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Tailings Expansion Project Terrestrial Biophysical Assessment

REF # 142-039

Prepared for:

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20
YEARS



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1.0 Introduction

Tacora Resources Inc.'s (Tacora) Scully Mine is in Wabush, NL, in western Labrador, and consists of open pit mining operations, concentrator and support facilities, waste rock and tailings management facilities, and a spur railway line that connects to the Quebec North Shore and Labrador (QNS&L) Railway. The iron concentrate is transported by rail to a pelletizing plant in Pointe Noire (Sept-îles), QC, for processing and shipment throughout North America and Europe.

Waste products generated by the milling include millions of tonnes of thickened tailings annually, which are deposited into Flora Lake under a license originally provided by the province of Newfoundland (Order 410-62), and currently under approval by the Newfoundland and Labrador Department of Environment and Climate Change (NLDECC). Historically, tailings were deposited on land in the Flora Lake watershed until Flora Lake was divided into distinct North and South Basins. Regulatory approvals were finalized in 2009 through the Schedule 2 process under the Metal and Diamond Mining Effluent Regulations (MDMER), formally designating Flora Lake and portions of its watershed as the Flora Tailings Impoundment Area (TIA). The Flora TIA included the South Basin, the North Basin and associated tailings-covered areas, which have a total surface area of approximately 23.1 km². Thickened tailings are deposited into the South Basin which acts as a settling pond.

Tacora has developed a feasibility study to demonstrate proven iron ore reserves to support continual mining to an estimated end life of mine (ELOM) of 2047. The tailings deposition plan to ELOM of 2047 determined that Tacora will require additional tailings storage capacity beyond the currently approved TIA. The proposed tailings expansion entails the continuation of disposal of tailings in the same manner as current operations, within the same watershed, and into new areas south of the currently approved TIA. The tailings deposition plan indicated that 605 ha to the south of the existing operations will be infilled, resulting in the elimination of 724 hectares of terrestrial habitat (Figure 1.1), including the areas flooded beyond the extent of the tailings. This Project requires the alteration and conversion of habitats within the terrestrial environment. Subsequently, a comprehensive field program was undertaken to ensure that all potential Valued Ecosystem Components (VECs) were studied in the Project Area, including birds, mammals, Species at Risk (SAR), amphibians, rare flora, and an Ecological Land Classification (ELC).

Tacora submitted an Environmental Assessment (EA) Registration on July 21, 2021, to provide regulators with details of the proposed tailings expansion project. Tacora was subsequently released on March 31, 2022, from the EA subject to several conditions and requirements. To follow through on commitments in the EA Registration document, Sikumiut Environmental Management Ltd. (SEM) conducted detailed field and desktop studies to document existing features in the footprint of the proposed tailings expansion.

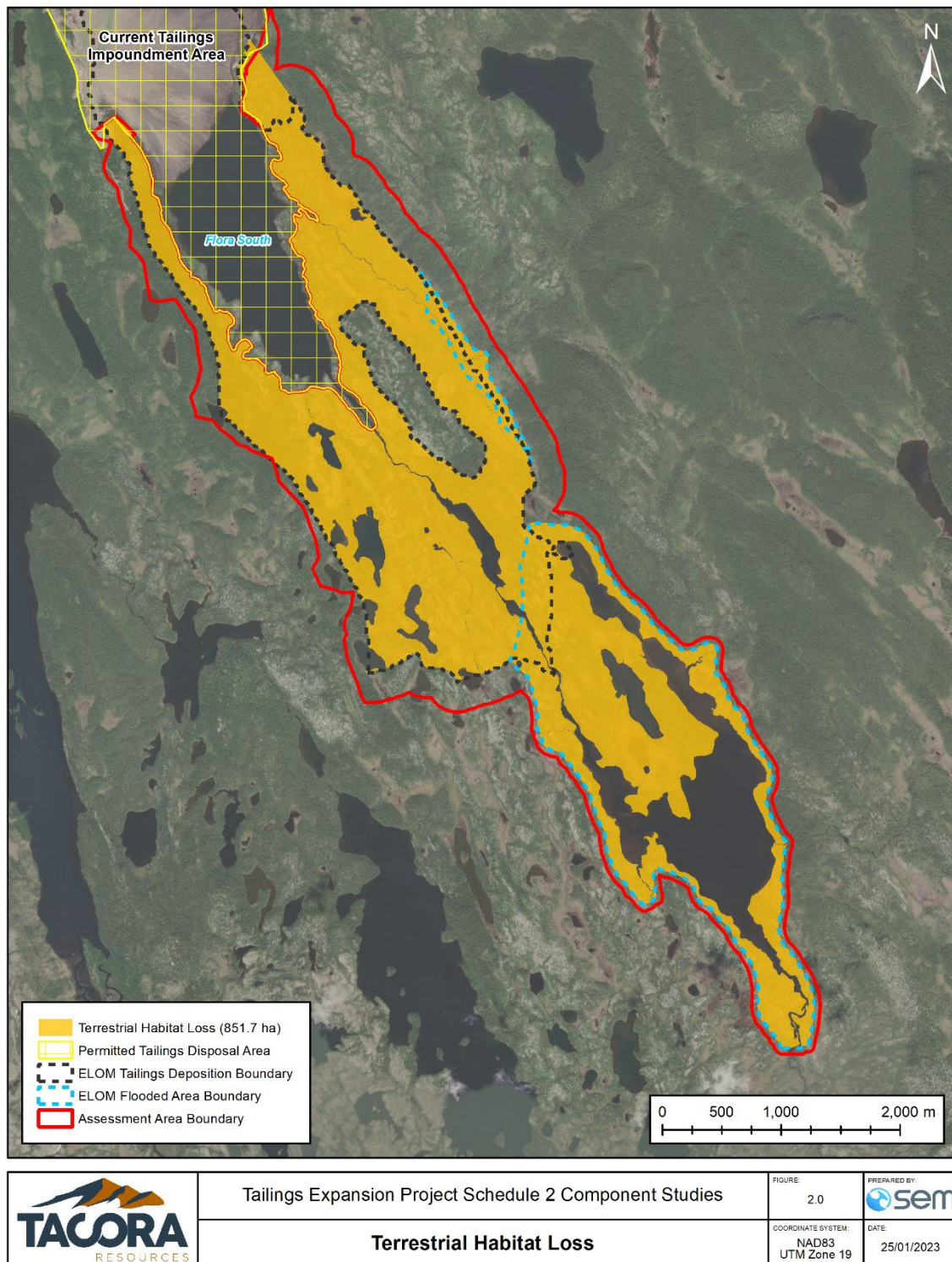


Figure 1.1 Habitat to be Impacted by Tacora's Proposed Tailings Expansion.

1.1 Relevant Legislation

Several pieces of federal and Provincial legislation pertain to the terrestrial VECs associated with this Project. The following sections describe those acts and regulations.

1.1.1 Federal Regulations

1.1.1.1 *Migratory Birds Convention Act and Regulations*

The *Migratory Birds Convention Act (MBCA)* prohibits killing or harming individuals or destroying the eggs or young of several Families of migratory bird species. This Act protects most bird species known in and around the Project Area and Labrador West, with some exceptions. Those species not protected under the *MBCA* are afforded protection under provincial legislation.

1.1.1.2 *Species at Risk Act*

The Canadian *Species at Risk Act (SARA)* protects SAR in Canada. *SARA* provides a framework to facilitate recovery of species listed as Threatened or Endangered and aims to prevent species listed as Special Concern from becoming Threatened or Endangered. SAR habitats are also protected under *SARA*, prohibiting the destruction of critical habitat of an Endangered or Threatened SAR. Species designated as Special Concern are not protected by the prohibitions of *SARA*, but provincial or regional management plans are developed to protect these species. *SARA* is one of three major components in the Government of Canada Strategy for the Protection of Species at Risk. The other two components are the Habitat Stewardship Program and the Accord for the Protection of Species at Risk. There are over 300 wild plant and animal species protected under the Act. No approvals or permits under *SARA* were required with respect to this Project.

1.1.2 Provincial Regulations

1.1.2.1 *Wild Life Act*

The *Wild Life Act* gives protection to wildlife and prohibits the hunting, taking, or killing of wildlife for specific places, times, and methods (with certain exemptions for permit and licence holders). The Act allows for the management and the regulation of activities relating to the taking and trading of wildlife, primarily game animals and furbearer species. The *Wild Life Regulations* provide supplementary information pertaining to individual species and groups.

1.1.2.2 *Endangered Species Act*

The Newfoundland and Labrador *Endangered Species Act* (NL *ESA*) lists and provides regulations on SAR and is intended to protect plant and animal species listed as Endangered, Threatened, or Vulnerable in NL. Management and recovery plans are developed under the NL *ESA* to attempt to prevent further declines and promote recovery. This *Act* applies to native species, subspecies, and populations (not marine fish, which are under federal jurisdiction). Recommendations from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the Species Status Advisory Committee are considered in designation under the NL *ESA*.

2.0 Methods

2.1 Study Team

SEM assembled a Study Team of qualified and experienced professionals for the terrestrial biophysical assessment. The Study Team and their roles are identified in Table 2.1

Table 2.1 SEM Study Team.

Team Member	Title	Role
Steve Gullage	VP Environment and Climate Change	Project Management, Client Liaison, Field Studies
Stephen Rowe	VP Innovation & Growth	RPAS Surveying and Operations
Chris Hearn	Terrestrial Biologist	Field Studies
Colin Bursey	GIS Analyst	Ecological Land Classification, Map Preparation, GIS
Brittany Connolly	Environmental Scientist	Reporting, Data Compilation & Analysis, QA/QC
Derrick Mitchell	Terrestrial Ecologist	Rare Flora Survey

2.2 Scope of Work

The Scope of Work included the quantification and classification of terrestrial habitats within the boundary of the projected expansion area (851 ha). A comprehensive biophysical assessment was completed for the Project Area to determine the existing habitats (ecotypes) with an Ecological Land Classification, the wildlife species using the Project Area, and any rare flora that exist on-site.

Several desktop and field surveys contributed to the data for this biophysical assessment, including the following components, or 'Valued Ecosystem Components' (VECs):

- Ecological Land Classification
- Wetlands
- Rare Flora
- Avifauna, including:
 - Passeriformes and Other Perching Birds
 - Raptors
 - Waterfowl and Waterbirds

- Mammals
- Amphibians
- Species at Risk and Species of Conservation Concern

Prior to field efforts, a data request was submitted to the Atlantic Canada Conservation Data Centre (ACCDC) to develop a preliminary list of rare species and Species of Conservation Concern (SCC). The ACCDC compiles provincial lists of plants and animals and assigns an “S-rank”, or conservation status rank, along with the legal status for each species if they are also a SAR (Atlantic Canada Conservation Data Centre 2012). The S-rank definitions can be found in Appendix A.

The ACCDC data request typically includes a 5 km radius within the Project Area, and indicates rare species known to occur or are possible within the Project Area (Figure 2.1).

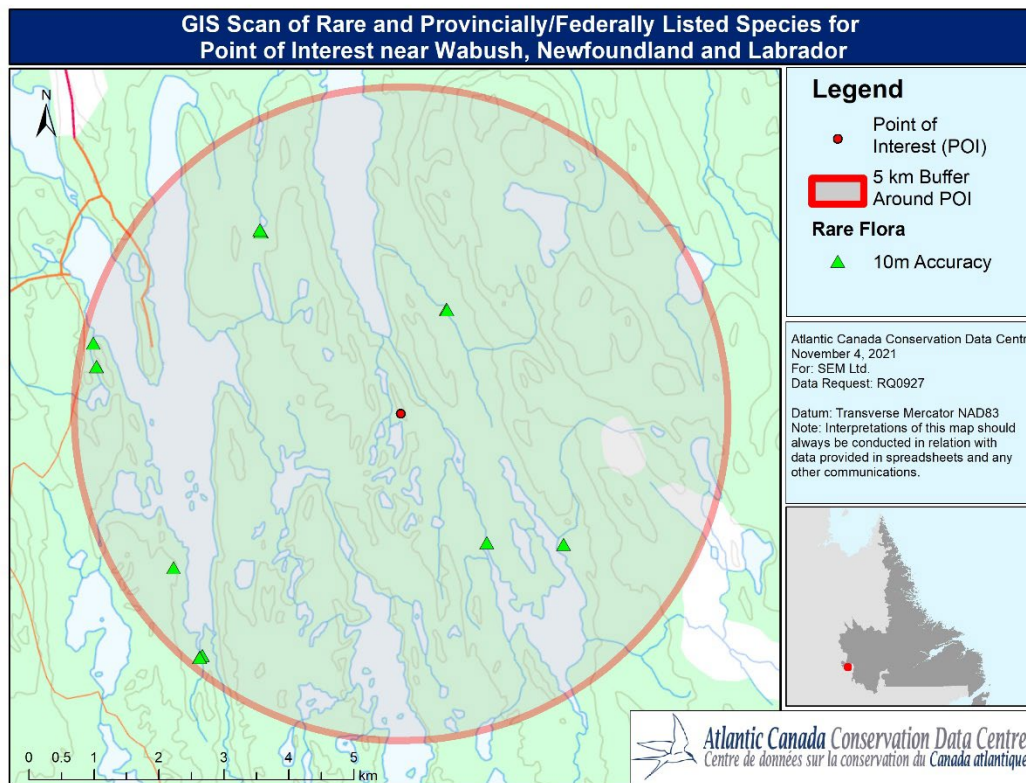


Figure 2.1 ACCDC GIS Scan of Rare and Provincially/Federally Listed Species within the Project Area.

The list of rare species generated from the ACCDC request was assessed and habitat associations were compiled for each rare species (S3 to S1), which facilitated the planning of field studies to focus the Rare Flora survey efforts on those habitat types.

2.3 Ecological Land Classification

SEM employed a two-method approach for the identification of the habitat types that exist throughout the Project Area; first, a comprehensive literature review and data compilation exercise was conducted to compile existing information on the Project Area, at both regional and local scales. Secondly, detailed ELC mapping was completed for the Project Area. For this classification, SEM utilized high-resolution colour imagery collected with a SenseFly eBee remotely piloted aircraft system (RPAS). The resulting imagery dataset was comprised of a series of high-resolution digital images (3.3 cm/pixel) captured directly from the sensor onboard the RPAS (in stereo). The orthorectified imagery was imported into ArcGIS for interpretation. Digital stereo viewing software aided interpretation and the digitization of polygon information (e.g., habitat types). Unique fine-scale habitats tend to have elevated potential for the occurrence of rare wildlife and plants species, and many such species have specific habitat associations. Habitat types were therefore used to determine areas of heightened potential for the occurrence of rare species (e.g., wetlands, rock outcrops).

Habitat polygons were interpreted at a scale of 1:5,000 using the high-resolution digital imagery and information gathered from ground-truthing efforts in the field. Information was captured consistently based on a static zoom level with the interpreter defining homogeneous regions for each targeted ecotype. Digitization of polygons was supplemented by a point file within ArcGIS that was populated with attribute information related to each vegetation polygon. This centroid point data was entered based on the interpreter's field experience and familiarity with regional ecotypes and information collected from the field.

Ecotypes were verified in the field by sampling predetermined sampled points plotted during the boundary interpretation stage. Field verification facilitated the production of a characterization of ecotypes, including species composition. Information gathered in the field was used to refine ecotype boundaries and aggregate ecotypes based on similar characteristics.

2.4 Wetlands

Wetlands in Labrador West can be characterized (according to the Canadian Wetland Classification System (CWCS)) into five classes: (i) bog; (ii) fen; (iii) swamp; (iv) marsh; and (v) shallow-water wetlands (CWCS 1997). The five classes fit into two larger categories known as *organic wetlands* and *mineral wetlands*, referring to their accumulation of peat (i.e., present in organic, void in mineral). From SEM's experience conducting several surveys and assessments in the Labrador West region, it was hypothesized that most of the wetlands occurring in Flora Basin would be predominately organic in nature, consisting largely of fens.

The CWCS standardizes wetland classification which facilitates the identification of wetlands with ecological values and functions (i.e., some wetland types are typically more biodiverse and ecologically functional than others) which is also useful for identifying habitats with an elevated potential to contain rare and/or uncommon plant species. To complete the wetland surveys and further classify the wetlands for habitat suitability for various species an expert-level botanist and a wildlife biologist visited each accessible wetland throughout the Project Area.

2.5 Rare Flora

The rare flora VEC required the identification of any rare species in the Project Area. This study began with an information query to the ACCDC to obtain a rare species list of records for a 5 km radius around the Project Area, and a desktop analysis of habitat types within the Project Area, with the purpose of predicting those of higher probability of occurrence. SEM compiled a list of rare flora that could exist in the Project Area (based on the ACCDC list) and a map of wetlands and other specialized habitats like rock outcrops, talus slopes, cliffs, watercourses, and old-growth forests which also have elevated potential for rare flora species. Rare flora species in Labrador are most often associated with wetland habitats, which are interspersed throughout the entirety of the Project Area.

The field component of the rare vascular plant survey was conducted from August 18-24, 2021, during the peak time for observing most species of flowering vascular plants in the region. A targeted approach was undertaken to increase efficiency and ensure sufficient coverage for each habitat type and the target habitats. Locations of rare plants were recorded using a handheld GPS and first sightings of each species (regardless of rarity) were documented as per NL Wildlife Division (NLWD) protocol. The number of individuals of each rare species was estimated at each discrete site to indicate the abundance of individuals of the species and the extent of the habitat occupied. Specimens or portions of the plant were collected if a species could not be identified in the field and were subsequently identified in the laboratory using various botanical keys and optical equipment.

2.6 Avifauna

Resident and migratory species of birds in the Wabush area include representatives from the bird Orders Anseriformes (Waterfowl), Galliformes (Gamebirds), Gaviiformes (Loons), Accipitriformes (Raptors), Charadriiformes (Shorebirds), Columbiformes (Doves), Strigiformes (Owls), Caprimulgiformes (Nightjars), Coraciiformes (Kingfishers), Piciformes (Woodpeckers), and Passeriformes (Perching Birds). Most Families of birds are federally protected by the MBCA (1994) including all waterfowl species, shorebirds, woodpeckers, and most families of perching birds. Several species are listed on Schedule 1 of SARA and the NL ESA, including Bank Swallow (*Riparia riparia*) which is known from other locations on Tacora's

property. Raptors and owls are not protected under the MBCA but are protected by Provincial legislation under the *Wild Life Act* (1990).

Additional protection for migratory birds is now incorporated under the Migratory Birds Regulations, 2022 (MBR). These regulations list 18 species on Schedule 1 which will have enhanced protections including the multi-year protection of nests. In Newfoundland, this subset of protections primarily pertains to marine shorebirds or waterbirds that nest on the coast or have specific habitat types that do not occur in Labrador West. However, if any of these species were observed in the Project Area it would be documented and species-specific surveys would be completed (MBR 2022).

To determine the resident and migratory species of birds using the Project Area, SEM employed a multifaceted approach to assess the presence/absence and relative abundance of the species. A desktop data/information compilation exercise was conducted before field surveys to gather information for the species previously known within or near the Project Area, and throughout the region. A component of this desktop study included a review of the ACCDC data query results for the Project Area. Secondly, field survey maps were generated using ArcGIS with demarcated Project Area boundaries. Finally, a comprehensive bird survey was conducted from June 22-28, 2021 (peak breeding season) to produce an inventory of the maximum number of species (i.e., species richness) using the Project Area. The atlassing approach combines several bird survey techniques to maximize the likelihood of detection across multiple bird groups and species. All the habitat types in the Project Area were surveyed and effort was stratified according to the prevalence and/or significance of each habitat. All auditory and visual observations were recorded including breeding evidence (e.g., carrying nest material or food, courtship, etc.) using codes for breeding birds visible in Appendix B, numbers of individuals observed, and the direction and distance from the transect line.

2.6.1 Passeriformes and other Perching Birds

Surveys for Passeriformes and other Perching Birds were conducted during the transect surveys throughout the Project Area. Surveys were conducted documenting observations of birds through visual and auditory detection and were recorded according to the type of observation (i.e., song/call/drum/visual), and the location of each.

During the ground surveys, the transect walking pace depended upon habitat type, topography, and the number of detections (i.e., bird activity). Surveys began after sunrise and ended depending on the weather, the temperature, and the perceived activity of birds. Surveys were not conducted in inclement weather (e.g., heavy wind or rain) as it can reduce the detectability of birds.

2.6.2 Raptors and Owls

Concurrent with Passerines and Perching bird surveys throughout the Project Area, SEM integrated a raptor survey component by strategically conducting ten-minute sky scans in appropriate locations (i.e., areas of open canopy) to determine if any raptors were flying overhead. Raptors and owls were also surveyed based on visual and auditory detections concurrent with the atlassing surveys.

In addition, SEM conducted an aerial transect survey with a RPAS to identify any potential raptor nests within the Project Area. The nests of some raptors are large and can be identified while observing the forest stands from above. These nests are difficult to survey from the ground since the areas of large mature forests above the canopy cannot be seen easily by observers travelling below. Since nest site fidelity across years is common for many raptor species, nests of large raptors can be identified from the resulting high-resolution imagery collected by the RPAS. Both a SenseFly eBee fixed-wing RPAS and a rotary-style RPAS were used to conduct these nest site surveys (Beardsell *et al.* 2016). The subsequent “orthomosaic” of the area has excellent resolution (3.30 cm/pixel) and was thoroughly investigated for nests. These images were processed using Pix4D photogrammetry software.

In situations where a thorough conclusion could not be determined, rotary RPAS flights were completed to obtain a more detailed survey. The DJI M210 RPAS, equipped with a Zenmuse Z30 zoom camera, was employed for this purpose.

2.6.3 Waterfowl and Waterbirds

Using the data obtained from a desktop review, including the ACCDC files requested, SEM created a list of the waterfowl and waterbirds possibly using the Project Area. A GIS exercise was completed to identify wetlands and other waterbodies in the Project Area to focus efforts and visual scan locations. In addition, aerial images from the previously created orthomosaic were examined to determine potential habitats. Each suitable wetland/waterbody within the Project Area was surveyed by the SEM ornithologist and accompanying biologist as they completed 15-minute scans of the shorelines and open water using high-quality optics. Observations were made of species, number of individuals, sex, and breeding evidence that occurred during the surveys.

Any waterfowl species incidentally observed during other avian surveys including flyovers or auditory detections were also documented to incorporate into the waterfowl data. For example, the wetlands were all revisited during the Rare Plants survey, and additional waterfowl/waterbird observations were added to the database from that effort.

2.7 Mammals

A diverse suite of mammal species is associated with the boreal forest and surrounding ecoregion in Labrador West. Historical data was obtained through desktop research and from SEM's database of former work completed for Tacora. In addition, the ELC was cross-referenced with the known mammal species' habitat preferences to obtain a preliminary list of probable mammal species for the Project Area.

Two cycles of baseline wildlife surveys were conducted by wildlife biologists from June 22-28 and from August 18-24, 2021. Survey transects extended the full length of the Project Area with proportional coverage of all the habitat types. Additional transects were added on existing trails and around cabins within the Project Area, as anthropogenic corridors are known to be favoured by many species of wildlife (Latham and Boutin 2015). SEM biologists recorded empirical data on wildlife and wildlife signs, including those regarding small mammals, furbearers, and large mammals like black bear (*Ursus americanus*), and moose (*Alces alces*). Signs of mammalian wildlife observed included tracks, trails, scat, browsing evidence, den construction, tunnelling, bark scaling, and auditory detections. The abundance of these signs can indicate the relative level of use of the Project Area for the various mammal species and give an estimator of approximate relative abundance.

Bat species known from the Labrador West area, Little brown bat (*Myotis lucifugus*) and Northern Myotis (*Myotis septentrionalis*), were emergency listed in 2014 under SARA because of rapid population declines, primarily attributed to the impacts of White Nose Syndrome (WNS), a contagious disease that evokes bats from hibernation during winter, inevitably ending in death (COSEWIC 2013; ECCC 2018). Hoary Bat (*Lasiurus cinereus*) may also use the Project Area as it has been detected in Labrador West, but it is unknown if the area is significant for this species.

Due to this conservation concern regarding bats and the potential for this Project to interact with SAR bats and/or bat habitats, SEM conducted a dedicated survey by deploying Anabat Swift detectors in appropriate habitats throughout the Project Area in the summers of 2021 and 2022. Before deployment, GIS was used to identify high-potential areas (i.e., potential foraging areas adjacent to waterbodies and wetlands) that would be suitable for deployment (and somewhat accessible for changing SD cards and batteries). Five (5) detectors were deployed in 2021 and six were deployed in 2022. Some of the locations were changed in 2022 to obtain data for a greater number of wetlands and/or waterbodies and to cover more area within the boundaries of the Project (Figure 2.2).

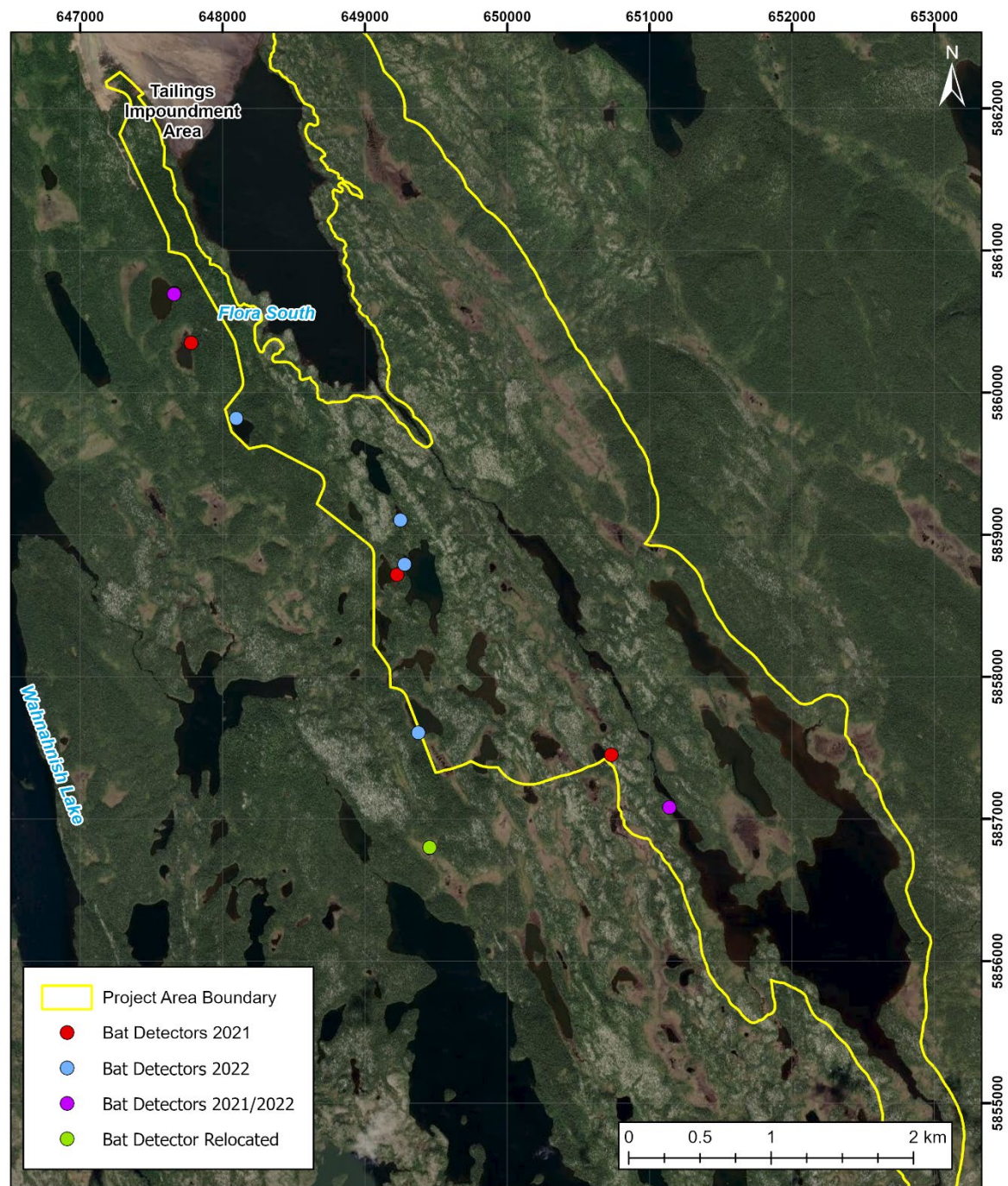


Figure 2.2 Project Area.

2.8 Amphibians

There are seven species of amphibians known from Labrador, including two-lined salamander (*Eurycea bislineata*), blue-spotted salamander (*Ambystoma laterale*), American toad (*Bufo americanus*), mink frog (*Rana septentrionalis*), wood frog (*Rana sylvatica*), northern leopard frog (*Rana pipiens*), and spring peeper (*Hyla crucifer*). None of these species are listed on SARA or the NL ESA.

Amphibians were surveyed from June 22-28th and from August 18-24th, 2021. As per the other terrestrial components, amphibians were first assessed with a desktop literature and a data compilation/search. Concurrent with the bird and mammal transect surveys, amphibian surveys were completed in appropriate habitats (i.e., wetlands) and incorporated auditory detection for frog and toad species in the area with specific surveys dedicated to areas with suitable habitat types such as wetlands, waterbodies, vernal pools, streams, rivers, and other areas with suitable habitat for various amphibian species that exist in Labrador West. Frogs and toads frequently call to attract mates and defend territories and can be readily detected if present during the appropriate temporal window. However, salamanders were visually sought opportunistically under coarse wood debris as they do not call in the same manner. All encounters of amphibians were documented, and their GPS locations were recorded.

2.9 Species At Risk and Species of Conservation Concern

Wildlife and plant species in Newfoundland and Labrador may be listed as a Species at Risk (SAR) either Provincially under the Newfoundland and Labrador *Endangered Species Act* (NL ESA) or federally under the *Species at Risk Act* (SARA). These Provincial and federal lists often have many species in common, with some exceptions. Generally, the NL ESA lists indigenous species, subspecies, and populations that are considered Endangered, Threatened, or Vulnerable within the Province of Newfoundland and Labrador. The mandate of SARA is “to provide for the recovery of wildlife species that are Extirpated, Endangered, or Threatened as a result of human activity, and to manage species of Special Concern to prevent them from becoming Endangered or Threatened”. SARA’s list is produced from recommendations of an independent body of experts (Committee on the Status of Endangered Wildlife in Canada).

In addition to SAR, Species of Conservation Concern (SCC) were also considered in SEM’s evaluation. SCC comprise those species that are not listed on the NL ESA or the SARA list but may be rare or of concern according to the ACCDC records. These species are most frequently in the rare plants category.

To obtain a list of candidate SAR and SCC for the Project Area, SEM conducted a literature review to compile historical records of SAR observations in the Project Area (if existing) and the region. Desktop research and data compilation were completed to obtain the flora, avifauna, mammal, or amphibian

species that may inhabit the Project Area either permanently, seasonally, or at specific stages throughout their life cycle. Preceding avifauna surveys conducted by SEM at Tacora provided further insight into the SAR and SAR habitats possible for the Project Area. In addition, online databases, including The Cornell Lab of Ornithology's eBird website, facilitated establishing the historical presence of many potential SAR in the region. After gathering information on the possible SAR and their associated habitats, ELC maps created from RPAS images were reviewed to assess SAR habitats within the Project Area. The locations of these habitat types were identified for future assessment during the field surveys.

To pair with the literature review, SEM conducted comprehensive field surveys for potential SAR and SCC within the Project Area from June 22-28th and from August 18-24th, 2021, and opportunistically throughout the summer and fall while conducting other surveys in the Project Area. Specific surveys developed for each SAR were completed supplementally during other survey transects on habitats which have suitable habitat for these species. (e.g., Short-eared Owl (*Asio flammeus*) surveys in open-foraging/nesting habitat during raptor and breeding bird surveys).

3.0 Results

The Biophysical Assessment of the Tacora Tailing's Expansion Area was completed through a combination of literature review, data compilation, and field surveys. For each terrestrial wildlife/botanical group a survey was completed to identify presence/absence and relative abundance within the Project Area. Field surveys were conducted in two rounds, from June 22-28 and August 18-24, 2021 and opportunistically during other components (e.g., aquatics program). The ELC conducted on the property was used to classify the entire property into specific habitat types based on the dominant vegetation species.

The Project Area was comprised of a diversity of habitat types including several types of forests and wetlands, and drier upland rocky outcrops and heaths. The species assemblages observed were typical of the species for this region. The following sections summarize the results from the surveys, the literature review, and data compilation efforts.

Results from each of the VEC studies are summarized in the following sections.

3.1 Ecological Land Classification

Labrador West is within the Mid Subarctic Forest Ecoregion (Parks and Natural Areas 2007) and is characterized predominantly by spruce-dominated forests, string bogs and fens, and open spruce-lichen forests. Through a desktop review, remote sensing and GIS techniques SEM identified several habitat types, characteristic of this ecoregion, and an extensive burned area from the Wabush wildfire of 2013.

In addition to ArcGIS imagery, which was used as a starting point, SEM obtained higher-definition imagery through RPAS (i.e., drone) flights of the expansion area. This higher resolution facilitated the identification and refinement of ELC habitat types (and also the identification of linear corridors and other habitat details).

The Project Area has a variety of forest types in varying abundances (Figure 3.1, Table 3.1). Black Spruce-Feathermoss (Figure 3.2) comprises the greatest percentage of the Project Area (note that the naming of this ecotype reflects the dominance of black spruce, but white spruce was also quite prevalent in certain areas). The Black Spruce-Lichen Forest was more restricted to drier upland sites throughout the Project Area. Burned regrowth (from the 2013 Wabush wildfire), and wetland also comprise significant habitat area in the Project Area. Open water comprises a large percentage of the Project Area. For detailed maps see Appendix C.

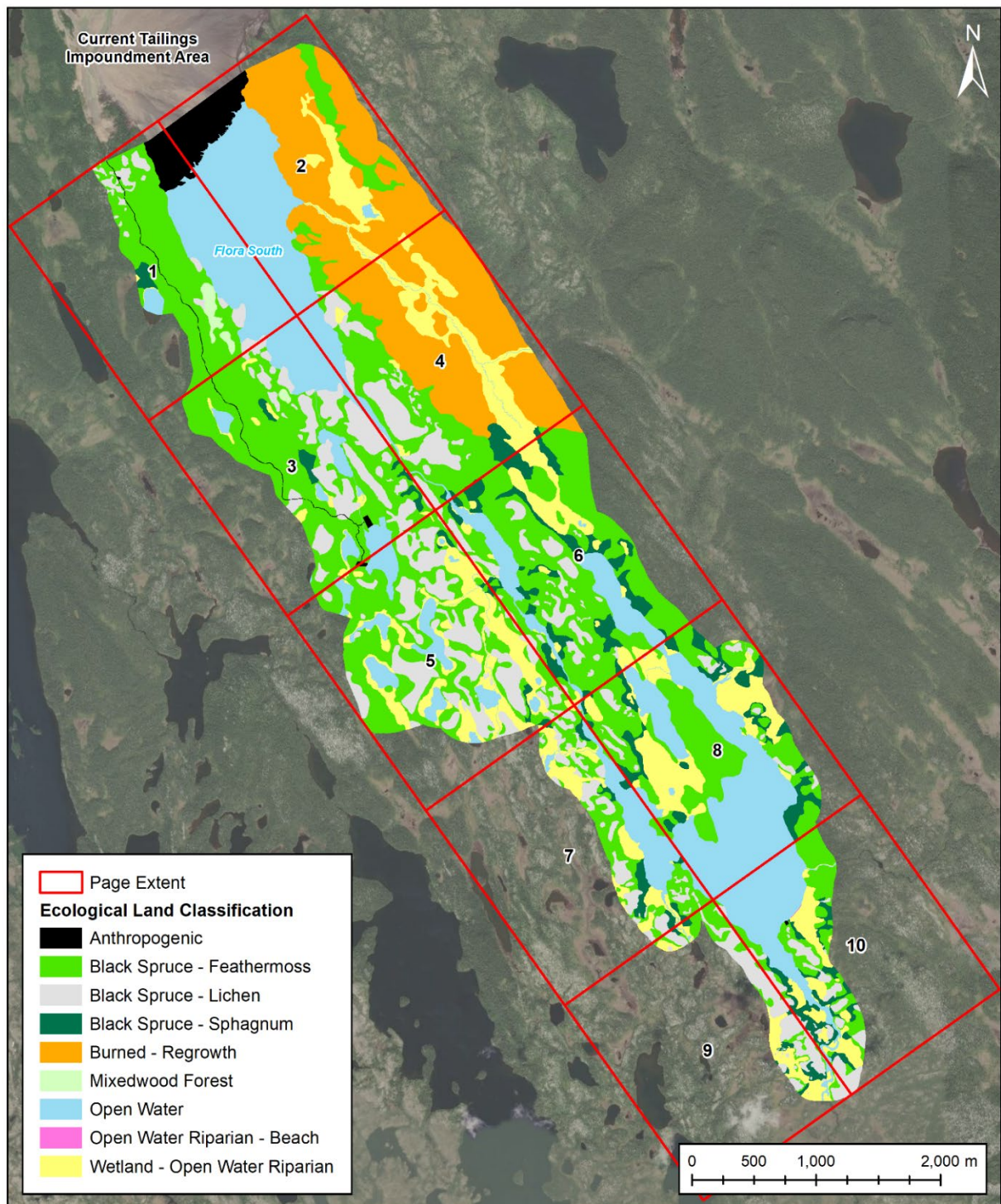


Figure 3.1 Ecological Land Classification Map Depicting Various Ecotypes Throughout the Project Area.

Table 3.1 Ecological Land Classification/ Habitat Composition of the Project Area.

ELC Ecotype/Habitat	Area (ha)	Percentage of Project Area (%)
Anthropogenic	35.319	1.92
Black Spruce – Feathermoss	595.724	32.38
Black Spruce – Lichen	230.707	12.54
Black Spruce – Sphagnum	89.851	4.884
Burned – Regrowth	253.258	13.766
Mixedwood Forest	5.726	0.311
Open Water	410.834	22.33
Open Water Riparian – Beach	0.069	0.004
Wetland – Open Water Riparian	218.371	11.87

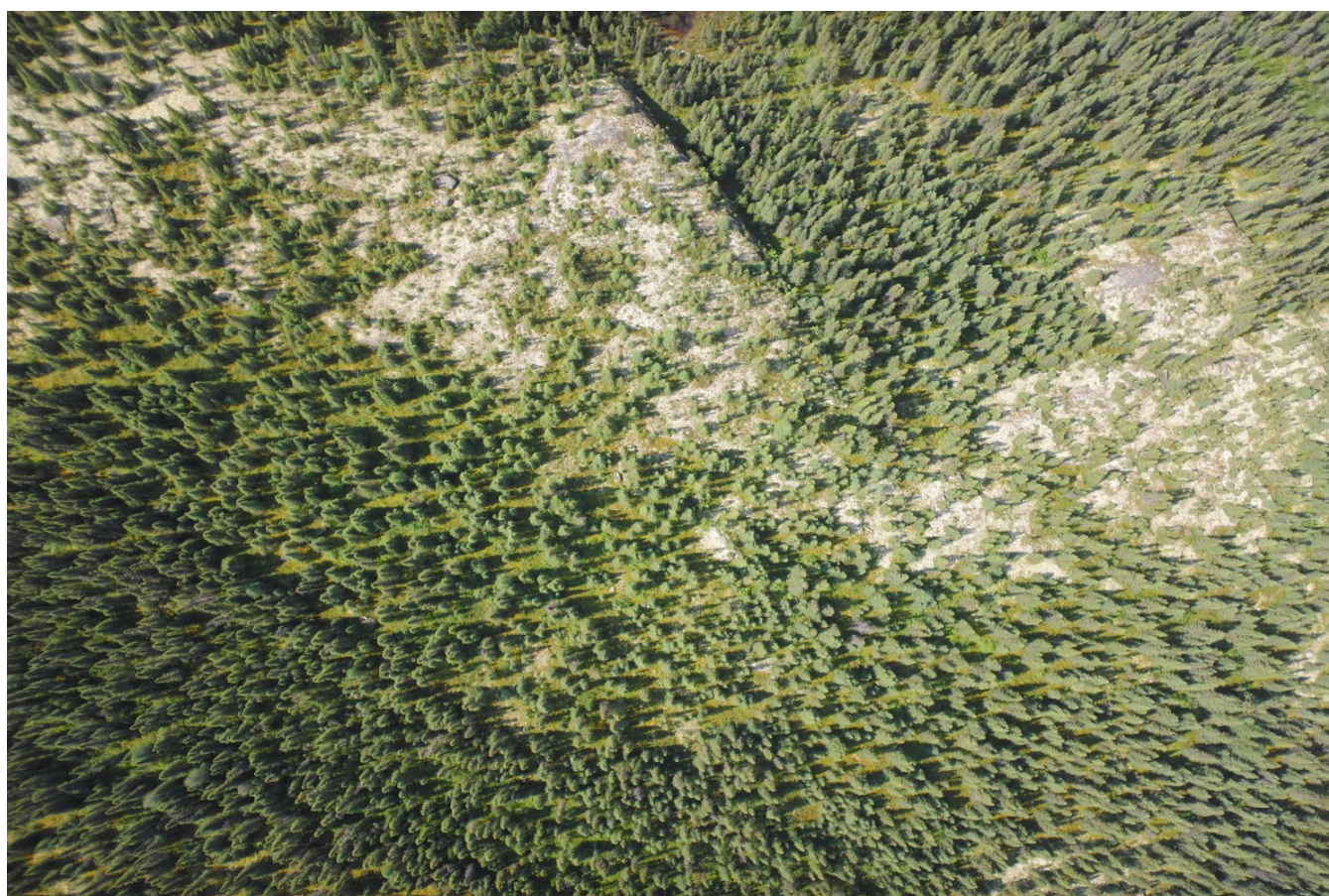


Figure 3.2 RPAS Image Capture of Black Spruce-Lichen forest (top half) Transitioning to Black Spruce- Feathermoss Forest (bottom half).

The ELC categories classified for the Project Area are as follows: Black Spruce-Feathermoss, Black Spruce-Lichen, Black Spruce-Sphagnum, Wetland, Open Water Riparian, Open Water, Burned- Regrowth, and

Anthropogenic. The area of each ecotype in hectares (ha) and percent land cover are listed in Table 3.1. Each ecotype is described below.

3.1.1 Black Spruce Feathermoss

The Black Spruce-Feathermoss ecotype is the most abundant ecotype in the Project Area, occurring primarily on upland areas with relatively moist conditions and closed canopy (Figures 3.3 and 3.4). Black spruce (*Picea mariana*), white spruce (*Picea glauca*), and balsam fir (*Abies balsamea*) dominate the tree layer. The understory is comprised of several species of feathermosses schreber's moss (*Pleurozium schreberi*), stair-step Moss (*Hylocomium splendens*), and plume moss (*Ptilium crista-castrensis*), bunchberry (*Cornus canadensis*), creeping snowberry (*Gaultheria hispidula*), Labrador tea (*Ledum groenlandicum*), glandular birch (*Betula glandulosum*), sweetgale (*Myrica gale*), lowbush blueberry (*Vaccinium angustifolium*), twinflower (*Linnea borealis*), clinton lily (*Clintonia borealis*), and interrupted clubmoss (*Lycopodium annotinum*).



Figure 3.3 Black Spruce - Feathermoss Forest Type (aerial view).



Figure 3.4 Black Spruce - Feathermoss Forest Type (ground view).

3.1.2 Black Spruce-Lichen

A distinctive ecotype characteristic to the region (and to much of Labrador) Black Spruce-Lichen, contrasts with the more moist Black Spruce-Feathermoss forests that often grow adjacent in this area. Black Spruce-

Lichen is often found in more elevated upland areas over bedrock with relatively drier conditions and is dominated by a carpet of lichen species from the Genus *Cladonia*, the “caribou lichens” such as *Cladonia rangiferina*, *Cladonia stellaris*, and *Cladonia mitis* (Meades and Moores 1994). The shrub layer is often characterized by glandular birch, Labrador tea, lowbush blueberry, and sheep laurel. In the Project Area, this ecotype represents the majority of elevated drier land, and often has areas of exposed bedrock. The contrast between this ecotype and the wetland and Black Spruce Feathermoss forest type can be seen in Figures 3.5 and 3.6. The lichens give the ecotype it’s bright white coloration and was easily delineated from aerial imagery obtained with a RPAS system.



Figure 3.5 Black Spruce – Lichen Forests in upland areas (whitish areas).



Figure 3.6 Typical Black Spruce - Lichen Forest in the Project Area.

3.1.3 Black Spruce-Sphagnum

The Black Spruce-Sphagnum ecotype was situated in lower elevation areas with abundant moisture at the surface, supporting several species of sphagnum moss (Figure 3.7). This ecotype is often associated with nearby wetlands and often occurs in a transition zone between the two ecotypes (e.g., Black Spruce-Feathermoss to fen transition). The shrub layer tends to consist of scattered low shrubs dominated by Labrador tea, glandular birch, lowbush blueberry, creeping snowberry, and mountain cranberry. Horsetails and clubmosses also inhabit the forest floor in this ecotype. Sedges (*Carex* spp.) and eastern larch often occur in the wetter areas.



Figure 3.7 Black Spruce - Sphagnum Forest at Wetland Transition.

3.1.4 Old Burn/Regrowth

The Old Burn/Regrowth ecotype comprised a significant portion of the ground cover since the fire in 2013 swept through the area (Figures 3.8 and 3.9). The typical species in these regrowth areas were fireweed,

lowbush blueberry, and Bebb's willow. As the progression occurs, species like black spruce and balsam fir may recolonize from the seedbed. The area will likely progress from shrubland to forest in the coming decades.



Figure 3.8 Old Burn-Regrowth Area with Pioneer Species (e.g., fireweed, willow).



Figure 3.9 **Old- Burn-Regrowth.**

3.1.5 Anthropogenic

This ecotype collectively represents the various areas in which human influence has significantly altered the ecosystem for commercial or recreational use, the scale of which can range from tailings areas to satellite cabins in the wilderness and the associated trails and land clearing. The Anthropogenic ecotype often is associated with the complete removal of native vegetation. This clearing of land and/or the cutting of trails may produce “edge effects” that alter vegetation communities and alter species compositions (Braithwaite & Mallik 2012). In these areas non-native species often become more prevalent due to the altered habitat (i.e., creation of areas of disturbed soil, compaction, altered drainage, etc.) and the tendency to inadvertently transport seeds from other anthropogenic areas on vehicles.

3.1.6 Open Water Riparian

A riparian zone represents the transitional zone between a waterbody and the surrounding terrestrial environment (Quinn *et al.* 2001). Riparian zones are an important ecosystem with highly distinct features shaped by microclimates that affect the species, and abiotic features that compose the areas. Wetlands, tree stands, shrubland, or other ecosystems in these areas may be highly influenced by these factors and are distinct enough to be represented in the ELC. Influenced by the erosional forces of water and wind associated with waterbodies, riparian zones are often specialized habitats in terms of vegetation. The Open Water Riparian ecotype in this ELC was designated a distinct classification from the Wetland Riparian due to the abundance of open water in the former (Figures 3.10a and 3.10b).



Figure 3.10a Riparian Vegetation Surrounding an Open Water Habitat in the Project Area.



Figure 3.10b Riparian Zone Minimized and Quickly Transitions to Spruce Forest.

In most areas of western Labrador, riparian zones are dominated by sandy substrates which may affect the diversity of vegetation that may grow in the area. Species evolved to exist in these areas may dominate the zones surrounding water bodies and often contrast markedly with the species that persist just outside of riparian zones.

Figure 3.10a illustrates a typical riparian zone for open water habitats in the Project Area. Species such as eastern larch (*Larix laricina*), glandular birch (*Betula glandulosa*), Canada burnett (*Sanguisorba canadensis*),

Labrador tea, kalmia, shining willow (*Salix Lucida*), green alder (*Alnus viridis*), and two blueberry species (*Vaccinium* spp.). This area is adjacent to a stream though lacustrine riparian habitat within the Project Area may be slightly different in that some lakes have Black Spruce forest that encroaches onto the very edge of the vegetation line in the riparian zone. Areas such as this will show less riparian vegetation diversity and often the effects of the waterbody on the terrestrial habitat are less apparent. Figure 3.10b illustrates this riparian habitat though even with the encroaching forest small riparian shrubs can be seen at the junction of the forest and the open water habitat.

3.1.7 Open Water

The Open Water ecotype consists of water bodies greater than 2 meters deep. This threshold distinguishes lakes and ponds from shallow water wetlands. Water levels are seasonally relatively stable in open water habitats, and most aquatic vegetation tends to be confined to water body margins.

Lakes and ponds in the Project Area are mostly small and shallow, but some larger ponds/lakes also exist which increase the abundance of riparian zone habitat, fish habitat, waterfowl, and freshwater mammals like beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), and river otter (*Lontra canadensis*).

Open water habitats were studied intensively by SEM personnel working on the Aquatic Field Program in the Project Area and results are outlined in detail in the Aquatics report (SEM, 2022).

3.2 Wetlands

Wetlands cover approximately 12% of the entire Project Area. The Project Area contains several wetlands and wetland complexes in the forms of two main types, bogs and fens, while some small areas of marsh existed at the transitions between wetlands and Open Water habitat. Bogs and fens are discussed in more detail below.

3.2.1 Fen

Fens are characterized (and distinguished from bogs) by the movement of mineral-rich but nutrient-poor surface water through pools, channels, and seepage (CWCS 1997). Three sub-classification of fens were observed in the Project Area: treed fens, ribbed fens, and basin fens. The treed fens were much more abundant than the other forms. Ground cover on treed fens consisted of sparsely populated tree species like Eastern larch and black spruce, while the shrub layer consisted of glandular birch, bog laurel, and sweetgale (CWCS 1997). Other species observed included *Carex* (i.e., sedge) species, other graminoid species (i.e., grasses and rushes), mosses (primarily myriad *Sphagnum* species), and marsh cinquefoil (*Potentilla fruticose*). On ribbed fens, species were similar to the above, minus the presence of the larger

tree species. Basin Fens are associated with small valleys wherein water collects in deeper pools or trenches that are surrounded by shrubby, herbaceous growth of the species above. Like treed fens, there is a reduced presence of larger tree species in this wetland subtype and more *Carex* species associated with portions of the fen near the water sources.



Figure 3.11 RPAS -captured Aerial Image of a Fen Wetland Complex on Tacora Expansion Area, 2021.

3.2.2 Bog

Bogs are characterized by the lack of moving water into the area from above-ground or below-ground water sources, differentiating them from fens. A bog is less diverse in its suite of vegetation species due a general lack of nutrient and mineral sources and largely consists of sphagnum mosses, graminoid species, and some select herbs and shrubs such as leatherleaf (*Chamaedaphne calyculata*) and Kalmia genus species (Warner and Rubic 1997). Bogs were less abundant than fens across the Project Area.

3.3 Rare Flora

The goals of the Rare Flora study were to identify, and to map observed, or likely occurrences of plant species listed under SARA and/or the NL ESA. The study also targeted species currently ranked regionally rare to uncommon (i.e., ranked S1 to S3) by the ACCDC. Species with some uncertainty (due to lack of information) may be marked with a range (e.g., S1S3) which means the species may occur over the region at rarity level between S1 and S3 but remains unclear.

3.3.1 Rare Flora

Of the federally listed plant and lichen SAR, only the Fernald's milk vetch is known to occur in Labrador, but the Project Area is outside of its known range and isolated from any known locations of the species (NL ESA 2021). However, several SCC were identified during previous surveys in relative proximity to the Project Area, the former Alderon claim (ACCDC 2012). Table 3.2 outlines the species previously observed and considered possible for the Project Area. Note these are not technically "Species at Risk" but are considered Species of Conservation Concern due to their rarity rankings.

Table 3.2 ACCDC Records of Rare Plants Historically Observed in the Project Area.

Common Name	Scientific Name	Ranking
American False Hellebore	<i>Veratrum viride</i> var. <i>viride</i>	S2
Beautiful Sedge	<i>Carex concinna</i>	S2
Chestnut-Colored Sedge	<i>Carex castanea</i>	S1S2
Green Spleenwort	<i>Asplenium viride</i>	S1S2
Leafy Northern Green Orchid	<i>Platanthera aquilonis</i>	S3S4
Marsh Muhly	<i>Muhlenbergia glomerata</i>	S2?
Marsh Valerian	<i>Valeriana dioica</i> subsp. <i>sylvatica</i>	S1
White-Stem Pondweed	<i>Potamogeton praelongus</i>	S2S4
Yellow Sedge	<i>Carex flava</i>	S3S4

At this time, there are 14 plants (including lichen and moss species) listed under SARA and/or the NL ESA that are known to occur in Newfoundland and Labrador. The number of plants ranked as regionally rare and/or uncommon is constantly 'evolving' because many areas of the province have not been surveyed. All species that are listed in SARA, NL ESA, or ranked S1 to S3 by ACCDC are collectively referred to as 'rare' plants hereafter.

The species provided by ACCDC requested by SEM before the study commenced are found in Table 3.3.

Table 3.3 ACCDC Request File Results – Rare Flora, 5 km radius from Flora Basin.

Scientific Name	Common Name	S-RANK
<i>Valeriana dioica subsp. sylvatica</i>	Northern valerian, march valerian	S2
<i>Carex castanea</i>	Chestnut-Colored Sedge	S3
<i>Carex flava</i>	Yellow Sedge	S3S4
<i>Veratrum viride var. viride</i>	American false hellebore	S2
<i>Muhlenbergia glomerata</i>	Marsh Muhly	S2?
<i>Muhlenbergia glomerata</i>	Marsh Muhly	S2?
<i>Platanthera aquilonis</i>	Leafy Northern Green Orchis	S3S4
<i>Potamogeton praelongus</i>	White-Stem Pondweed	S2S4
<i>Asplenium viride</i>	Green Spleenwort	S1S2
<i>Carex concinna</i>	Beautiful Sedge	S2
<i>Carex flava</i>	Yellow Sedge	S3S4
<i>Carex flava</i>	Yellow Sedge	S3S4

3.3.1.1 Biophysical results

While completing the rare flora assessment of the Project Area, SEM personnel documented all observed vascular (or non-vascular of a rare rank) vegetation along the transects of the Project Area . A plant list was produced including ACCDC rankings (Table 3.4).

Table 3.4 List of Plants Observed During the Rare Flora Survey in 2021.

Scientific Name	Common Name	S-Rank
<i>Abies balsamea</i>	Balsam Fir	S5
<i>Achillea millefolium</i>	Common Yarrow	SNA
<i>Actaea rubra</i>	Red Baneberry	S4S5
<i>Agrostis mertensii</i>	Arctic Bentgrass	S4S5
<i>Agrostis scabra</i>	Rough Bentgrass	S5
<i>Alnus viridis</i>	Green Alder	S5
<i>Alopecurus pratensis</i>	Meadow Foxtail	SNA
<i>Amelanchier bartramiana</i>	Bartram Shadbush	S4S5
<i>Anaphalis margaritacea</i>	Pearly Everlasting	S4S5
<i>Andromeda polifolia</i>	Bog Rosemary	S5
<i>Anemone parviflora</i>	Small-Flower Anemone	S3S4
<i>Antennaria rosea</i>	Rosy Pussytoes	SU
<i>Betula cordifolia</i>	Heartleaf Birch	S4S5
<i>Betula glandulosa</i>	Tundra Dwarf Birch	S5
<i>Betula michauxii</i>	Newfoundland Dwarf Birch	S5
<i>Betula minor</i>	Dwarf White Birch	S4S5
<i>Calamagrostis canadensis</i>	Blue-Joint Reedgrass	S5
<i>Calamagrostis stricta</i>	Slim-Stem Small-Reedgrass	S5

Scientific Name	Common Name	S-Rank
<i>Carex aquatilis</i>	Water Sedge	S4S5
<i>Carex brunnescens</i>	Brownish Sedge	S5
<i>Carex buxbaumii</i>	Buxbaum's Sedge	S3
<i>Carex canescens</i>	Hoary Sedge	S3S5
<i>Carex castanea</i>	Chestnut-Colored Sedge	S3
<i>Carex disperma</i>	Softleaf Sedge	S3S5
<i>Carex echinata</i>	Little Prickly Sedge	S3S5
<i>Carex exilis</i>	Coast Sedge	S3S5
<i>Carex flava</i>	Yellow Sedge	S3S4
<i>Carex foenea</i>	Dry-Spike Sedge	S3S5
<i>Carex gynocrates</i>	Northern Bog Sedge	S3S4
<i>Carex lasiocarpa</i>	Slender Sedge	S1
<i>Carex lenticularis</i>	Shore Sedge	S4S5
<i>Carex leptalea</i>	Bristly-Stalk Sedge	S3S5
<i>Carex limosa</i>	Mud Sedge	S5
<i>Carex magellanica</i>	A Sedge	S5
<i>Carex michauxiana</i>	Michaux Sedge	S2S4
<i>Carex oligosperma</i>	Few-Seeded Sedge	S5
<i>Carex pauciflora</i>	Few-Flowered Sedge	S4S5
<i>Carex rostrata</i>	Beaked Sedge	S4S5
<i>Carex tenuiflora</i>	Sparse-Flowered Sedge	S3S4
<i>Carex trisperma</i>	Three-Seed Sedge	S4S5
<i>Carex utriculata</i>	Bear Sedge	S2S4
<i>Carex vaginata</i>	Sheathed Sedge	S3S4
<i>Carex vesicaria</i>	Inflated Sedge	S4S5
<i>Castilleja septentrionalis</i>	Labrador Indian-Paintbrush	S4S5
<i>Cerastium fontanum</i>	Common Mouse-Ear Chickweed	SNA
<i>Chamaedaphne calyculata</i>	Leatherleaf	S5
<i>Chamerion angustifolium</i>	Fireweed	S5
<i>Clintonia borealis</i>	Clinton Lily	S5
<i>Comarum palustre</i>	Marsh Cinquefoil	S4S5
<i>Coptidium lapponicum</i>	Lapland Buttercup	S2S4
<i>Coptis trifolia</i>	Goldthread	S5
<i>Cornus canadensis</i>	Dwarf Dogwood	S5
<i>Cornus suecica</i>	Swedish Dwarf Dogwood	S4S5
<i>Danthonia intermedia</i>	Vasey Oatgrass	S2S3
<i>Dasiphora fruticosa</i>	Golden-Hardhack	S3S4
<i>Deschampsia cespitosa</i>	Tufted Hairgrass	S3S5
<i>Diphasiastrum complanatum</i>	Northern running-pine	S5
<i>Diphasiastrum sitchense</i>	Sitka clubmoss	S3S4
<i>Drosera anglica</i>	English Sundew	S3S5

Scientific Name	Common Name	S-Rank
<i>Drosera intermedia</i>	Spoon-Leaved Sundew	S3S4
<i>Drosera rotundifolia</i>	Roundleaf Sundew	S5
<i>Eleocharis acicularis</i>	Least Spike-Rush	S3S4
<i>Elymus trachycaulus</i>	Slender Wheatgrass	S5
<i>Empetrum nigrum</i>	Black Crowberry	S5
<i>Epilobium ciliatum</i>	Hairy Willow-Herb	S5
<i>Epilobium palustre</i>	Marsh Willow-Herb	S5
<i>Equisetum arvense</i>	Field Horsetail	S5
<i>Equisetum fluviatile</i>	Water Horsetail	S3S4
<i>Equisetum sylvaticum</i>	Woodland Horsetail	S5
<i>Erigeron hyssopifolius</i>	Daisy Fleabane	S2
<i>Eriophorum vaginatum</i>	Tussock Cotton-Grass	S5
<i>Eriophorum viridicarinarum</i>	Green Keeled Cottongrass	S3S4
<i>Euphrasia nemorosa</i>	Common Eyebright	S2S3
<i>Eurybia radula</i>	Rough-Leaved Aster	S4S5
<i>Fragaria virginiana</i>	Virginia Strawberry	S3S4
<i>Galium trifidum</i>	Small Bedstraw	S4S5
<i>Gaultheria hispidula</i>	Creeping Snowberry	S5
<i>Gentianella amarella</i>	Northern Gentian	S2S3
<i>Geocaulon lividum</i>	Northern Comandra	S5
<i>Geum rivale</i>	Purple Avens	S3S4
<i>Glyceria striata</i>	Fowl Manna-Grass	S4S5
<i>Gymnocarpium dryopteris</i>	Northern Oak Fern	S5
<i>Hedysarum alpinum</i>	Apline Sweet-Vetch	S2S3
<i>Hippuris vulgaris</i>	Common Mare's-Tail	S4S5
<i>Juncus alpinoarticulatus</i>	A Rush	S3S4
<i>Juncus balticus</i>	Baltic Rush	S4
<i>Juncus filiformis</i>	Thread Rush	S5
<i>Juncus stygius</i>	Moor Rush	S3S4
<i>Juncus subtilis</i>	Creeping Rush	S1S3
<i>Juncus tenuis</i>	Slender Rush	S2S3
<i>Juniperus communis</i>	Ground Juniper	S4S5
<i>Kalmia polifolia</i>	Pale Laurel	S5
<i>Larix laricina</i>	American Larch	S5
<i>Linnaea borealis</i>	Twinflower	S5
<i>Lonicera villosa</i>	Mountain Fly-Honeysuckle	S5
<i>Luzula parviflora</i>	Small-Flowered Wood-Rush	S5
<i>Lycopodiella inundata</i>	Bog Clubmoss	S2S4
<i>Lycopodium annotinum</i>	Stiff Clubmoss	S5
<i>Maianthemum trifolium</i>	Three-Leaf Solomon's-Plume	S5
<i>Menyanthes trifoliata</i>	Bog Buckbean	S5

Scientific Name	Common Name	S-Rank
<i>Mitella nuda</i>	Naked Bishop's-Cap	S4S5
<i>Myrica gale</i>	Sweet Bayberry	S5
<i>Neottia cordata</i>	Heartleaf Twayblade	S4S5
<i>Nuphar variegata</i>	Yellow Cowlily	S5
<i>Oclemena nemoralis</i>	Bog Aster	S5
<i>Odontoschisma macounii</i>	Macoun's Flapwort	S1S3
<i>Orthilia secunda</i>	One-Side Wintergreen	S5
<i>Packera aurea</i>	Golden Groundsel	S3S4
<i>Parnassia parviflora</i>	Small-flower Grass-of-Parnassu	S2
<i>Petasites frigidus</i>	Arctic Butter-Bur	S4S5
<i>Phegopteris connectilis</i>	Northern Beech Fern	S5
<i>Picea glauca</i>	White Spruce	S5
<i>Picea mariana</i>	Black Spruce	S5
<i>Pilosella caespitosa</i>	Meadow Hawkweed	SNA
<i>Pinguicula vulgaris</i>	Common Butterwort	S4S5
<i>Platanthera dilatata</i>	Leafy White Orchis	S4S5
<i>Populus tremuloides</i>	Quaking Aspen	S4S5
<i>Potamogeton alpinus</i>	Northern Pondweed	S2S4
<i>Potamogeton praelongus</i>	White-Stem Pondweed	S2S4
<i>Primula mistassinica</i>	Bird's-Eye Primrose	S3S4
<i>Prunus pensylvanica</i>	Fire Cherry	S4S5
<i>Pyrola minor</i>	Lesser Wintergreen	S4S5
<i>Rhinanthus minor</i>	Little Yellow-Rattle	SU
<i>Rhododendron groenlandicum</i>	Labrador Tea	S5
<i>Ribes glandulosum</i>	Skunk Currant	S5
<i>Ribes lacustre</i>	Bristly Black Currant	S3S4
<i>Ribes triste</i>	Swamp Red Currant	S3
<i>Rubus arcticus</i>	Northern Blackberry	S5
<i>Rubus chamaemorus</i>	Cloudberry	S5
<i>Rubus idaeus</i>	Red Raspberry	S4S5
<i>Rubus pubescens</i>	Dwarf Red Raspberry	S5
<i>Sagina procumbens</i>	Procumbent Pearlwort	S3S4
<i>Salix arctophila</i>	Arctic Willow	S5
<i>Salix humilis</i>	Prairie Willow	S4S5
<i>Salix pedicellaris</i>	Bog Willow	S4
<i>Salix pellita</i>	Satiny Willow	S4
<i>Salix planifolia</i>	Tea-Leaved Willow	S5
<i>Salix pyrifolia</i>	Balsam Willow	S4S5
<i>Sanguisorba canadensis</i>	Canada Burnet	S4S5
<i>Saxifraga paniculata</i>	White Mountain Saxifrage	S3S4
<i>Scirpus atrocinctus</i>	Black-Girdle Bulrush	S3S5

Scientific Name	Common Name	S-Rank
<i>Solidago macrophylla</i>	Large-Leaf Goldenrod	S5
<i>Solidago uliginosa</i>	Bog Goldenrod	S5
<i>Sorbus decora</i>	Northern Mountain-Ash	S4S5
<i>Sparganium hyperboreum</i>	Northern Bur-Reed	S4
<i>Spiranthes romanzoffiana</i>	Hooded Ladies'-Tresses	S3S4
<i>Stellaria borealis</i>	Northern Stitchwort	S5
<i>Streptopus amplexifolius</i>	Clasping Twisted-Stalk	S5
<i>Symphotrichum puniceum</i>	Swamp Aster	S4
<i>Taraxacum ceratophorum</i>	Common Dandelion	S3S4
<i>Taraxacum officinale</i>	Common Dandelion	SNA
<i>Thalictrum pubescens</i>	Tall Meadow-Rue	S4S5
<i>Tofieldia pusilla</i>	Scotch False-Asphodel	S4S5
<i>Triantha glutinosa</i>	Sticky False-Asphodel	S3S4
<i>Trichophorum alpinum</i>	Alpine Cotton-Grass	S3S5
<i>Trichophorum cespitosum</i>	Deergrass	S5
<i>Trientalis borealis</i>	Northern Starflower	S5
<i>Triglochin palustris</i>	Slender Bog Arrow-Grass	S4S5
<i>Trisetum spicatum</i>	Narrow False Oats	S5
<i>Vaccinium angustifolium</i>	Lowbush Blueberry	S5
<i>Vaccinium boreale</i>	Northern Blueberry	S4S5
<i>Vaccinium caespitosum</i>	Dwarf Blueberry	S4S5
<i>Vaccinium oxycoccos</i>	Small Cranberry	S5
<i>Vaccinium uliginosum</i>	Alpine Blueberry	S5
<i>Vaccinium vitis-idaea</i>	Mountain Cranberry	S5
<i>Veratrum viride</i>	American False-Hellebore	S2
<i>Viburnum edule</i>	Squashberry	S5
<i>Viola labradorica</i>	Labrador Violet	S4S5
<i>Viola macloskeyi</i>	Smooth White Violet	S5
<i>Viola renifolia</i>	Kidney-Leaf White Violet	S2S4
<i>Woodsia alpina</i>	Northern Woodsia	S1S3

3.3.1.2 Flora Species of Conservation Concern (SCC)

After a comprehensive ground survey of the Project Area, the following rare flora were observed throughout the myriad habitats within the boundaries of the Project Area, the rarest of which are ranked by singular S-ranks of S1 and S2 and were confirmed by AC CDC. These S1 and S2 ranked species are listed in Table 3.5.

Table 3.5 Flora Species of Conservation Concern.

Scientific	Common	S Rank	Observations	Plant Abundance
<i>Carex lasiocarpa</i>	Slender sedge	S1	1	Unknown
<i>Erigeron hyssopifolius</i>	Hyssop-leaved fleabane	S2	3	50
<i>Parnassia parviflora</i>	Small-flower grass-of-Parnassus	S2	2	33
<i>Veratrum viride</i>	American false-hellebore	S2	10	221

Slender Sedge (*Carex lasiocarpa*) - S1 Rank

The slender sedge has an S1 ranking for the region of Labrador West making it an extremely rare plant, with five or fewer known locations from the region based on available observation records. The species was not known in the region and was absent from ACCDC request files.

This sedge grows mainly in wetland or lacustrine areas, especially those with full to partial sun exposure and abundant water, occasionally growing in floating masses in waterbodies. The species can also be observed encroaching into areas adjacent to these preferred aquatic or wetland habitats as was the case for the observations during this survey. It was observed growing near the side of a trail that travelled along the east side of a small pond, ~80 meters from the water's edge.

Hyssop-leaved Fleabane (*Erigeron hyssopifolius*) - S2 Rank

Hyssop-leaved fleabane is a species associated with wetlands but is sometimes found outside of wetlands (i.e., it is a "facultative wetland species"). It has an S2 ranking, which means it is considered imperiled in the Province due to a restricted range or few populations, or steep declines or other factors increasing vulnerability. Fifty (50) individuals of this species were observed in three clumps on the eastern side of Flora Lake (~1 km east of the southern tip of the lake), in a riparian wetland area.

Small-Flower Grass-of-Parnassus (*Parnassia parviflora*) - S2 Rank

This flowering forb species was observed near a roadside during the Rare Flora survey. It prefers wet habitats including fens, marshes, riparian areas of lakes or rivers, and wet meadows. The soil type occurring in these areas are often moist to wet and may be sandy, or calcareous. Two observations of the species were recorded during the transects; one location adjacent to a dirt road running south along the eastern portion of the Project Area held 25 individuals and eight individuals were observed in an area nearby, occupying a similar dirt roadside habitat. Both locations contained surface water due to the pooling of runoff possibly influenced by the development of the road. This may have impacted the colonization of the area by this species (Wisconsin Department of Natural Resources [WDNR] 2021).

American False Hellebore (*Veratrum viride*)- S2 Ranking

American false hellebore can be found in several areas of the Project Area. Two hundred twenty-one (221) individuals were observed from ten separate locations. This species is associated with moist to wet sites across various soil types (e.g., sandy, loamy, organic) along wetlands and water bodies. American false hellebore (Figure 3.12) also appears to prefer areas of minimized snow accumulation (Mulligan and Munro 1987). Large groupings of this species were observed on the shorelines of water bodies throughout the Project Area. Although this species has an S2 ranking, from SEM's experience it is relatively common throughout Labrador West on moist sites (i.e., the ranking may be due to a lack of survey effort).



Figure 1.12 False Hellebore, Flora Basin.

3.4 Avifauna

A comprehensive literature search and data compilation exercise was conducted including a query to the ACCDC and a search through the eBird online database. A list of potential species for the Project Area was

formulated prior to surveys. However, SEM biologists were already familiar with the suite of bird species from Labrador West, having conducted many similar surveys in the region over the past several years. Each bird group is discussed below.

3.4.1 Passerines and Other Perching Birds

An avifauna habitat assessment was completed prior to field surveys to determine the avian species (including any SAR raptor and waterfowl species) that were likely to occur in the Project Area and determined that the Project Area encompassed a broad diversity of bird habitats, and the species richness of Passerines and other Perching Birds would correspond to that diversity of habitat types.

3.4.2 Raptors

From previous work completed in Labrador City and Wabush area, several species of Raptor are known to exist in the area. Some habitat types observed in areas nearby may not exist in the Flora Basin (e.g., Rocky Upland Outcrops) and species existing in the areas of these previous surveys heavily reliant on these specific habitat types were determined to be unlikely for significant use of the Flora Basin Project Area. Prey species of such Raptors however, may inhabit Flora Basin and so based on prey abundance of the area, these species may be present during surveys while hunting or flying overhead. Table 3.6 represent those raptors that may use the Flora Basin Project Area throughout their life cycle.

Table 3.6 Raptor Species Previously Observed in the Project Area.

Raptor Species Previously Observed in the Project Area				
Common Name	Scientific Name	Provincial Status	COSEWIC Status	SARA Status (S1)
American kestrel	<i>Falco sparverius</i>	NA		NA
Bald Eagle	<i>Haliaeetus leucocephalus</i>	NA	Not at Risk (1984)	NA
Boreal Owl	<i>Aegolius funereus</i>	NA	Not at Risk (1995)	NA
Golden Eagle	<i>Aquila chrysaetos</i>	NA	Not at Risk (1996)	NA
Great-horned Owl	<i>Bubo virginianus</i>	NA		NA
Merlin	<i>Falco columbarius</i>	NA	Not at Risk (1985)	NA
Northern Goshawk	<i>Accipiter gentilis</i>	NA	Not at Risk (1995)	NA
Northern Harrier	<i>Circus cyaneus</i>	NA	Not at Risk (1993)	NA
Northern Hawk Owl	<i>Surnia ulula</i>	NA	Not at Risk (1992)	NA
Osprey	<i>Pandion haliaetus</i>	NA	NA	NA
Red-tailed Hawk	<i>Buteo jamaicensis</i>	NA	Not at Risk (1995)	NA
Rough-legged Hawk	<i>Buteo lagopus</i>	NA	Not at Risk (1995)	NA
Short-eared Owl	<i>Asio flammeus</i>	Vulnerable (2008)	Threatened (2021)	Special Concern (2012)

3.4.3 Waterfowl and Waterbirds

Several species of waterfowl and waterbirds were observed during the previous surveys in the Labrador West region including Canada Goose as well as observations of Common Loon, Common Goldeneye, Greater Yellowlegs, Wilson’s Snipe, Spotted Sandpiper, Mallards, and Spotted Kingfisher. In addition to those observations, there are several other species that would likely be using the water bodies and wetlands in the Project Area, based on surveys of other sites in the Labrador City/Wabush area, seen in Table 3.7.

Table 3.7 Waterfowl and Waterbird Species Previously Observed in the Project Area.

Waterfowl and Waterbird Species Previously observed in the Project Area				
Common Name	Scientific Name	Provincial Status	COSEWIC Status	SARA Status (S1)
American Black Duck	Anas rubripes	NA		NA
Common Goldeneye	Bucephala clangula	NA	Not at Risk (1984)	NA
Common Merganser	Mergus merganser	NA	Not at Risk (1995)	NA
Green-winged Teal	Anas crecca	NA	Not at Risk (1996)	NA
Northern Pintail	Anas acuta	NA		NA
Red-breasted Merganser	Mergus serrator	NA	Not at Risk (1985)	NA
Ring-necked Duck	Aythya collaris	NA	Not at Risk (1995)	NA
Surf Scoter	Melanitta perspicillata	NA	Not at Risk (1993)	NA
Black Scoter	Melanitta nigra	NA	Not at Risk (1992)	NA
Snow Goose	Chen caerulescens (migration only)	NA	NA	NA

3.4.4 Biophysical Results

Table 3.8 illustrate birds that were observed while traversing the Project Area with the top eight species comprised of forest Passeriformes making up the vast majority of all bird observation. Crossbills, white-winged and red, make up a large portion of the observations which may be attributed to the maturity of the spruce forest as it produces cone crops to provide the crossbills ample forage habitat.

Table 3.8 Birds Observed in the Project Area.

Species Common Name	Latin Name	Count
Red Crossbill	<i>Loxia curvirostr</i>	45
Ruby-Crowned kinglet	<i>Regulus calendula</i>	38

White-Winged Crossbill	<i>Loxia leucoptera</i>	36
Yellow-rumped Warbler	<i>Setophaga coronata</i>	33
Dark-Eyed Junco	<i>Junco hyemalis</i>	23
Gray Jay	<i>Perisoreus canadensis</i>	18
White-Throated Sparrow	<i>Zonotrichia albicollis</i>	16
American Robin	<i>Turdus migratorius</i>	15
Greater Yellowlegs	<i>Tringa melanoleuca</i>	9
Hermit Thrush	<i>Catharus guttatus</i>	9
Common Goldeneye	<i>Bucephala clangula</i>	8
Swainson's Thrush	<i>Catharus ustulatus</i>	8
Canada Goose	<i>Branta canadensis</i>	8
Common Loon	<i>Gavia immer</i>	6
Ptarmigan	<i>Lagopus lagopus</i>	6
Lincoln's Sparrow	<i>Melospiza lincolni</i>	5
Yellow-Bellied Flycatcher	<i>Empidonax flaviventris</i>	4
Tree Swallow	<i>Tachycineta bicolor</i>	4
Northern Waterthrush	<i>Paresia noveboracensis</i>	4
Tennessee Warbler	<i>Leiothlypis peregrina</i>	3
Boreal Chickadee	<i>Poecile hudsonicus</i>	3
Alder Flycatcher	<i>Empidonax alnorum</i>	3
Black-Backed Woodpecker	<i>Picoides arcticus</i>	3
Spruce Grouse	<i>Falcapennis canadensis</i>	3
Three-Toed Woodpecker	<i>Picoides dorsalis</i>	3
Bald Eagle	<i>Haliaeetus leucocephalus</i>	2
Wilson's Snipe	<i>Gallinago delicata</i>	2
Common Raven	<i>Corvus corax</i>	2
Northern Flicker	<i>Colaptes auratus</i>	1
Fox Sparrow	<i>Passerella iliaca</i>	1
Orange-Crowned Warbler	<i>Vermivora celata</i>	1
Mourning Warbler	<i>Geothlypis philadelphia</i>	1
Sandpiper spp.	<i>Actitis spp.</i>	1
Spotted Sandpiper	<i>Actitis macularius</i>	1
Mallard	<i>Anas platyrhynchos</i>	1
Merlin	<i>Falco columbarius</i>	1
Belted Kingfisher	<i>Megasceryle alcyon</i>	1
Swamp Sparrow	<i>Melospiza georgiana</i>	1
Pine Siskin	<i>Spinus pinus</i>	1

3.5 Mammals

Baseline studies were previously completed within the Labrador West region and represented similar habitat types for the area. The results from previous wildlife observations and surveys completed in this region of Labrador West facilitated the assessment of the Project Area. In addition to existing information from those surveys, species occurrence and distribution of furbearers and mammals were established from track survey transects throughout the Project Area, and by utilizing information from databases available from the Atlantic Canada Conservation Data Centre (ACCDC), Newfoundland and Labrador Wildlife Division, the Nature Conservancy, Environment Canada, and local ecological knowledge from trappers.

During the previous study on nearby projects in Labrador City, biologists recorded evidence of small mammals, furbearers, black bear, and ungulates. Transect data were combined with information from literature searches to give a comprehensive list of wildlife that use this region of Labrador West and specifically areas adjacent to Wabush and Labrador City. Mammal species detected during the surveys included black bear, Canada lynx (*Lynx canadensis*), grey wolf (*Canis lupus*), moose, muskrat, red fox (*Vulpes vulpes*), and red squirrel (*Tamiasciurus hudsonicus*). Moose, grey wolf, and red squirrel were the most detected mammal species but other species such as snowshoe hare (*Lepus americanus*), marten (*Martes americana*), short-tailed weasel (*Mustela ermine*), red squirrel, northern flying squirrel (*Glaucomys sabrinus*), and porcupine (*Erethizon dorsatum*) were documented in past assessments near Labrador City (AMEC 2012).

Other mammals that may be found in the general area of the Flora Basin in Labrador West include beaver, American mink (*Neovison vison*), cinereus shrew (*Sorex cinereus*), pygmy shrew (*Sorex hoyi*), eastern heather vole (*Phenacomys ungava*), rock vole (*Microtus chrotorrhinus*), least weasel (*Mustela nivalis*), fisher (*Martes pennanti*), little brown bat (*Myotis lucifugus*), meadow jumping mouse (*Zapus hudsonius*), meadow vole (*Microtus pennsylvanicus*), deer mouse (*Peromyscus maniculatus*), otter (*Lontra canadensis*), porcupine, northern bog lemming (*Synaptomys borealis*), northern flying squirrel (*Glaucomys sabrinus*), southern red-backed vole (*Clethrionomys gapperi*), and star-nosed mole (*Condylura cristata*).

Utilizing information from previous studies, new information from surveys, and local ecological knowledge we have provided, in the Results section, a detailed appraisal of mammalian species occurrence within the Project Area. This information, combined with the regional ELC data, and a higher-resolution ELC gathered and developed (using RPAS) as a separate component of this work, were used to identify the variety of habitats for mammals and any potential habitats for SAR within the project boundaries (e.g., Little brown bat).

The Project Area is comprised of a diversity of habitat types including Black Spruce Feathermoss forests, upland Black Spruce Lichen forests, and wetlands in the form of the basin, treed, and ribbon fens, to name a few. The mammals found in the conifer-dominated forests, wetlands, second growth, and uplands are typical of the species for similar areas across southern Labrador. Trails and human developments like cabins bisect some areas of the Project Area and are also heavily used by certain species of wildlife.

Mammal species detected during the surveys included most abundantly red squirrel, black bear, beaver, and moose. Other species that were observed by various forms of signs were snowshoe hare, muskrat, porcupine, gray wolf, and otter. These species were detected from scat, caches, bark scaling, and tracks along transects throughout the various habitat types of the Project Area. The list of mammal observations can be viewed in Appendix D.

Red squirrel have a dominant presence throughout the Boreal forest that encompass the landscapes of Labrador West. Highly reliant on conifer cones, it is expected that this species would be detected more frequently than most other mammal species. This is also true due to their frequent, easily detected movements and unmistakable call.

Black bear were detected throughout the Project Area suggesting abundant bear activity. The large portion of Old Burn Regrowth land (represented in the ELC classifications completed by SEM personnel) creates the environmental conditions that stimulate the growth of lowbush blueberry and other species of berry that may provide good foraging opportunities for the bears as well as easily traveled landscapes.

Given the presence of grey wolf in the surrounding area of Labrador City and Wabush, the low detection rate of wolf sign was surprising but may be due to the lack of detectability in the sign that wolves leave on such landscapes. Scat is the easiest detectable sign for the species, along with black bear, but heavily vegetated areas may hide large amounts of this type of sign from view of SEM's biologists. SEM has detected wolf presence in proximity to the Project Area near the time of this terrestrial field program while working on other projects for Tacora (Figure 3.13).



Figure 3.13 Wolf Prints on Flora Basin Tailings, 2021.

3.6 Amphibians

Amphibian habitat was surveyed during surveys of areas in proximity to the Flora Basin Project Area in Labrador West in 2021. This primarily involved targeting wetland areas and recording visual observations of adults, tadpoles, and egg sacs. Determining the salamander species in the Project Area would have likely required specialized surveys to determine their occurrence in the proposed areas for development (e.g., salamander cover board surveys). However, inspections for salamanders under natural logs were opportunistically undertaken.

Historical records and literature review revealed several amphibian species which may occur within the Project Area, as given in Table 3.9.

Table 3.9 Amphibian Species Possible Within the Project Area.

Common Name	Scientific Name
American Toad	<i>Bufo americanus</i>
Mink Frog	<i>Rana septentrionalis</i>
Wood Frog	<i>Rana sylvatica</i>
Northern Leopard Frog	<i>Rana pipiens</i>
Spring Peeper	<i>Hyla crucifer</i>
Two-Lined Salamander	<i>Eurycea bislineata</i>
Blue-Spotted Salamander	<i>Ambystoma laterale</i>

The amphibian surveys that were conducted concurrently with other ground surveys including bird atlasing and ELC completed by SEM Biologists, resulted in the gathering of multiple sites that comprise of suitable habitat for various species of amphibians on the Project Area. The most effective auditory detection time for amphibian breeding calls is in the spring ranging from April through May and had concluded by the time these ground surveys were completed. This limited the detection of amphibians, especially frogs, in the Project Area to visual observations. The species observed during the surveys were the green frog (*Lithobates clamitans*), wood frog (*Lithobates sylvaticus*), and American toad (*Anaxyrus americanus*) by visual observation. The observations and associated habitat types are listed in Table 3.10.

Table 3.10 Amphibians Observed Including the ELC.

ELC (Classification)	Common Name	Scientific Name
Open Water Riparian (Wetland-- Marsh)	Green frog	<i>Lithobates clamitans</i>
Open Water Riparian (Wetland-- Marsh)	Green frog	<i>Lithobates clamitans</i>
	American toad	<i>Anaxyrus americanus</i>
Old Burn Regrowth	Wood frog	<i>Lithobates sylvaticus</i>

Green frogs were observed in their preferred habitat (i.e., Wetland – Marshes adjacent to water bodies) and the wood frog was observed in Burned Regrowth area that can be assumed to within reach of woodland vernal pools that the species prefers to inhabit. Since individuals of the species may travel hundreds of meters from their pools, this habitat may not necessarily represent the exact location of it's home range but rather a travel route between resources the individual was using such as food sources (Baldwin *et al.* 2006).

No salamanders were detected during these ground surveys which was due to lack of in-depth surveying of small streams in the Project Area. To detect the species of salamander possible for the area, two-lined salamander (*Eurycea bislineata*), and the blue-spotted salamander (*Ambystoma laterale*), plank wood cover traps could be used. This entails laying planks of wood loosely on the rocks of a stream towards the minimal flow areas. The salamanders moving along the waterways will use these as cover. SEM personnel

could then lift the planks and detect the species that are taking cover underneath each plank trap. This is recommended for future salamander detection. Further investigative measures for salamander detection could incorporate the use of Environmental DNA (eDNA) which can detect traces of DNA left behind by the salamanders as they carry out normal bodily functions in their natural environments. Samples of water and soil in the habitats being assessed are collected and the DNA sequences can be identified within the sample based on presence or absence (Walker *et al.* 2017).

3.7 Species At Risk

After completion of the ground surveys across transects covering the Project Area, no Federally or Provincially listed SAR were observed. The presence of the two native bat species, Little brown bat and Northern Myotis, in the surrounding areas of the region (i.e., Labrador City and Wabush) indicate that this Project Area is highly probable to provide some habitat to those species. Areas identified by RPAS drone surveillance and imagery review may indicate the presence of some possible roost sites. These sites may be revisited or surveyed using rotary drones, bat detector deployment, and ground-truthing surveys to detect their presence. SEM has observed these species on previous bat acoustic detecting surveys completed in Labrador West in 2020.

Suitable habitat for some of the avian SAR such as Short-eared Owl, Rusty Blackbird, and Olive-sided Flycatcher was observed but no indication of their use of the Project Area was detected. Habitat also suitable for other SAR such as caribou was also observed but historical sightings and lack of presence since the opening of the mine left the habitat unused by the herds in the region and so the possibility of those caribou returning while the mine is in operation would be minimal.

3.7.1 Avifauna Species at Risk

A data query with the ACCDC produced zero records of rare animals from the 5 km radius around the center of the Project Area. However, “expert opinion maps” from ACCDC, which suggest where SAR *may* be found (regardless of actual records) listed Rusty Blackbird, Common Nighthawk, Harlequin Duck, Barrow’s Goldeneye, and Short-eared Owl as *possible*, while Peregrine Falcon was deemed possible but unlikely. SEM used aerial imagery collected with RPAS and the ELC to determine habitat suitability and the likelihood of each of those species to exist in the Project Area (and cross-referenced the Cornell Lab of Ornithology’s eBird online database).

It was determined that there was no available breeding or wintering habitat for the Harlequin Duck within the boundaries of the Project Area. This species prefers fast-flowing mountain streams in breeding season, and the marine environment in winter. Therefore, no suitable habitat exists for Harlequin Duck in this area, aside from marginal staging habitat. Similarly, Barrow’s Goldeneye prefers mountainous habitat

for breeding (e.g., lakes and large rivers) and saltwater habitats in winter. One record exists on eBird for the general vicinity of Labrador City from May 2012, so this species evidently rarely visits Labrador West and if it does it would likely only be during migration, as no suitable habitat exists for its life history traits. Peregrine Falcon is known to breed on the northern coast of Labrador (subspecies *anatum/tundirus*) but records are rare from Labrador West, the last one evidently in 2007 when a local expert birder spotted two in late August, possibly during migration south for the winter.

The other three species, the Rusty Blackbird, Common Nighthawk, and Short-eared Owl were all deemed possible for the Project Area, based on available habitat and known life history traits for these species. Some of the wetland habitat types in the Project Area would be suitable for Olive-sided Flycatcher and Rusty Blackbird, listed as Threatened and Vulnerable in the NL ESA, respectively (Table 3.11). These species were given additional survey time in suitable habitats for those species (e.g., wetland edges, forested wetlands, wet areas of high snag density). Although no records existed in the ACCDC database, these species are listed in eBird for the area from 2018 for Olive-sided Flycatcher, and from 2011 for Rusty Blackbird. While these species were possible for the Project Area, no observations were made for these species after extensive surveys, which means they may not be using the area. However, if new information is attained prior to the expansion of the tailings area, an adaptive monitoring and mitigation plan will be developed.

Table 3.11 Possible Avian SAR for the Project Area.

Common Name	Scientific Name	NL ESA Status	COSEWIC Status	SARA Status
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Threatened (2009)	Special Concern (2018)	Threatened (2010) (Under Consideration for change)
Rusty Blackbird	<i>Euphagus carolinus</i>	Vulnerable (2007)	Special Concern (2017)	Special Concern (2009)
Short-eared Owl	<i>Asio flammeus</i>	Vulnerable (2008)	Threatened (2021)	Special Concern (2012) (Under consideration for change)
Common Nighthawk	<i>Chordeiles minor</i>	Threatened (2007)	Special Concern (2018)	Threatened (2010)

Short-eared Owl was also determined to be possible for the Project Area, based on life history traits and the habitat types present from the ELC. The Short-eared Owl is a diurnal species of owl with widespread breeding populations across various continents. It prefers open habitat such as tundra, grasslands, pasture, open wetlands, and other areas where they may fly low along the vegetation and hunt small mammals. The abundance of owls in an area may be irruptive in nature (rapid increases year to year) due to the abundance of prey items each year. In Labrador, the owl has been observed on coastal barrens but most pertinently to Labrador West, the species has been observed on large bogs throughout the area and other areas of the mid-subarctic forest region and are mostly observed here during migrations or winter

while migrating to find abundant prey and are less documented during the breeding season in June to July (Schmelzer 2005). Since this species relies on open habitats for breeding it is unlikely to be breeding in the Project Area, given that most of the area is treed as well as many of the wetlands. Some of the more open wetlands would provide *possible* habitat, however, no observations of Short-eared Owl were recorded during field surveys in 2021. However, if new information is gathered about this species in or near the Project Area, Tacora will establish an adaptive monitoring and mitigation plan. In addition, Tacora is developing an Avifauna Management Plan which will incorporate additional efforts to identify SAR on Tacora properties during routine bird surveys.

Common Nighthawk is the most likely SAR to be found within the boundaries of the Project Area. This species nests along sand dunes, beaches, open forests, burnovers, grasslands, and rock outcrops. Almost all these habitat types are present to some extent within the Project Area. In addition, this species has been recorded by SEM staff on several occasions in Labrador West. Although this species was not detected during surveys, it is possible it is nesting within the boundaries of the Project Area. This species will be a component within the Avifauna Management Plan, which will seek to identify SAR habitat and individuals on Tacora property.

3.7.2 Mammal Species at Risk

Four species of mammals are listed under the NL ESA (including three caribou herds), but only the Woodland Caribou (Lac Joseph herd and Eastern Migratory herd), the Little Brown Myotis (*Myotis lucifugus*), and the Northern Myotis (*Myotis septentrionalis*) were possible for the Project Area (Table 3.12).

Table 3.12 Possible Mammal SAR for the Project Area.

Possible Mammal Species At Risk in th Project Area				
Common Name	Scientific Name	NL ESA Status	COSEWIC Status	SARA Status
Little Brown Myotis	<i>Myotis lucifugus</i>	Endangered	Endangered (2013)	Endangered (2014)
Northern Myotis	<i>Myotis septentrionalis</i>	Endangered	Endangered (2013)	Endangered (2014)
Woodland Caribou (Lac Joseph herd)	<i>Rangifer tarandus</i>	Threatened (2002)	Threatened (2003)	Threatened (2003)
Woodland Caribou (Eastern Migratory)	<i>Rangifer tarandus</i>	Not listed	Endangered (2017)	Under consideration

The edge of the range of the sedentary Lac Joseph boreal caribou herd was historically within ~30 kilometers of Labrador City, and the George River migratory herd formerly used the region around Labrador West on migration. However, given the precipitous decline of the George River herd, the lack of sightings of caribou around Labrador West in the past decade (from anecdotal surveys of local residents) and that the Lac Joseph herd did not historically use the Labrador West area, a survey for caribou was not warranted.

Previous studies in the Labrador West region indicated that two native bat species, Little brown bat and Northern Myotis were known to occur in the region, so a dedicated survey was conducted in summer 2021 and 2022 to establish the presence of these species above suitable wetlands and waterbodies (i.e., foraging habitat) throughout the Project Area. Locations were chosen according to suitability for foraging (i.e., open, buggy airspace above wetlands or lakes), and accessibility for changing SD cards and batteries.

Five detectors deployed from June to September 2021, resulted in fifteen (15) bat recordings which represented two species and one unknown call that may or may not have been made by a bat (i.e. “unknown”. Fourteen (14) of these detections were little brown myotis with one detection of Northern myotis. Most calls (eight) were from the most southerly detector.

Table 3.13 Total Number of Bat Detections in 2021 and 2022.

Species	Echolocation Detections 2021	Echolocation Detections 2022
Little brown bat (<i>Myotis lucifugus</i>)	14	7
Unknown	1	1
Northern Myotis (<i>Myotis septentrionalis</i>)	1	1
Total	16	9

From the deployment of six detectors June to September 2022, only ten bat detections were recorded. Of these, seven (7) were from Little brown bat and one recording was from Northern myotis. One bat detection was not declarable based on quality (i.e., Unidentified). The detections were somewhat distributed over the detector locations from north to south.

Table 3.14 Bat Detections in Tacora Tailings Expansion Area, 2021-2022.

Tacora Bat Detectors 2021				
Bat Detector	Coordinates	Little brown bat	Northern myotis	Unidentified
A	647635.13 m E, 5860658.78 m N	1	0	1
B	647779.50 m E, 5860302.65 m N	2	0	0
C	649215.82 m E, 5858665.77 m N	1	0	0
D	650695.62 m E, 5857418.46 m N	2	1	0
E	651133.86 m E, 5857046.52 m N	8	0	0
Tacora Bat Detectors 2022				
Bat Detector	Coordinates	Little brown bat	Northern myotis	Unidentified
1	647635.13 m E, 5860658.78 m N	1	0	0
2	648100.34 m E, 5859795.82 m N	0	0	0
3	649216.48 m E, 5859027.73 m N	2	0	0
4	649246.42 m E, 5858731.15 m N	0	1	1
5	649376.81 m E, 5857595.25 m N	4	0	0
6	651133.86 m E, 5857046.52 m N	0	0	0

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APPENDIX A

ACCDC S-Ranks

Table A-1 S-Rank Definitions

S-Rank	Definition
SX	Presumed Extirpated - Species or community is believed to be extirpated from the province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
S1	Critically Imperiled - Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2	Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3	Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
S4	Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors.
S5	Secure - Common, widespread, and abundant in the province.
SNR	Unranked - Nation or state/province conservation status not yet assessed.
SU	Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA	Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S#	Range Rank - A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
SH	Possibly Extirpated (Historical) —Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. The SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
Not Provided	Species is not known to occur in the province.



APPENDIX B

Breeding Bird Survey Evidence Codes

Table B-1 Codes Employed for Breeding Bird Surveys

Code	Description
POSSIBLE BREEDING	
H	Species observed in suitable nesting habitat during its breeding season.
S	Individual singing or producing other sounds associated with breeding (e.g., calls or drumming) in suitable nesting habitat
PROBABLE BREEDING	
M	At least 7 individuals singing or producing other sounds associated with breeding (e.g., calls or drumming), heard during the same visit to Wabush 3
P	Pair observed in suitable nesting habitat during the species' breeding season.
T	Presumed territory based on the presence of an adult bird in the same place in suitable nesting habitat on two visits a week or more apart
C	Breeding behavior involving a male and female (e.g., display, courtship feeding and copulation) or antagonistic behavior between males
V	Bird visiting a probable nest site in suitable nesting habitat during the species' breeding season.
A	Agitated behavior or alarm call of an adult in suitable nesting habitat during the species' breeding season.
N	Nest-building by wrens or nest hole excavation by Woodpeckers.
CONFIRMED BREEDING	
CN	Nest building and/or carrying of nesting material
NU	Empty nest recently used, or the shells of eggs.
NO	Adult occupying, leaving, or entering a probable nest site (visible or not)
FE	Adult carrying a fecal sac.
AT	Adult carrying food for young.
NF	Nest containing one or more eggs.



APPENDIX D

Mammal Survey Observations

Table D1 Mammals and mammal sign observed during surveys.

Mammals	Scientific Name	Count
Red squirrel	<i>Tamiasciurus hudsonicus</i>	18
Black bear	<i>Ursus americanus</i>	11
Beaver	<i>Castor canadensis</i>	5
Moose	<i>Alces alces</i>	5
Snowshoe hare	<i>Lepus americanus</i>	4
Muskrat	<i>Ondatra zibethicus</i>	3
Porcupine	<i>Erethizon dorsatum</i>	2
Vole	<i>Microtus sp.</i>	2
Grey wolf	<i>Canis lupus labradorius</i>	1
River otter	<i>Lontra canadensis</i>	1

