest First Nation if appropriate). It should be noted that the removal of the pre-contact archaeological resource would proceed only under the direction of the ASU representative. In addition, NB Power, ASU, and the Field Archaeologist would make a determination regarding the status of the stop work order and notify the Project Manager/Construction Manager. |
| **ASU/Field Archaeologist** | 5. Revoke stop work order and resume construction activities as per normal operating procedures. |
| **Construction Manager** | 6. Prepare assessment report and provide copies to NB Power as well as WNNB, MTI, Peskotomuhkati, and Kopit Lodge and the closest First Nation (if appropriate). |
| **ASU/Field Archaeologist** | **D. POST-CONTACT ARCHAEOLOGICAL RESOURCE**<br>1. Contact ASU and the Field Archaeologist and advise of the discovery. |
| | 2. Upon arrival on-site, review the protection measures and excavation plan. |
| **NB Power, ASU, and Field Archaeologist** | 3. Collect and catalogue the discovery. It should be noted that the removal of the post-contact archaeological resource would proceed only under the direction of ASU representative. |
| | 4. Make determination regarding the status of the stop work order and notify the Project Manager / Construction Manager. |

**Project/ Construction Manager**

5. Revoke stop work order and resume construction activities resume as per normal operating procedures.

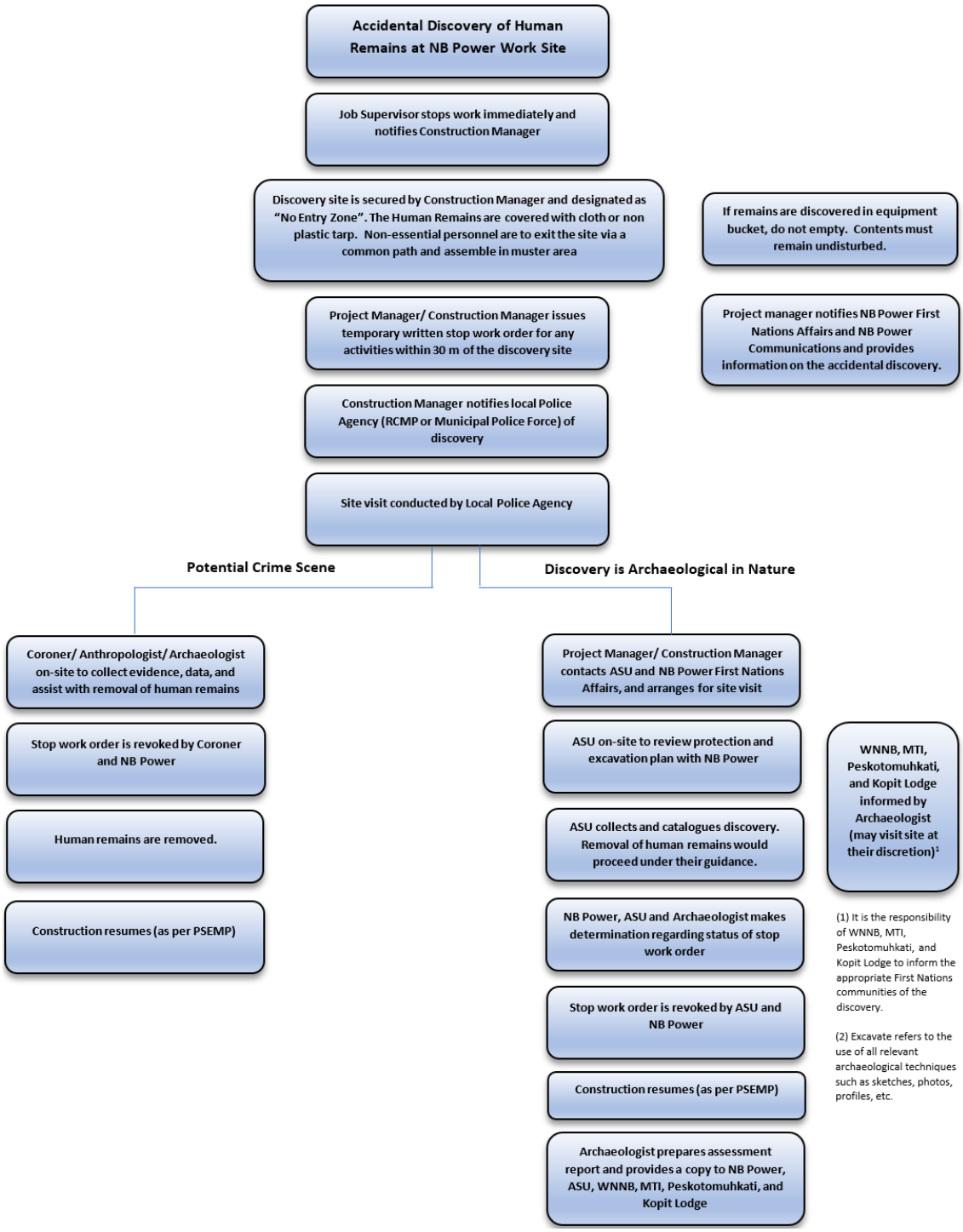
**ASU/Field Archaeologist**

6. Assessment report is prepared by ASU/ field archaeologist

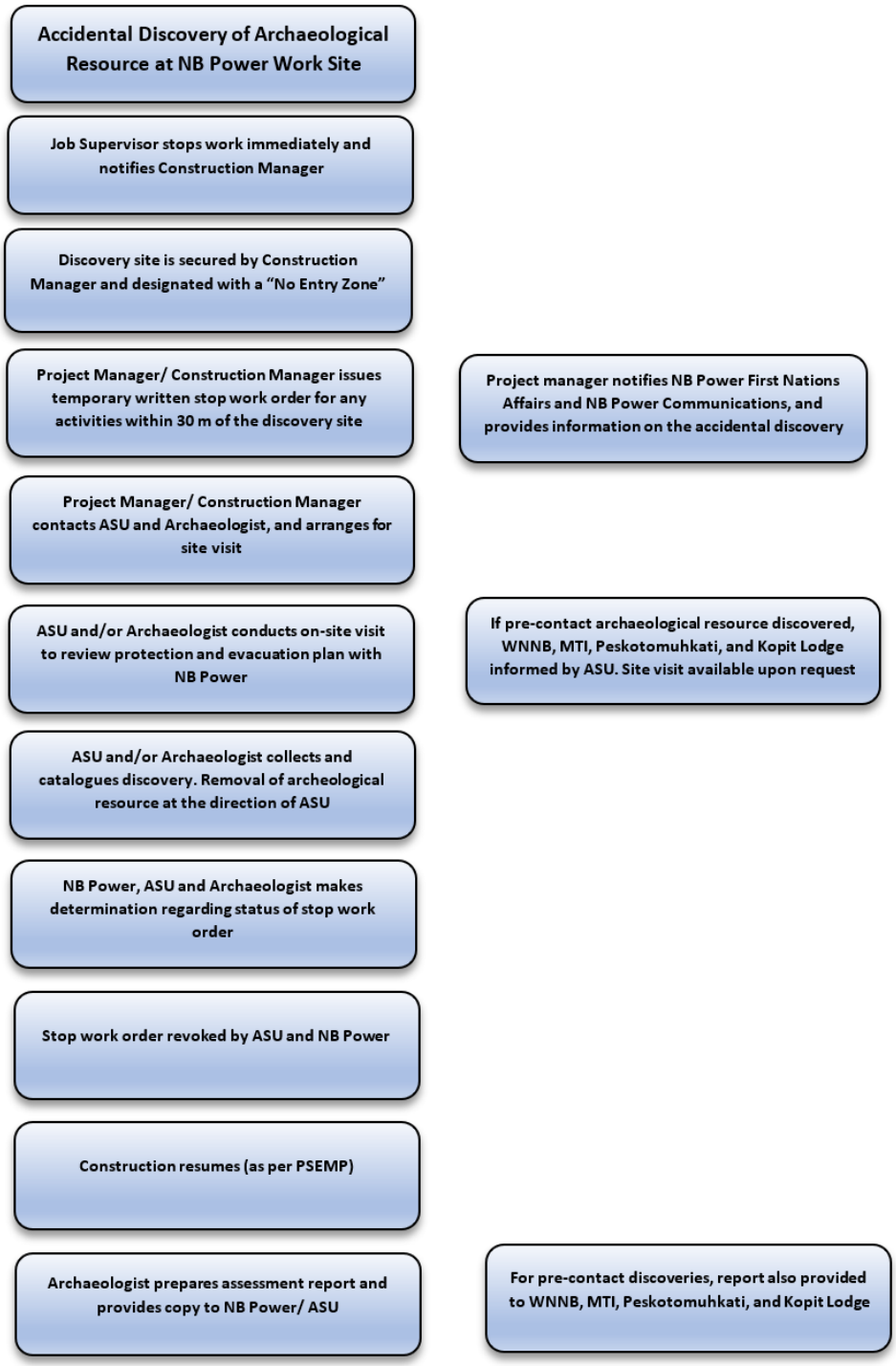
**Revision History:**

| Revision Number | Revised Section (s) | Revision Summary | Prepared / Revised by: | Effective Date: (YYYY/MM/DD) |
|---|---|---|---|---|
| 00 | New | New procedure | C. LaFlamme | 2022/02/02 |
| | | | | |

## APPENDIX A: ACCIDENTAL DISCOVERY OF HUMAN REMAINS FLOWCHART



## APPENDIX B: ACCIDENTAL DISCOVERY OF ARCHAEOLOGICAL RESOURCE FLOWCHART

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