



**Development of the North  
Tributary Tailings Pond (NTP) at  
the Caribou Mine, New  
Brunswick: Supplemental  
Baseline Technical Data  
Report**

January 29, 2019

Prepared for:

Trevali Mining (New Brunswick) Ltd.  
9361 Highway 180  
P.O. Box 790, Station Main Bathurst,  
NB E2A 4A5

Prepared by:

Stantec Consulting Ltd.  
845 Prospect Street  
Fredericton, NB E3B 2T7

Job No.: 121415530



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**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE,  
NEW BRUNSWICK: SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT**



DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE,  
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## Executive Summary

Trevali Mining (New Brunswick) Ltd. (TMNBL) is planning the construction and operation of a new tailings management facility (TMF) and supporting infrastructure at the Caribou Mine site in northern New Brunswick (the Project). The Project is considered an Undertaking under the New Brunswick *Environmental Impact Assessment Regulation* of the *Clean Environment Act* and thus an Environmental Impact Assessment Registration document<sup>1</sup> was filed by TMNBL. The registration document did not include results of field studies that were subsequently completed for several disciplines: surface water, fish and fish habitat, vegetation and wetlands, and wildlife and wildlife habitat. This document, the Supplemental Baseline Technical Data Report, provides the results of these field studies and comments on the EIA conclusions for these disciplines as presented in the Environmental Impact Assessment Registration.

Six water temperature data loggers were installed downstream of major confluences along Forty Mile Brook to measure baseline pre-Project water temperatures during July and August 2018. A model was used to predict the change in temperature and dissolved oxygen at these locations following the development of the Project. Water temperatures are predicted to increase by up to 1.4°C, ranging from 10.1 to 27.2°C. Dissolved oxygen concentrations are predicted to decrease by up to 0.2 to 0.4 mg/L, resulting in dissolved oxygen concentrations between 7.9 and 11.3 mg/L. The predicted increase in temperature and decrease in dissolved oxygen are expected to remain within suitable ranges for brook trout and are not expected to result in a change in fish populations or fish habitat.

Vegetation and wetland surveys were conducted in the Stage 1 PDA and portions of the Stage 2 PDA in August 2018. No vascular plant Species at Risk (SAR) or Species of Conservation Concern (SOCC) were observed within the Stage 1 PDA, but several vascular plant SOCC were observed within the Stage 2 PDA. Flooding to create the new TMF basin for Stage 1 of the Project will result in the conversion of 42.7 ha of land to aquatic systems, including 34.9 ha of forest and 6.5 ha of wetland with 1.7 ha of wetland considered to be regulated by the *Watercourse and Wetland Alteration Regulation* under the *Clean Water Act*. This is a reduction from the amount of wetland that was predicted to be affected by the Project in the EIA Registration document.

Early breeding bird and owl surveys were conducted in the vicinity of the Project in early May 2018 and breeding bird surveys were conducted in the vicinity of the Project in June 2018. Twenty-seven species were detected during early breeding bird surveys and 65 species were detected during June breeding

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<sup>1</sup> Stantec. 2018. Environmental Impact Assessment Registration: Development of the North Tributary Tailings Pond (NTP) at the Caribou Mine, New Brunswick. Prepared for Trevali Mining (New Brunswick) Ltd. by Stantec Consulting Ltd. Fredericton, New Brunswick. Dated July 17, 2108; submitted September 18, 2018.



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bird surveys. No owls were detected. Of the bird species observed, four were SAR and two were SOCC. Other wildlife species, such as moose, were recorded incidentally during field surveys conducted in

support of the Project. Sign or direct sightings were made of 16 non-avian wildlife species, all of which are ranked secure in New Brunswick.

An Archaeological Impact Assessment (AIA) was completed, including background historical research and a field survey of the Stage 1 and Stage 2 PDAs, with background research extending to the surrounding area. Survey transects were walked at defined intervals, depending on whether areas were considered to have elevated potential for archaeological resources. Shovel test pitting recommendations were developed based on the results of the survey transects.

There are no documented archaeological resources within the PDA and none were identified in the field survey walkovers. Eight areas of elevated archaeological potential were identified within the PDA, which were typically well-drained, flat terraces along slopes leading to watercourses. Shovel testing is recommended at 5 m intervals in areas considered to have high potential for archaeological resources, and at 10 m intervals in areas considered to have medium potential for archaeological resources. In total, 500 shovel test pits are recommended prior to any ground disturbance in the Stage 1 and Stage 2 PDAs.

With the implementation of mitigation measures outlined in the EIA, the potential interactions between the Project and surface water, fish and fish habitat, vegetation and wetlands, wildlife and wildlife habitat, and heritage resources during construction, operation, and closure are not expected to be substantive on the local, regional, or provincial scale.



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## Abbreviations

AEON	Archaeological Electronic Observation and Notation
AIA	Archaeological Impact Assessment
AS	Archaeological Services
ECCC	Ecological Communities of Conservation Concern
EIA	Environmental Impact Assessment
GIS	Geographic Information Systems
GPS	Global Positioning System
LAA	Local Assessment Area
MBBA	Maritimes Breeding Bird Atlas
NBDELG	New Brunswick Department of Environment and Local Government
NBDERD	New Brunswick Department of Energy and Resource Development
NB SARA	New Brunswick Species at Risk Act
NTTP	North Tributary Tailings Pond
PDA	Project Development Area
Project	Construction and operation of the new North Tributary Tailings Pond
SAR	Species at Risk
SARA	Species at Risk Act
SOCC	Species of Conservation Concern
STTP	South Tributary Tailings Pond
TMF	Tailings Management Facility
TMNBL	Trevali Mining (New Brunswick) Ltd.
WESP-AC	Wetland Ecological Services Protocol – Atlantic Canada



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Introduction  
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## 1.0 INTRODUCTION

### 1.1 PROJECT OVERVIEW

Trevali Mining (New Brunswick) Ltd. (“TMNBL”; “the Proponent”) recently filed an Environmental Impact Assessment (EIA) Registration document to fulfill the requirements for registration of an Undertaking under the New Brunswick *Environmental Impact Assessment Regulation* of the *Clean Environment Act* (Stantec 2018, available online: <https://www2.gnb.ca/content/dam/gnb/Departments/env/pdf/EIA-EIE/Registrations-Engregistremets/documents/EIARegistration1498.pdf>). The undertaking included the construction and operation of a new tailings management facility (TMF) referred to as the North Tributary Tailings Pond (NTTP; the “Project”), at the Caribou Mine in northern New Brunswick. The Project includes constructing a new tailings management facility, a Polishing Pond, a water treatment facility, and supporting permanent and non-permanent ancillary facilities to support the ongoing mining and milling operations at the Caribou mine. The EIA document was written using information available at the time and did not include the results of field studies that have since been completed for several disciplines.

### 1.2 PURPOSE OF THIS TECHNICAL REPORT

The purpose of this supplemental Baseline Technical Data Report is to fulfill EIA follow-up commitments for the following valued components (VCs): surface water, fish and fish habitat, vegetation and wetlands, wildlife and wildlife habitat, and heritage resources. These follow-up commitments are fulfilled by providing the results of field work conducted in 2018 and describing the conditions in the vicinity of the Project, ultimately to support or update the conclusions of the EIA. This present report should be read in conjunction with the EIA Registration document (Stantec 2018).

### 1.3 SPATIAL BOUNDARIES

The Environmental Impact Assessment for the Project included two spatial boundaries for assessment: Project Development Area (PDA) and Local Assessment Area (LAA), which varies by discipline.

#### 1.3.1 Project Development Area

The PDA represents the Project footprint and is limited to the anticipated area of physical disturbance associated with the construction, operation, and eventual closure of the Project (Figure 1.1). The PDA has two components: Stage 1, which includes a TMF dam (including an emergency spillway), TMF basin, a Polishing Pond and dam, and water treatment facilities; and Stage 2, which includes an expanded TMF dam (with expanded emergency spillway), TMF basin, and an alternative access road to the Caribou site. Ancillary and temporary facilities required to support the Project (e.g., temporary laydown areas, access roads) are included in the PDA for each stage. The Stage 1 PDA encompasses an area of approximately 43 ha, and the Stage 2 PDA encompasses the Stage 1 PDA plus an additional area of approximately 115 ha (for a total of 158 ha).



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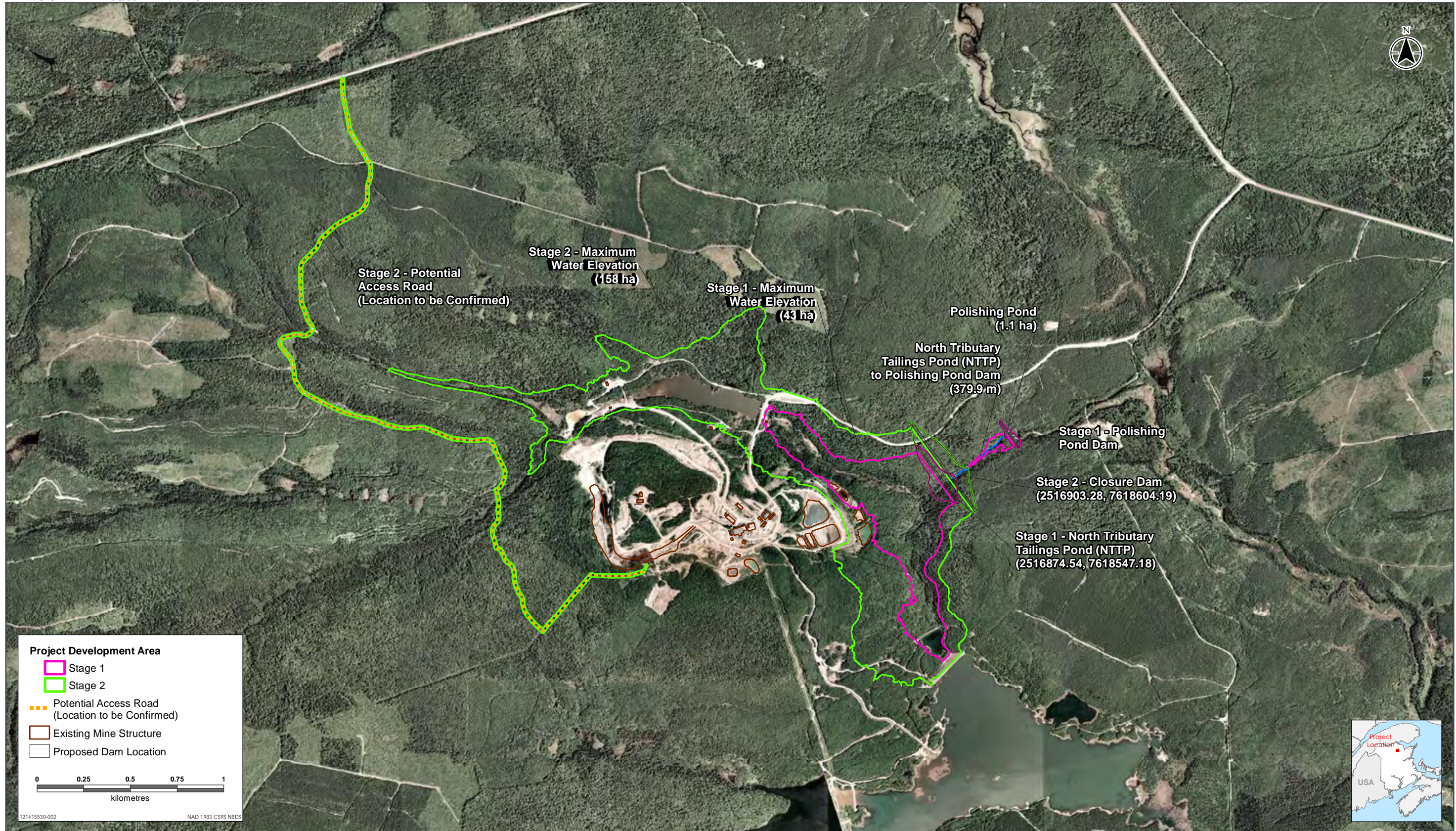
## 1.3.2 Local Assessment Area

The LAA is the maximum area where Project-specific environmental interactions can be predicted and measured with a reasonable degree of accuracy and confidence (i.e., the zone of influence of the Project for each discipline). The LAA for the VCs included in this technical report (and consistent with the EIA registration) are as follows:

- Surface water: the PDA and the downstream portion of the Diversion Channel and downstream of the proposed PDA extending down to the mouth of the Forty Mile Brook, at the confluence with the Nepisiguit River
- Fish and fish habitat: the PDA and from the headwaters of the North and South Branch of Forty Mile Brook the confluence of Forty Mile Brook and the Nepisiguit River, and from the inflow of the diversion channel on Woodside Brook to the confluence with Forty Mile Brook (4.6 km downstream of the Caribou mine). The LAA extends 30 m from the observed high-water mark of the banks into the riparian area of watercourses.
- Vegetation and wetlands: 500 m buffer beyond the PDA
- Wildlife and wildlife habitat: 500 m buffer beyond the PDA
- Heritage resources: The PDA

The LAA for each discipline is illustrated on figures within the appropriate section.





**Project Development Area**

- Stage 1
- Stage 2
- Potential Access Road (Location to be Confirmed)
- Existing Mine Structure
- Proposed Dam Location

0 0.25 0.5 0.75 1  
kilometres

121415530-002 NAD 1983 CSRS NBD5

Sources: Base Data from the Government of New Brunswick  
Service Layer Credits: Service New Brunswick/Service Nouveau Brunswick

Stage 1 and Stage 2 Project Development Areas







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Surface Water  
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## 2.0 SURFACE WATER

The following section provides a description of the supplementary baseline surface water information that was collected to augment the EIA registration for the development of the Forty Mile Brook TMF at the Caribou Mine, New Brunswick. This information will assist efforts to predict the potential effects of increased water temperature (magnitude and extent) and decreased dissolved oxygen on surface water resources.

### 2.1 METHODS

#### 2.1.1 Water Temperature

Six HOBO Pendant MX2201 (Onset, Bourne, MA) water temperature loggers were installed in Forty Mile Brook downstream of each major confluence to determine baseline water temperatures prior to Project development (Figure 2.1). The temperature loggers were installed inside of a 1.2 m long 5 cm wide piece of plastic pipe with holes in the pipe attached to a 2 cm piece of rebar which was driven into the substrate. The temperature loggers were installed on June 27, and July 5 and 6, 2018 and retrieved on October 2, 2018.

A previously-constructed model (Stantec 2015) was used to predict the change in temperature downstream of the NTTP. This model was for a TMF larger than the proposed NTTP and was considered applicable to this Project. The model predicted that the increase in temperature would be less than 1.4°C and is likely to be even less than this given that the proposed NTTP has a smaller surface area available for warming compared to the TMF that was used to construct the model. Therefore, 1.4°C was added to the measured maximum daily temperature of all stations, to represent a maximum daily temperature that could occur during operation as a result of the Project.

#### 2.1.2 Dissolved Oxygen

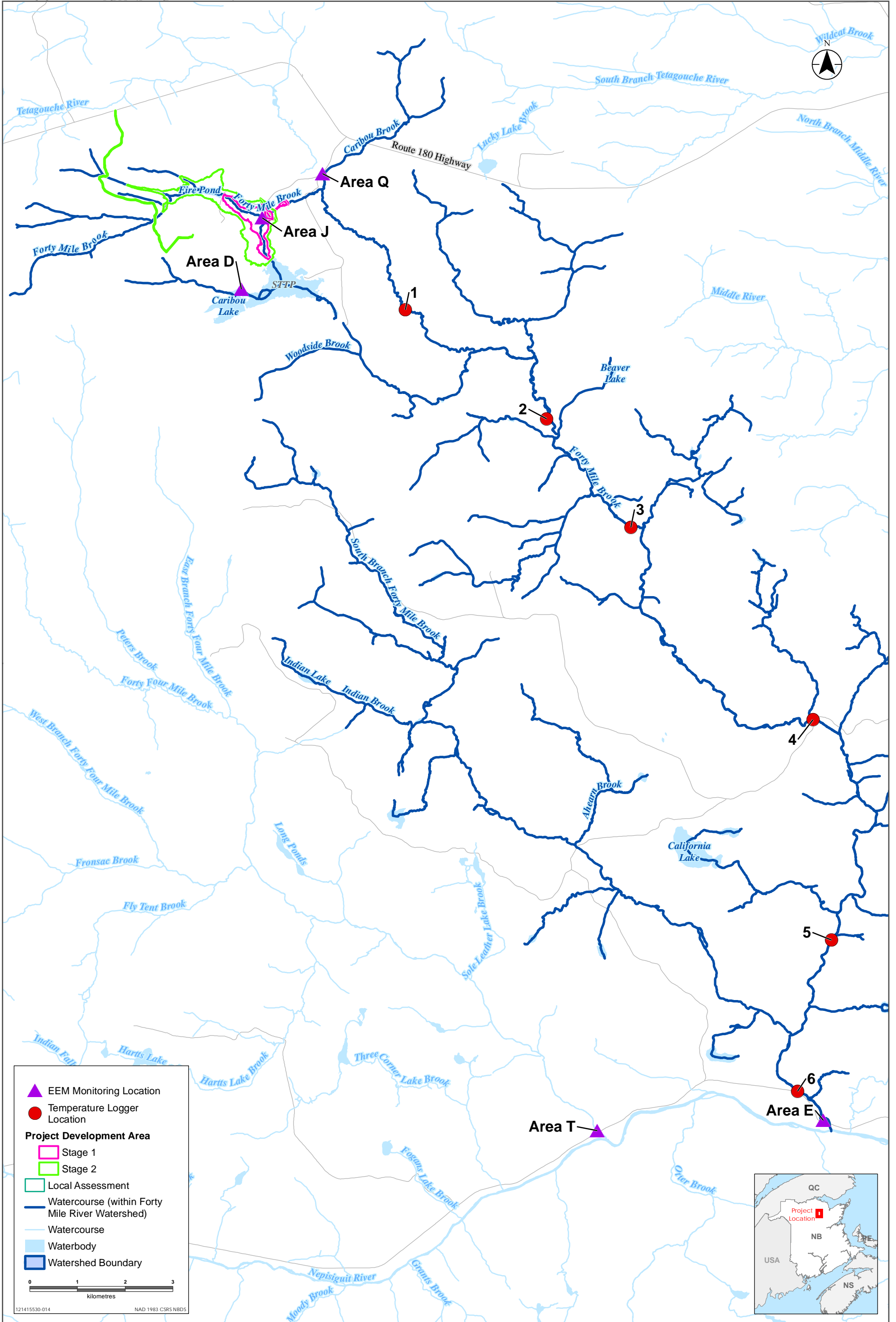
The relationship between water temperature and dissolved gasses (Henry's Law) was used to predict the change in dissolved oxygen that may occur during operation. Rivers and streams are typically at near 100% oxygen saturation due to their large surface area relative to depth; aeration from the movement of water over riffles, rapids, and groundwater discharge (Fondriest Environmental, Inc. 2013). Henry's Law indicates that there is an inverse relationship between water temperature and dissolved oxygen (i.e., as water temperature increases, dissolved oxygen decreases). The relationship was extrapolated from the maximum observed water temperature information collected in Forty Mile Brook to estimate dissolved oxygen concentrations in Forty Mile Brook during the monitoring period. The calculated dissolved oxygen concentrations were then compared to actual dissolved oxygen concentrations and water temperatures collected at environmental effects monitoring (EEM) stations during 2018 to confirm the assumption that Forty Mile Brook is at saturation for dissolved oxygen. The reference stations vary in location and include small (2<sup>nd</sup> and 3<sup>rd</sup> order tributaries) and larger (4<sup>th</sup> order) watercourses (Figure 2.1).



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Sources: Base Data is from the Government of New Brunswick.

Locations of Water Temperature Monitoring Stations on Forty Mile Brook, NB



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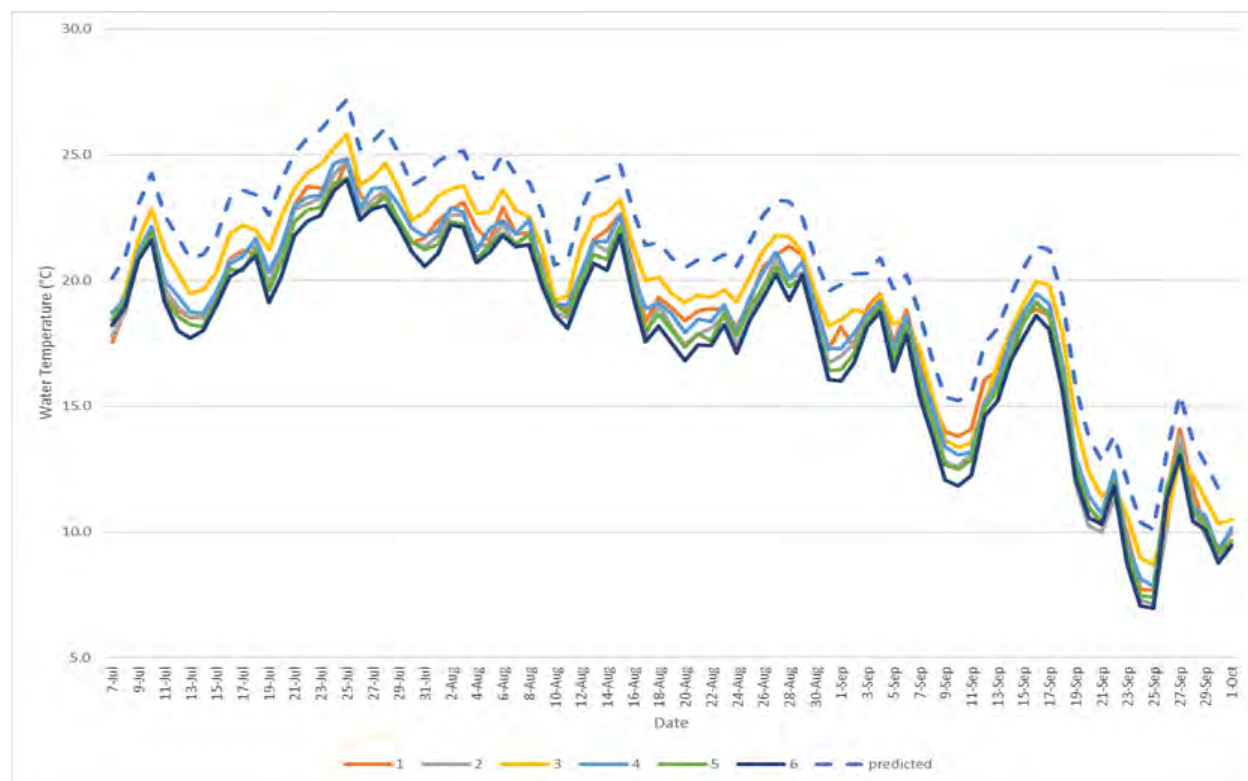
Surface Water  
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## 2.2 RESULTS

### 2.2.1 Water Temperature

Water temperatures during the deployment period ranged from 7.0 to 25.8°C (Figure 2.2). The highest water temperatures were observed in mid-July to early August and declined in late August and early September as fall approached.

Water temperatures were the warmest at Station 3 and coolest at Station 6 (Figure 2.1). Station 3 is located downstream of a large slow-moving section of river (~1400 m in length x 60 m in width). These results suggest that considerable warming takes place in this stretch of river likely as a result of the increased surface area and low velocity. Station 6 was the station located farthest downstream of the Project. The results indicate there may be some substantial cool-water inputs in the lower portion of Forty Mile Brook which assist in mitigating the warming effects of the existing South Tributary Tailings Pond (STTP) near the headwaters of Forty Mile Brook.



**Figure 2.2 Baseline and Predicted Water Temperatures in Forty Mile Brook, NB, in 2018; Numbered Lines in the Legend Refer to Monitoring Station Numbers.**

A predicted maximum increase in water temperature of 1.4°C as a result of the NTTP is expected to result in water temperatures that range from 10.1 to 27.2°C (Figure 2.2).

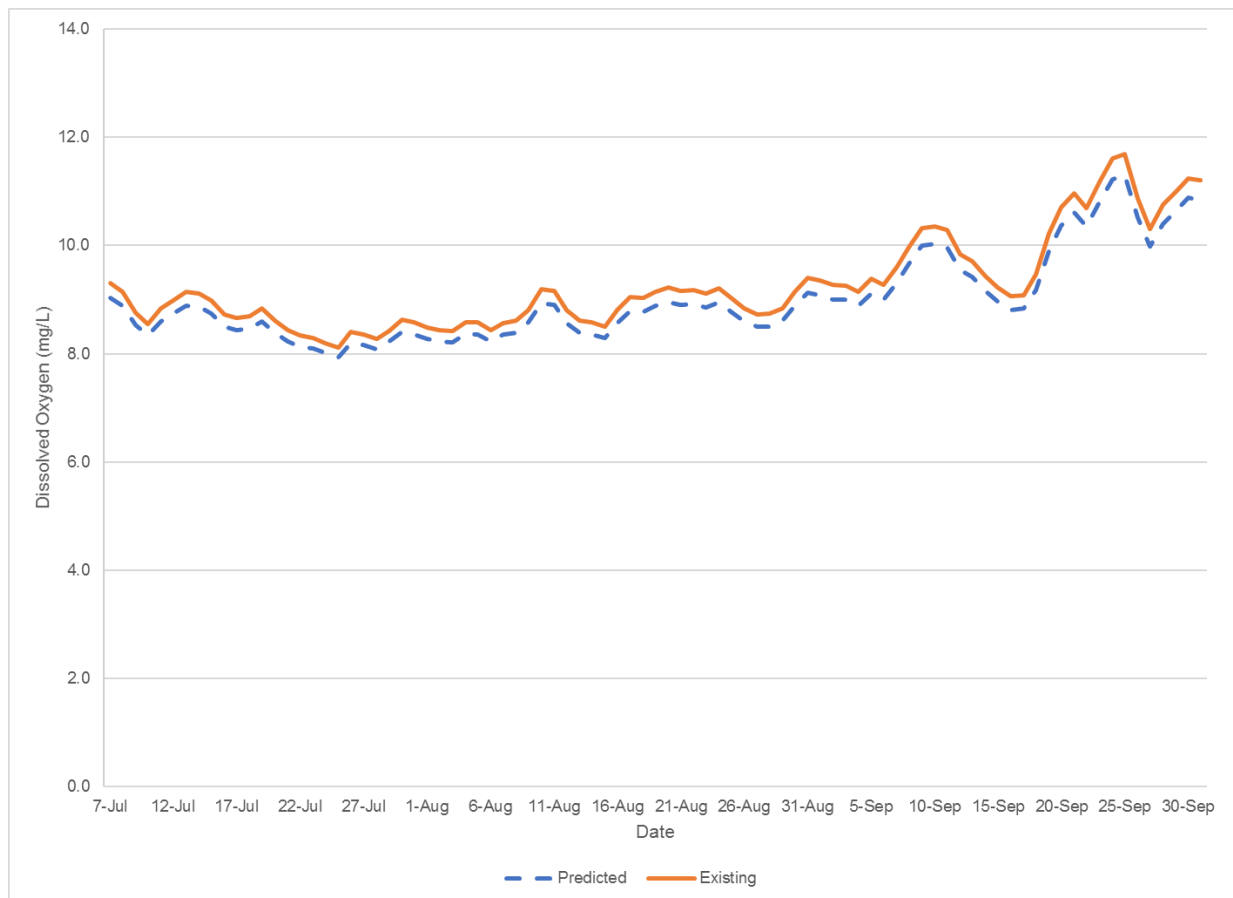


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## 2.2.2 Dissolved Oxygen

The calculated values of dissolved oxygen based on the average maximum observed daily water temperature of all stations within Forty Mile Brook range from 8.1 to 11.7 mg/L over the period of temperatures monitored (Figure 2.3). The values of measured *in situ* dissolved oxygen concentrations were within the range of calculated values for a given water temperature.



**Figure 2.3** Calculated Dissolved Oxygen Concentrations in Forty Mile Brook, NB, in 2018

Given the predicted increase in water temperature as a result of the NTTP, a decrease in dissolved oxygen of 0.2 to 0.4 mg/L is anticipated. During operation of the NTTP dissolved oxygen concentrations would be predicted to range between 7.9 and 11.3 mg/L (Figure 2.3).

## 2.3 DISCUSSION

Water levels were lower than normal and air temperatures were higher than normal in July and August of 2018 in the areas surrounding Caribou Mine (Government of Canada 2018a; Government of Canada 2018b). Therefore, the results obtained during the 2018 field season are likely representative of water



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temperatures that are typically higher and dissolved oxygen concentrations that are typically lower than would be observed during this timeframe in a normal year.

The maximum average water temperature observed from all stations assumes an increase in water temperature of 1.4°C based on a similar but larger Project (Stantec 2015). Based on this scenario, water temperatures are estimated to range from 10.1 to 27.2°C. The predicted increase in water temperature resulting from the proposed NTTP is anticipated to result in a decrease in dissolved oxygen of 0.2 to 0.4 mg/L. This is predicted to result in dissolved oxygen concentrations between 7.9 and 11.3 mg/L during operation of the NTTP.

No change in the current uses of surface water resources is anticipated as a result of changes in water temperature or dissolved oxygen as a result of the Project.

No future work is recommended with respect to water temperature or dissolved oxygen concentrations for baseline data collection for surface water resources.

## 3.0 FISH AND FISH HABITAT

The following section provides a description of the supplementary baseline fish and fish habitat information that was collected to augment the EIA registration for the development of The Forty Mile Brook TMF at the Caribou Mine, New Brunswick. This information will assist efforts to predict the potential effects of increased water temperature (magnitude and extent) and decreased dissolved oxygen on fish and fish habitat.

### 3.1 METHODS

The methods used to obtain baseline water temperature and dissolved oxygen concentrations are described in 2.0 – Surface Water. The following subsections describe the relationship between surface water and fish and fish habitat for water temperature and dissolved oxygen.

#### 3.1.1 Water Temperature

Brook trout (*Salvelinus fontinalis*) is a common fish species near Caribou Mine (Stantec 2018). Water temperature is a key feature in determining the distribution and abundance of brook trout (Stoneman and Jones 2000; Stanfield et al. 2006; MacMillan et al. 2008; Wilbur 2009). Therefore, current and predicted water temperatures were compared to the temperature preferences of brook trout to assess if Forty Mile Brook currently provides year-round or seasonal habitat. The maximum temperature preference for brook trout was set at 19°C for the purposes of this exercise (MacMillan et al. 2008; Wilbur 2009).

#### 3.1.2 Dissolved Oxygen

Dissolved oxygen concentration is a parameter that affects the suitability of fish habitat for brook trout (Raleigh 1982). Minimum dissolved oxygen (mg/L) during the late growing season and during embryo



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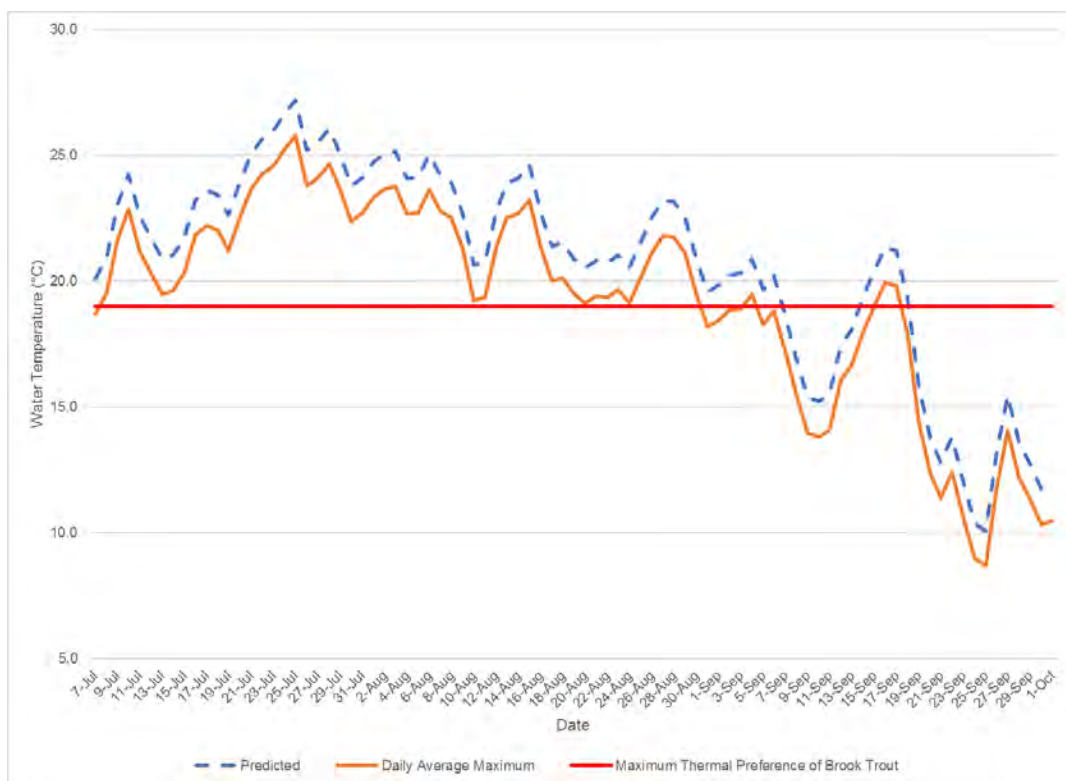
development is 6.5 mg/L for water temperatures above 15°C (i.e., warm water period) and 4.5 mg/L for water temperatures below 15°C (i.e., cool water period; Raleigh 1982). The minimum dissolved oxygen concentration suitable for brook trout was therefore set at 6.5 mg/L for the purposes of this report, as it is the higher minimum level throughout the life cycle of the species, and therefore the most limiting.

## 3.2 RESULTS

### 3.2.1 Water Temperature

Within the 2018 monitoring period, water temperatures in Forty Mile Brook exceeded the 19°C thermal preference for brook trout on 66% of the days monitored (58 out of 88 days, Figure 3.1). Forty Mile Brook contains habitat for brook trout; however, during the summer months they likely seek thermal refuge in tributaries to Forty Mile Brook or cool-water seeps within the mainstem as water temperatures in the mainstem are above their thermal preference. The mainstem of Forty Mile Brook does consistently provide suitable habitat within the thermal preferences of brook trout.

Applying the predicted increase in temperature from a larger TMF of 1.4°C to Forty Mile Brook (Section 2.1.1), 67 days compared to 58 days each year for the time period sampled (an additional nine days) would exceed the 19°C thermal preference for brook trout compared to the 2018 baseline collected.



**Figure 3.1 Average Daily Maximum of Baseline and Predicted Water Temperatures in Forty Mile Brook, NB, in 2018**





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## 3.2.2 Dissolved Oxygen

The calculated values of dissolved oxygen within Forty Mile Brook range from 8.1 to 11.7 mg/L over the period of temperatures monitored (Figure 3.2; Section 2.0). This range of values exceed the minimum dissolved oxygen requirement (6.5 mg/L) for brook trout (Raleigh 1982).



**Figure 3.2 Calculated Minimum Baseline and Operational Dissolved Oxygen Concentrations (mg/L) in Forty Mile Brook, NB**

## 3.3 DISCUSSION

Water levels were lower than normal and air temperatures were higher than normal in July and August of 2018 in the areas surrounding Caribou Mine (Government of Canada 2018a; Government of Canada 2018b). Based on the scenario described in Section 2.0, water temperatures are estimated to range from 10.1 to 27.2°C (Figure 2.2). The increase in water temperature as a result of the Project is not anticipated to result in a change in fish community or substantial change in fish habitat.

Given the predicted increase in water temperature as a result of the NTTP, a decrease in dissolved oxygen of 0.2 to 0.4 mg/L is anticipated. During operation of the NTTP dissolved oxygen concentrations would be predicted to range between 7.9 and 11.3 mg/L. The predicted decrease in dissolved oxygen concentration as a result of the Project is anticipated to remain within a suitable range for brook trout and is not anticipated to result in a change in fish populations or fish habitat.



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No future work is deemed to be required in regards to water temperature or dissolved oxygen concentrations for baseline data collection for fish and fish habitat.

## 4.0 VEGETATION AND WETLANDS

This section reports on supplemental field work on vegetation and wetlands that was completed in 2018, as outlined in the follow-up section of the EIA. Updated habitat metrics and descriptions, and vascular plants observed during surveys, are provided. The terms SAR and SOCC, referred to in this and the following section (Section 5.0), are defined as follows:

- SAR (species at risk) includes species listed as endangered, threatened or special concern by the federal *Species at Risk Act (SARA)*, the New Brunswick *Species at Risk Act (NB SARA)*, or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).
- SOCC (species of conservation concern) are not listed under federal or provincial legislation but are considered rare in New Brunswick, or the long-term sustainability of their populations has been evaluated as tenuous. SOCC are defined here as species ranked S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable) in New Brunswick by the AC CDC (2018).

### 4.1 METHODS

Vegetation and wetland surveys were conducted within the Stage 1 PDA between August 21 and 23, 2018.

Geographic coordinates of locations of vascular plants were recorded using ArcGIS Collector software on an iPhone paired with a Garmin Glo™ GPS to increase location accuracy. All vascular plant species were recorded when first observed, and plants that were not identifiable in the field were collected and later identified using a dissecting microscope and various floristic keys.

Wetlands were delineated and classified according to the Canadian Wetland Classification System (CWCS; NWWG 1997). This system classifies wetlands to three levels: class, form/subform, and type. There are five wetland classes: bog, fen, swamp, marsh, or shallow water. Form and subform indicate the physical morphology and hydrological characteristics of the wetland. Wetland type distinguishes wetland communities based on one of eight groups of dominant vegetation. Wetland boundary locations were recorded using a Trimble® Geo 7x GPS. Wetland function was assessed using the Wetland Ecological Services Protocol – Atlantic Canada (WESP-AC) method. This method requires both a field and office component and is considered less subjective than other wetland functional assessment methods. WESP-AC field assessments were completed for each of the wetlands delineated within the Stage 1 PDA. The WESP-AC data were entered in the most recent form available on December 7, 2018 (Adamus 2018).

Wetlands in the Stage 2 PDA as presented in the EIA registration (Stantec 2018) were visited, but not fully delineated, during the field survey on August 23 and 24, 2018, to help improve the accuracy of the air photo interpretation and to confirm the classes, forms and types of wetlands present. These wetland boundary checks were then used to adjust boundaries that had previously been interpreted for the EIA.



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Vascular plant species not previously observed in the Stage 1 PDA were also recorded during visits to Stage 2 wetlands. A more complete survey of the Stage 2 PDA will be completed prior to the start of Stage 2.

## 4.2 RESULTS

### 4.2.1 Upland and Wetland Vegetation Communities

Land classification data (i.e., wetland types, forest types, and other land uses) for both PDAs (Stage 1 and 2) and the LAA (i.e., 500 m buffer of the PDAs) were updated using the field information collected and are presented in Table 4.1 and shown on Figure 4.1.

**Table 4.1 Land Classification within the PDA and LAA**

Land classification	PDA – Stage 1		PDA – Stage 2		LAA	
	ha	%	ha	%	ha	%
Industrial	1.26	2.95	11.70	10.20	79.34	7.07
Infrastructure	-	-	0.77	0.67	9.63	0.86
Rural	-	-	0.57	0.49	0.57	0.05
<b>Forest Types</b>						
Regenerating-sapling Hardwood	5.48	12.84	17.90	15.61	122.64	10.93
Regenerating-sapling Mixedwood	-	-	0.30	0.26	5.26	0.47
Regenerating-sapling Softwood	-	-	0.42	0.37	31.49	2.81
Young-immature Hardwood	6.36	14.91	16.65	14.52	175.89	15.68
Young-immature Mixedwood	0.19	0.44	3.22	2.80	95.58	8.52
Young-immature Softwood	0.07	0.17	0.88	0.77	122.93	10.96
Mature-overmature Hardwood	-	-	2.92	2.55	112.57	10.04
Mature-overmature Mixedwood	12.62	29.56	21.20	18.49	136.47	12.17
Mature-overmature Softwood	10.18	23.86	22.58	19.69	135.72	12.10
Forest Total	34.90	81.78	86.07	75.06	938.58	83.67
<b>Wetlands</b>						
Shallow Water Wetland	0.87	2.04	0.20	0.18	2.19	0.20
Freshwater Marsh	0.55	1.29	1.99	1.74	8.97	0.80
Low Shrub Swamp	-	-	-	-	0.32	0.03
Tall Shrub Swamp	3.40	7.97	3.26	2.84	14.22	1.27
Treed Swamp	1.70	3.98	3.51	3.06	39.19	3.49
Wetland Total	6.52	15.28	8.96	7.82	64.89	5.78
Waterbody	-	-	6.60	5.76	28.80	2.57
<b>Total</b>	<b>42.68</b>	<b>100.00</b>	<b>114.67</b>	<b>100.00</b>	<b>1121.80</b>	<b>100.00</b>

Sources: NBDERD 2014, 2017a, 2017b; NBDELG 2011; field data (2018)



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The Stage 1 PDA includes a small amount of “industrial” land associated with several of the Anaconda Tailings Ponds. The remainder of the Stage 1 PDA is composed of forest and wetland (described in Section 4.3.1.1). Although the forest data from New Brunswick Department of Energy and Resource Development (NBDERD) are not recent, forests within the Stage 1 PDA are largely mature, both mixedwood and softwood. There are also some regenerating-sapling and young-immature aged hardwood stands within the Stage 1 PDA.

## 4.2.1.1 Stage 1 Wetlands

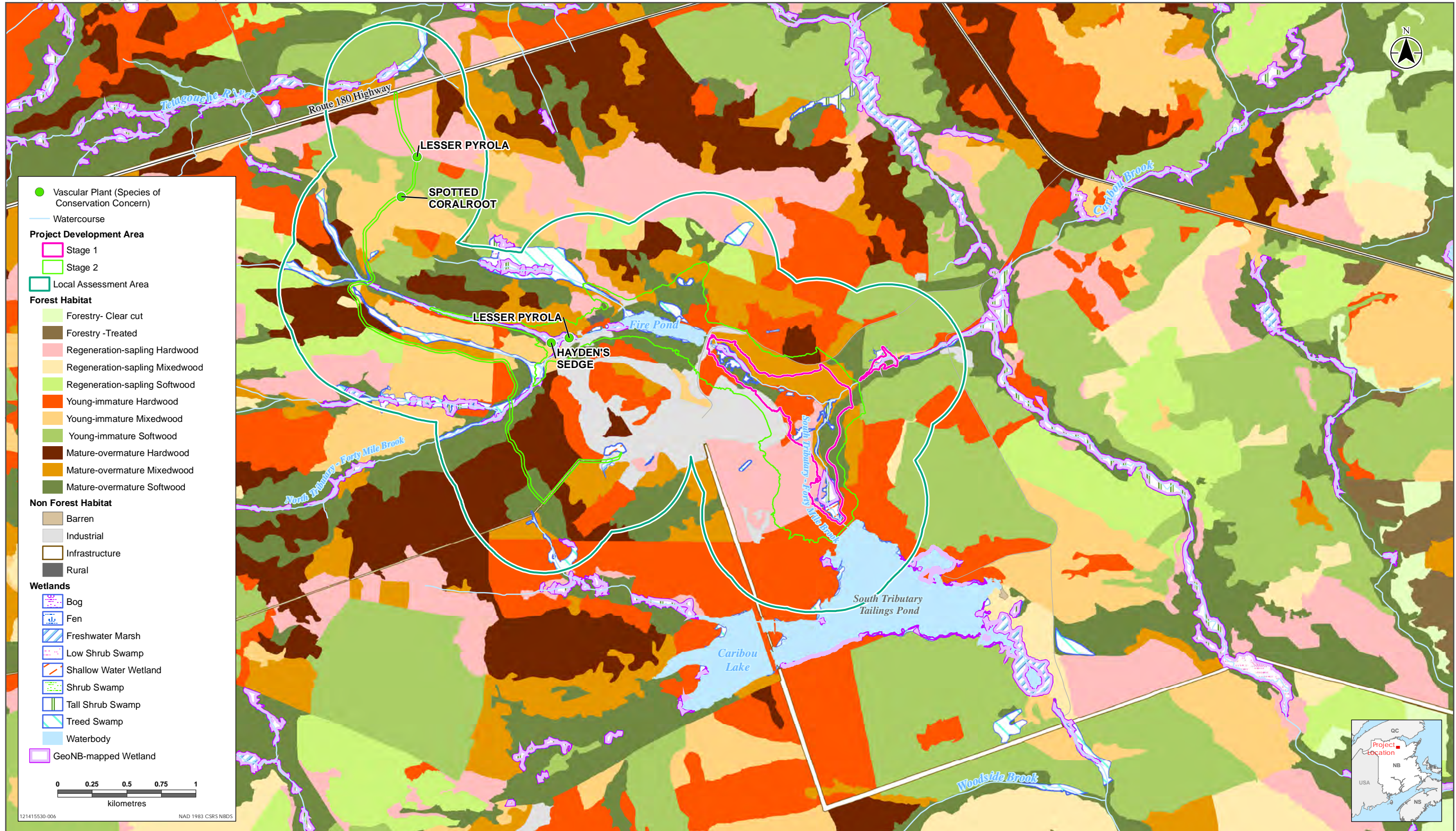
In total, 6.52 ha of wetland was delineated within the Stage 1 PDA (Table 4.2, Figure 4.1). Of this, 1.72 ha of wetlands are considered by New Brunswick Department of Environment and Local Government (NBDELG) to be regulated by the *Watercourse and Wetland Alteration Regulation* under the *Clean Water Act* because they are displayed on the “Regulated Wetlands Map” layer available on GeoNB (NBDELG 2017; SNB 2011). These wetlands (also referred to herein as GeoNB-mapped wetlands) are larger on the GeoNB website than were found in the field because portions of these wetlands (as presented by GeoNB) were determined in the field to be upland. No vascular plant SAR or SOCC were observed in any of the wetlands within the Stage 1 PDA.

**Table 4.2 Stage 1 Wetland Class, Type, and Area**

Wetland ID	Wetland Class and Type	Area (ha)	Area within Stage 1 PDA (ha)	% Area of Stage 1
1	Shallow water wetland and freshwater marsh	1.08	1.08	2.53
2	Tall shrub swamp	1.47	1.47	3.44
3	Tall shrub swamp	0.22	0.22	0.52
4	Tall shrub swamp	0.56	0.56	1.31
5	Tall shrub swamp	0.86	0.86	2.01
6	Tall shrub swamp	0.75	0.3	0.70
7	Coniferous treed swamp	0.08	0.08	0.19
8	Coniferous treed swamp	0.15	0.15	0.35
9	Coniferous treed swamp	0.10	0.1	0.23
10	Coniferous treed swamp	0.01	0.01	0.02
11	Coniferous treed swamp	0.04	0.04	0.09
12	Coniferous treed swamp	0.19	0.19	0.45
13	Coniferous treed swamp	0.59	0.59	1.38
14	Freshwater marsh	0.12	0.12	0.28
15	Freshwater marsh and coniferous treed swamp	0.75	0.75	1.76
<b>Total</b>		<b>6.97</b>	<b>6.52</b>	<b>15.28</b>

The wetlands within the Stage 1 PDA are discussed below.





Sources: Base Data - from the Government of New Brunswick and Atlantic Canada Conservation Data Centre, and Stantec.  
Service Layer Credits:

Upland and Wetland Vegetation Communities and Vascular Plant Species of Conservation Concern





Sources: Base Data - from the Government of New Brunswick, Atlantic Canada Conservation Data Centre and Stantec. Service Layer Credits: Service New Brunswick/Service Nouveau Brunswick

Wetlands and Vascular Plant Species of Concern within the Project Development Area





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## Shallow Water Wetlands

Wetland 1 is the only wetland in the PDA that contains shallow water wetland. This wetland is within the existing Polishing Pond and developed when an area of tall shrub swamp associated with the South Tributary to Forty Mile Brook (formerly part of Wetland 2) was inundated due to construction of the Polishing Pond dam. It lies within a managed industrial area. The flooded portion of the wetland is classified as floating aquatic lacustrine water. Average water depth in the pond is approximately 1 m and it supports a relatively heavy growth of submerged and floating leaved aquatic plants. The most abundant species include green-fruited burreed (*Sparganium emersum*), alpine pondweed (*Potamogeton alpinus*), and large water-starwort (*Callitriche heterophylla*).

## Tall Shrub Swamps

Five tall shrub swamps are found within the Phase 1 PDA (Wetland 2 through Wetland 6). These wetlands are all associated with the South Tributary to Forty Mile Brook which drains the South Tributary Tailings Pond (STTP) and associated Polishing Pond. Two tall shrub swamp forms are present including tall shrub riverine swamp and tall shrub drainageway swamp. The tall shrub riverine swamps are found on the floodplain of South Tributary to Forty Mile Brook while the tall shrub drainageway swamps are found on seepage tracks that drain into South Tributary to Forty Mile Brook. The vegetation of these wetlands is quite variable even within wetland forms; however, there are features of their plant communities that are characteristic of the entire suite of tall shrub swamps. The tree layer is sparse and is composed of a mixture of balsam fir (*Abies balsamea*), paper birch (*Betula papyrifera*), white spruce (*Picea glauca*), and black spruce (*Picea mariana*). The shrub layer is characterized by a moderately dense tall shrub overstory that is dominated by speckled alder (*Alnus incana*). Red raspberry (*Rubus idaeus*) is typically present in the understory. The ground vegetation layer is usually composed of a mixture of bluejoint reed grass (*Calamagrostis canadensis*), purple-stemmed aster (*Symphotrichum puniceum*), ostrich fern (*Matteuccia struthiopteris*), and tall meadow-rue (*Thalictrum pubescens*).

## Coniferous Treed Swamps

Eight coniferous treed swamps are found along the North Tributary to Forty Mile Brook that drains the Fire Pond. Six of these coniferous treed swamps are coniferous treed basin swamps and the remaining two are coniferous treed drainageway swamps. The coniferous treed basin swamps are all found on the south side of the North Tributary to Forty Mile Brook on a terrace at the foot of a long slope. The mine site is located at the top of the slope. The basins on the terrace are fed by seepage tracks most of which are located near the base of the slope. The basin swamps are arranged in a line running east to west that runs parallel to the North Tributary to Forty Mile Brook. The basin swamps have similar plant communities. Vegetation cover is notably sparse in these wetlands. Tree cover consists largely of scattered balsam fir and black spruce. Shrub cover is also relatively sparse and consists of stunted black spruce, balsam fir and paper birch. Ground vegetation cover is composed almost entirely of scattered patches of fire moss (*Ceratodon purpureus*) as well as small clumps of bulrushes (*Scirpus* spp.) and sedges (*Carex* spp.). Much of the surface of these wetlands is unvegetated substrate and pools. The species composition and physiognomy of these wetlands is unusual and may be indicative of disturbance effects. Measurements of the pH and conductivity of surface water within the wetland were taken at each



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of the coniferous treed basin swamps (Table 4.3). The pH readings for the coniferous treed basin swamps were lowest in those wetlands closest to and downhill from the Anaconda tailings ponds. Wetland 11 had the lowest pH, at 3.43, and Wetland 9, downslope from the tailings ponds, had a pH of 3.46 (Table 4.3). Wetland 7 at the eastern end of the distribution also had a low pH reading (4.21). The pH of the last coniferous treed basin swamp in the series (Wetland 15) was 4.70. These results suggest that these wetlands have been affected by acidic drainage. The location of the mine site upslope of these wetlands may indicate that the acidic drainage may be attributable to historical mining activities.

Two coniferous drainageway swamps are found in the PDA. Both of these swamps (Wetlands 13 and 15) are located to the west of the coniferous treed basin swamps along seepage tracks that arise from the lower slopes of the large hill. There was no evidence of acidic drainage in these wetlands with surface water pH readings of 5.19 and 5.26. The species composition of the tree and shrub layers were similar in these wetlands. The tree layer consists of a mixture of balsam fir, white spruce, and black spruce. The shrub layer is composed mainly of stunted balsam fir. The ground vegetation layer is characterized by carpet of sphagnum mosses (*Sphagnum* spp.). At Wetland 13, the sphagnum moss carpet is punctuated by patches of bluejoint reed grass and woodland horsetail (*Equisetum sylvaticum*). At Wetland 15, sensitive fern (*Onoclea sensibilis*) and spinulose wood fern (*Dryopteris carthusiana*) are co-dominant with the sphagnum mosses.

**Table 4.3 pH of Stage 1 Wetlands**

Wetland Number	Wetland Class and Type	pH
1	Shallow water wetland and freshwater marsh	7.84
2	Tall shrub swamp	7.69
3	Tall shrub swamp	7.23
4	Tall shrub swamp	7.08
5	Tall shrub swamp	4.85
6	Tall shrub swamp	N/A <sup>1</sup>
7	Coniferous treed swamp	4.21
8	Coniferous treed swamp	3.70
9	Coniferous treed swamp	3.46
10	Coniferous treed swamp	3.51
11	Coniferous treed swamp	3.43
12	Coniferous treed swamp	4.70
13	Coniferous treed swamp	5.19
14	Freshwater marsh	5.19
15	Freshwater marsh and coniferous treed swamp	5.26

<sup>1</sup> No surface water was present in the wetland at the time of field surveys.

Freshwater Marshes

Freshwater marsh is found in Wetlands 1, 14, and 15. At Wetland 1, freshwater marsh forms a fringe around the pond at the base of the tailings pond dam. This freshwater marsh is classified as a grass-



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dominated lacustrine marsh. Tree cover is absent and shrub cover consists of scattered patches of speckled alder and white meadowsweet (*Spiraea alba*). The dominant ground vegetation species are bluejoint reed grass, American burreed (*Sparanium americanum*), and fowl manna grass (*Glyceria striata*).

The freshwater marsh at Wetland 14 is classified as a graminoid-dominated slope marsh. It is situated near the base of the road bed that forms the water control structure for the Fire Pond. Water percolating through the roadbed provides the water source for the marsh. Like Wetland 1, tree cover is absent. Shrub cover consists largely of a few scattered speckled alder and pussy willow (*Salix discolor*). The ground vegetation is mostly composed of a mixture of nodding sedge (*Carex gynandra*), bluejoint reed grass, and small-fruited bulrush (*Scirpus microcarpus*).

The freshwater wetland portion of Wetland 15 is classified as a bulrush-dominated riparian floodplain marsh. This portion of Wetland 15 has developed on what appears to be a tailings deposit on the floodplain of North Tributary to Forty Mile Brook. These deposits are periodically inundated during spring freshets and heavy precipitation events and are saturated when water levels in North Tributary to Forty Mile Brook are high. The vegetation of this marsh is composed almost entirely of small-fruited bulrush. Small amounts of rough bent grass (*Agrostis scabra*), and moss are mixed with the bulrush in the ground vegetation layer. Shrub cover is restricted to areas of higher elevation and consists of scattered black spruce and paper birch. A few larger black spruce form the tree layer.

## 4.2.1.2 Stage 1 Wetland Functions

WESP-AC functional assessment scores tables for each of the Stage 1 wetlands are presented in Appendix A (Tables A.2 – A.16). For each function, wetlands are scored as “lower,” “moderate,” or “higher” which is relative to New Brunswick reference wetlands used in the creation of the WESP-AC system. In addition to evaluating function, the WESP-AC system also assesses wetland ecological condition, or the wetland’s integrity or “naturalness”, and wetland risk, which is an average of the wetland’s external stressors, typically anthropogenic in origin, and its sensitivity, or resiliency to both human and natural-caused stressors.

Wetland 1 contains shallow water wetland and freshwater marsh wetland types. This wetland scored higher for aquatic support and aquatic habitat as it provides streamflow support to South Tributary to Forty Mile Brook, provides water cooling and organic nutrient export function, and scored high for providing water bird feeding and nesting habitat, as well as amphibian and turtle habitat. The wetland likely scored high for wildlife habitat functions because of the open water component of its shallow water wetland type. In reality, the wetland formed within the Polishing Pond and is not a typical shallow water wetland; it likely does not represent high functioning wildlife habitat. The wetland has moderate surface water storage function and scored lower for water quality support and transition habitat. The wetland is considered to have moderate ecological condition, and scored higher for wetland risk, which considers both the sensitivity of the wetland and the external stressors. The wetland stressors scored higher in part because of the documented water toxicity within and downstream of the wetland.



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Wetlands 2-5 are tall shrub wetlands associated with South Tributary to Forty Mile Brook (Wetland 4 is a slope wetland but drains into South Tributary to Forty Mile Brook). These tall shrub wetlands all scored similarly to each other for grouped functions. All wetlands scored moderate for surface water storage and low for water quality support except for Wetland 4, which scored low for surface water storage. All wetlands scored high for aquatic support and transition habitat, and moderate for aquatic habitat. These wetlands provide some fish habitat, but do not support anadromous fish and do not have open water components (other than the associated South Tributary to Forty Mile Brook) to support water bird feeding or nesting. These wetlands scored higher for ecological condition, because they show no direct impacts from the surrounding industrial land use, and higher for risk, as water toxicity has been documented both up and downstream of these wetlands (Stantec 2018).

Wetland 6 is also a tall shrub wetland, but is further downstream of Wetlands 2-5, on the north bank of Forty Mile Brook. This wetland scored low for surface water storage and moderate for water quality support, but otherwise scored similarly to the other tall shrub wetlands (Wetlands 2-5) described above.

Wetlands 7-13 are coniferous treed swamps, and all but Wetland 10 are associated with the North Tributary to Forty Mile Brook. These wetlands have few function scores in common. All but Wetland 7 scored higher for aquatic support (i.e., stream flow support, aquatic invertebrate habitat, organic nutrient export, and water cooling), and all scored moderate for aquatic habitat (including habitat for resident fish, amphibian and turtles, water bird feeding and water bird nesting). Surface water storage scores were lower to moderate for the treed swamps, and water quality support was lower to moderate. Treed swamps typically scored moderate for ecological condition, with the exception of Wetlands 11 and 13, which scored lower, and Wetland 12, which scored higher. Wetland risk was moderate or higher for each of the treed swamps. Although there is no water toxicity information for these wetlands or areas upstream, there have been elevated levels of water contaminants recorded downstream close to Wetland 7 (Stantec 2018), and pH levels in the treed swamps were generally quite low (i.e., acidic), particularly for those wetlands further from the Fire Pond.

Wetland 14 is a freshwater marsh which scored lower for surface water storage and water quality support, and higher for aquatic support and aquatic habitat. Transition habitat (songbird, raptor, and mammal habitat, as well as pollinator habitat and native plant habitat) is considered moderate for this wetland. The wetland ecological condition is rated moderate, and the risk is higher.

Wetland 15 is a wetland complex composed of freshwater marsh and treed swamp. This wetland scored moderate for all grouped functions with the exception of transition habitat, which was rated higher. This wetland has a moderate ecological condition and higher risk.

## 4.2.1.3 Stage 2 Wetlands

Following field surveys completed in August 2018, the amount of wetland within the Stage 2 PDA (but outside of Stage 1 PDA) was refined from what was interpreted from aerial photography for the EIA registration to 8.96 ha (Table 4.4, Figure 4.1). Of this, 3.75 ha are GeoNB-mapped wetlands. As with the Stage 1 PDA, these wetlands are larger on the GeoNB website, but portions of these wetlands were



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determined in the field to be upland. Detailed surveys of the Stage 2 PDA will occur prior to the start of the operation phase, which will include flooding of the Stage 2 PDA.

Four combinations of wetland class and type are present in the Stage 2 PDA including treed swamp, tall shrub swamp, freshwater marsh, and shallow-water wetland. The approximate areas of these wetland class and type combinations based on air photo interpretation and limited field surveys are presented in Table 4.4.

**Table 4.4 Stage 2 Wetland Class, Type, and Area**

Wetland Class and Type	Area (ha)	% Area of Stage 2
Shallow water wetland	0.20	0.18
Freshwater marsh	1.99	1.74
Tall shrub swamp	3.26	2.84
Treed swamp	3.51	3.06
Total	8.96	7.82

Treed swamps encountered during field surveys included mixedwood drainageway swamp and deciduous drainageway swamp found along seepage tracks, and mixedwood treed riverine swamp found on the floodplains of large streams. All the tall shrub swamps encountered during the field visit were tall shrub riverine swamps situated on the floodplains of streams. Marshes encountered during the field visit included graminoid riparian floodplain marsh and graminoid riparian delta marsh. The graminoid riparian floodplain marsh included grass and sedge-dominated beaver meadows that had developed following abandonment and dewatering of beaver ponds. The graminoid riparian delta marsh was found at the point where the North Tributary to Forty Mile Brook flows into the Fire Pond. Sediment from disturbed areas upstream of the marsh was deposited at this point forming a sediment fan which has been colonized by a variety of grasses, bulrushes, and horsetails. Isolated basin water was the only shallow water wetland encountered during the field survey. It was found in a small bay of the Fire Pond that had been isolated by construction of a road.

## 4.2.2 Vascular Plant Species of Conservation Concern (SOCC)

In total, 250 vascular plant species were recorded during surveys conducted in and around the PDA. Of these, no SAR were observed, and three SOCC were observed: spotted coralroot (*Corallorhiza maculata* var. *maculata*; S2S3), lesser pyrola (*Pyrola minor*; S3), and Hayden's sedge (*Carex haydenii*; S3). All observations of SOCC were made within the Stage 2 PDA (Figure 4.1).

Spotted coralroot is ranked S2S3 by the AC CDC, indicating that in New Brunswick, the status of this species is uncertain but is between imperiled and vulnerable (AC CDC 2017; 2018a). This species is a myco-heterotrophic orchid, meaning it has little chlorophyll and receives most of its nutrients through an association with mycorrhizal fungi. The stem is typically reddish, and petals, particularly the lip, are spotted. Spotted coralroot is typically found in older woods with variable canopy cover but little competing understory vegetation (Hinds 2000; NAOCC no date). This species was found within the Stage 2 PDA, in an approximately 30-year-old mixedwood stand, next to a woods road (Figure 4.1).



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Lesser pyrola is ranked S3 by the AC CDC, indicating that the species is vulnerable in New Brunswick (AC CDC 2017; 2018a). This species, also known as little shinleaf, has round to oval leaves and is differentiated from other *Pyrola* species by its straight styles (Hinds 2000). It is typically found in moist, often coniferous woods (Hinds 2000; NEWFS no date a). It was found at two locations within the Stage 2 PDA: near the treed edge of a tall shrub swamp north of G Pond, and in a young white spruce (*Picea glauca*) plantation near the edge of a woods road (Figure 4.1).

Hayden's sedge is ranked S3 by the AC CDC and is thus considered vulnerable in New Brunswick (AC CDC 2017; 2018a). The inflorescence of this species has cylindrical spikelets with dark, brown to reddish-brown scales and inflated perigynia (Hinds 2000). It is an obligate wetland species, typically growing in marshes, wet meadows and fields, and on rocky shores of watercourses and lakes (Hinds 2000; NEWFS no date b). Hayden's sedge was observed within a freshwater marsh (dewatered beaver pond) located west of G Pond (Figure 4.1).

## 4.2.3 Ecological Communities of Conservation Concern

No Ecological Communities of Conservation Concern (ECCC) were identified in the LAA using available digital data sources (Stantec 2018). Field surveys did not identify any unmapped ECCC.

## 4.3 DISCUSSION

Vegetation and wetland surveys conducted in 2018 have provided new information to aid in the assessment of the Project. Land classification (i.e., upland and wetland vegetation communities and non-vegetated land uses) within the Stage 1 and Stage 2 PDAs have been refined. In total, 6.5 ha of wetland were delineated within the Stage 1 PDA, of which 1.7 ha are regulated by the *Watercourse and Wetland Alteration Regulation* under the *Clean Water Act*. Vascular plant surveys confirmed the presence of several SOCC within the Stage 2 PDA that were predicted to be potentially present within the PDA (lesser pyrola and Hayden's sedge, Stantec 2018), and resulted in the identification of an additional SOCC within the Stage 2 PDA: spotted coralroot.

As discussed in the EIA, the construction of the Project can result in changes to vegetation communities through site preparation, edge effects, introduction of invasive species, and ultimately, direct loss from flooding.

Flooding to create the new TMF basin for Stage 1 of the Project will result in the conversion of 42.7 ha of land to aquatic systems. This will result in the loss of 34.9 ha of forest habitat, and 6.5 ha of wetland habitat, including 1.72 ha of GeoNB-mapped wetlands. These amounts are lower than the 14.1 ha of GeoNB-mapped wetland habitat previously reported in the EIA Registration (Stantec 2018) and more accurate because they are based on field delineations rather than aerial photo interpretation.

Some wetlands adjacent to the flooded TMF basin may experience changes to hydrology and ultimately vegetation resulting from a higher water table. It is not possible to accurately predict the extent to which these changes may occur as this will be influenced by a number of factors, including but not limited to existing hydrology (including the current water table level), existing vegetation (and its tolerance to



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fluctuations in water level and soil saturation), soil characteristics (including permeability and texture), and surrounding topography. However, it is not expected to affect more than 0.45 ha of wetland at most (the amount directly adjacent to the Stage 1 PDA, Table 4.2). Changes to wetland function are possible, particularly if the vegetation changes are great enough to shift the vegetation type of the wetland. Although these potential changes cannot be accurately predicted, monitoring of wetlands adjacent to the TMF is not recommended as these wetlands will eventually be flooded by the Stage 2 TMF in approximately 2025, and are included in the amount of wetland that will be lost during that stage.

Operation of the Project is not expected to result in the direct disturbance or loss of remaining vegetation or wetlands. Some small-scale changes to vegetation or wetlands fringing the TMF basin may result from changes to water quantity or quality.

The closure phase of the Project includes raising the TMF dam, resulting in additional flooding within the Stage 2 PDA. Flooding associated with the Stage 2 TMF dam will affect the mine site access road; therefore, upgrades to an alternative access road is part of the Stage 2 PDA. One observation of lesser pyrola north of G Pond, and Hayden's sedge noted west of G Pond, are within the area planned to be flooded during Stage 2 and will be lost. It may be possible to avoid the lesser pyrola as well as the spotted coralroot, both observed adjacent to the road to be upgraded, when the design details for the road upgrade are finalized. However, none of these are SAR, and if the Project results in the loss of all four observed individuals observed in the Stage 2 PDA, the long-term survival of these species within the local surrounding landscape is not expected to be substantially reduced as a result of the Project. There are additional previous records of two of the three species (AC CDC 2018b), and the S-ranks of the three species indicate it is highly likely there are other instances of these species in the surrounding area.

Flooding for the Stage 2 level of the TMF dam and the construction of the alternative access road will result in the loss or conversion to aquatic system of an additional 114.7 ha of land, including approximately 86.1 ha of forest and approximately 9.0 ha of wetland, of which 3.75 ha are GeoNB-mapped wetlands. These values are approximate because only a portion of the Stage 2 PDA was surveyed: further surveys of the Stage 2 PDA will be completed prior to the start of Stage 2.

No additional mitigation measures beyond what is presented in the EIA are recommended based on the updated information presented in this technical data report, nor does this new information change the conclusions of the EIA with respect to vegetation and wetlands. With the implementation of mitigation measures outlined in the EIA, the potential interactions between the Project and vegetation and wetlands during construction, operation, and closure are not expected to be substantive on the local, regional, or provincial scale.

## 5.0 WILDLIFE AND WILDLIFE HABITAT

This section provides the results and analyses of bird field surveys that were completed in 2018 and not described in the EIA, as outlined in the follow-up section of the EIA. This includes the results of early breeding bird surveys, owl surveys, and June breeding bird surveys. Interior forest data, which were



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reported on in the EIA, are updated with new habitat metrics resulting from wetland delineations and other field surveys completed in support of the Project (Section 4.0).

## 5.1 METHODS

### 5.1.1 Early Breeding Birds

Early breeding bird surveys, targeting diurnal early-nesting species such as woodpeckers and forest breeding raptors were conducted from May 1-2, 2018. The surveys consisted of an area search within the Stage 1 and 2 PDA as well as the larger LAA. Surveys were conducted in good weather conditions with light winds and no precipitation. Surveys began near dawn and continued until approximately 1300 each survey day. Observers collected data on each bird species observed, and information about environmental conditions. Data for all species observed during the surveys were recorded.

### 5.1.2 Owls

Surveys targeting owl species were conducted during the evening of May 1, 2018. Playback surveys were conducted at five locations within and near the LAA between 2100 and 0000. Each survey was a total of 12 minutes in length and included playbacks of boreal owl (*Aegolius funereus*) and barred owl (*Strix varia*) vocalizations, interspersed with silent listening periods. This survey technique has been shown to increase the detection of barred owls relative to listening only (Takats et al. 2001). Surveys were conducted in good weather conditions with light winds and no precipitation.

### 5.1.3 Breeding Birds

Surveys targeting forest breeding bird species were conducted in the Stage 1 and Stage 2 PDA. Surveys in the Stage 1 PDA involved a Stantec biologist conducting area searches through the PDA recording each species encountered, along with breeding evidence (Stewart et al. 2015) and habitat information. A total of 8 hours of effort was spent in or near the Stage 1 PDA over two days. The area search was selected over point counts for Stage 1 as the riparian nature of the PDA is largely linear, and this approach was expected more likely to detect SAR, if present.

Point counts were conducted at one location within Stage 1 PDA, 10 locations within the Stage 2 PDA plus one location on the boundary between Stage 1 and Stage 2. The point count surveys were based on a modified fixed-radius point count sampling procedure (Bibbey et al. 2000). Observers noted that ambient noise coming from the nearby mining facility was elevated within the Stage 2 PDA, which could have resulted in reduced detection of species beyond 100 m of the centre of the point count.

All surveys began following dawn and continued until approximately 1000. Observers collected data on each bird species observed (including GPS location and breeding evidence), and information about environmental conditions at each survey location including wind conditions, cloud cover, temperature, and precipitation. Surveys took place in good environmental conditions, with light winds, and no precipitation.





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## 5.1.4 Nightjars

Nightjar (i.e., common nighthawk) surveys were planned in the EIA, but following site visits it was determined that there is currently low potential for suitable habitat for nighthawks within the LAA and surrounding area. No nightjar surveys were conducted in support of the Project.

## 5.1.5 Other Wildlife

Incidental wildlife observations were recorded during all bird surveys, as well as during vegetation and wetland surveys conducted in 2018 (Section 4.2).

## 5.1.6 Interior forest

Interior forest is here defined as patches of mature forest greater than 10 ha in size, and at least 100 m from an “edge” (e.g., clearcut, industrial or other anthropogenic area, linear features such as roads or transmission lines, or waterbodies and open wetlands). Some wildlife species are sensitive to fragmentation and prefer or require interior forest habitat. These species, known as interior species, include black-throated blue warbler, hermit thrush, Canada warbler, and ovenbird (LandOwner Resource Centre 2000). Interior forest area was calculated for the EIA (Stantec 2018) and was recalculated following the completion of field surveys, which updated the boundaries and types of habitats within the PDA. Because the forest data available are over 10 years old, stands listed as clearcuts were not buffered for this exercise as they are no longer clearcuts. The interior forest amount calculations may be overestimations as information on recent clearcuts is not available; however, no recent clearcuts were observed within the LAA during field surveys.

## 5.2 RESULTS

### 5.2.1 Early Breeding Birds

Early breeding bird surveys resulted in the identification of 27 species (Table 5.1). These species included four woodpecker species: downy woodpecker (*Picoides pubescens*), yellow-bellied sapsucker (*Sphyrapicus varius*), pileated woodpecker (*Dryocopus pileatus*), and northern flicker (*Colaptes auratus*). No SAR were observed, but one SOCC, pine siskin (*Spinus pinus*, S3) was observed both singly and in flocks of up to 6 birds, at 15 locations in both PDAs, in the LAA, and outside of the LAA. No forest-breeding raptor species were observed.

**Table 5.1 Early Breeding Birds Observed in the Vicinity of the Project**

Common Name	Scientific Name	AC CDC S Rank1
ruffed grouse	<i>Bonasa umbellus</i>	S5
American woodcock	<i>Scolopax minor</i>	S5B,S5M
yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	S5B,S5M
downy woodpecker	<i>Picoides pubescens</i>	S5



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**Table 5.1 Early Breeding Birds Observed in the Vicinity of the Project**

Common Name	Scientific Name	AC CDC S Rank1
northern flicker	<i>Colaptes auratus</i>	S5B,S5M
pileated woodpecker	<i>Dryocopus pileatus</i>	S5
blue jay	<i>Cyanocitta cristata</i>	S5
American crow	<i>Corvus brachyrhynchos</i>	S5
common raven	<i>Corvus corax</i>	S5
tree swallow	<i>Tachycineta bicolor</i>	S4B,S4M
black-capped chickadee	<i>Poecile atricapillus</i>	S5
boreal chickadee	<i>Poecile hudsonicus</i>	S4
red-breasted nuthatch	<i>Sitta canadensis</i>	S5
brown creeper	<i>Certhia Americana</i>	S5
golden-crowned kinglet	<i>Regulus satrapa</i>	S5
ruby-crowned kinglet	<i>Regulus calendula</i>	S4B,S5M
hermit thrush	<i>Catharus guttatus</i>	S5B,S5M
American robin	<i>Turdus migratorius</i>	S5B,S5M
European starling	<i>Sturnus vulgaris</i>	SNA
cedar waxwing	<i>Bombycilla cedrorum</i>	S5B,S5M
palm warbler	<i>Setophaga palmarum</i>	S5B,S5M
fox sparrow	<i>Passerella iliaca</i>	S4B,S5M
white-throated sparrow	<i>Zonotrichia albicollis</i>	S5B,S5M
dark-eyed junco	<i>Junco hyemalis</i>	S5
common grackle	<i>Quiscalus quiscula</i>	S5B,S5M
<b>pine siskin</b>	<b><i>Spinus pinus</i></b>	<b>S3</b>
purple finch	<i>Haemorhous purpureus</i>	S4S5B,SUN,S5M

Note: Species in **bold** text are SOCC.

<sup>1</sup> S1 = critically imperiled, S2 = imperiled, S3 = vulnerable, S4 = apparently secure, S5 = secure, SU = unrankable (due to lack of or conflicting information). S#S# = indicates a range of uncertainty about the status of the species or community. B = breeding, N = non-breeding, M = migrant. (AC CDC 2018a)

### 5.2.2 Owls

No owl species were detected incidentally or during surveys conducted in early May 2018.

### 5.2.3 Breeding Birds

Including incidental observations, point count surveys, and area searches, June breeding bird surveys detected the presence of a total of 65 species within the PDAs and LAA (Table 5.2).



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**Table 5.2 Bird Species Observed During June Breeding Bird Surveys (Area Searches and Point Counts)**

Common Name	Scientific Name	SARA Rank <sup>1</sup>	COSEWIC Rating <sup>1</sup>	NB SARA Rank <sup>1</sup>	AC CDC S Rank <sup>2</sup>	Highest Breeding Status (Stantec)
mallard	<i>Anas platyrhynchos</i>	-	-	-	S5B, S4N, S5M	Observed
green-winged teal	<i>Anas crecca</i>	-	-	-	S4B, S5M	Observed
ring-necked duck	<i>Aythya collaris</i>	-	-	-	S5B, S5M	Probable
ruffed grouse	<i>Bonasa umbellus</i>	-	-	-	S5	Confirmed
common loon	<i>Gavia immer</i>	-	NAR	-	S4B, S4M, S4N	Observed
northern goshawk	<i>Accipiter gentilis</i>	-	NAR	-	S4	Observed
broad-winged hawk	<i>Buteo platypterus</i>	-	-	-	S5B, S5M	Observed
red-tailed hawk	<i>Buteo jamaicensis</i>	-	NAR	-	S4	Possible
spotted sandpiper	<i>Actitis macularius</i>	-	-	-	S3S4B, S5M	Probable
<b>chimney swift</b>	<b><i>Chaetura pelagica</i></b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>S2S3B, S2M</b>	<b>Probable</b>
yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	-	-	-	S5B, S5M	Possible
downy woodpecker	<i>Picoides pubescens</i>	-	-	-	S5	Confirmed
hairy woodpecker	<i>Picoides villosus</i>	-	-	-	S5	Possible
black-backed woodpecker	<i>Picoides arcticus</i>	-	-	-	S4	Possible
northern flicker	<i>Colaptes auratus</i>	-	-	-	S5B, S5M	Possible
pileated woodpecker	<i>Dryocopus pileatus</i>	-	-	-	S5	Possible
alder flycatcher	<i>Empidonax alnorum</i>	-	-	-	S5B, S5M	Possible
least flycatcher	<i>Empidonax minimus</i>	-	-	-	S5B, S5M	Confirmed
blue-headed vireo	<i>Vireo solitarius</i>	-	-	-	S5B, S5M	Possible
red-eyed vireo	<i>Vireo olivaceus</i>	-	-	-	S5B, S5M	Possible
blue jay	<i>Cyanocitta cristata</i>	-	-	-	S5	Possible
American crow	<i>Corvus brachyrhynchos</i>	-	-	-	S5	Observed
tree swallow	<i>Tachycineta bicolor</i>	-	-	-	S4B, S4M	Possible
<b>barn swallow</b>	<b><i>Hirundo rustica</i></b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>S2B, S2M</b>	<b>Confirmed</b>
black-capped chickadee	<i>Poecile atricapillus</i>	-	-	-	S5	Confirmed
boreal chickadee	<i>Poecile hudsonicus</i>	-	-	-	S4	Possible
red-breasted nuthatch	<i>Sitta canadensis</i>	-	-	-	S5	Confirmed
brown creeper	<i>Certhia Americana</i>	-	-	-	S5	Possible



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**Table 5.2 Bird Species Observed During June Breeding Bird Surveys (Area Searches and Point Counts)**

Common Name	Scientific Name	SARA Rank <sup>1</sup>	COSEWIC Rating <sup>1</sup>	NB SARA Rank <sup>1</sup>	AC CDC S Rank <sup>2</sup>	Highest Breeding Status (Stantec)
golden-crowned kinglet	<i>Regulus satrapa</i>	-	-	-	S5	Probable
ruby-crowned kinglet	<i>Regulus calendula</i>	-	-	-	S4B, S5M	Possible
veery	<i>Catharus fuscescens</i>	-	-	-	S4B, S4M	Possible
Swainson's thrush	<i>Catharus ustulatus</i>	-	-	-	S5B, S5M	Possible
hermit thrush	<i>Catharus guttatus</i>	-	-	-	S5B, S5M	Confirmed
American robin	<i>Turdus migratorius</i>	-	-	-	S5B, S5M	Confirmed
cedar waxwing	<i>Bombycilla cedrorum</i>	-	-	-	S5B, S5M	Possible
Nashville warbler	<i>Oreothlypis ruficapilla</i>	-	-	-	S5B, S5M	Possible
northern parula	<i>Setophaga Americana</i>	-	-	-	S5B, S5M	Possible
yellow warbler	<i>Setophaga petechia</i>	-	-	-	S5B, S5M	Possible
chestnut-sided warbler	<i>Setophaga pensylvanica</i>	-	-	-	S5B, S5M	Possible
magnolia warbler	<i>Setophaga magnolia</i>	-	-	-	S5B, S5M	Possible
<b>Cape May warbler</b>	<b><i>Setophaga tigrina</i></b>	-	-	-	<b>S3B, S4S5M</b>	<b>Possible</b>
black-throated blue warbler	<i>Setophaga caerulescens</i>	-	-	-	S5B, S5M	Possible
yellow-rumped warbler	<i>Setophaga coronata</i>	-	-	-	S5B, S5M	Possible
black-throated green warbler	<i>Setophaga virens</i>	-	-	-	S5B, S5M	Possible
blackburnian warbler	<i>Setophaga fusca</i>	-	-	-	S5B, S5M	Possible
bay-breasted warbler	<i>Setophaga castanea</i>	-	-	-	S4B, S4S5M	Possible
blackpoll warbler	<i>Setophaga striata</i>	-	-	-	S3S4B, S5M	Possible
black-and-white warbler	<i>Mniotilta varia</i>	-	-	-	S5B, S5M	Possible
American redstart	<i>Setophaga ruticilla</i>	-	-	-	S5B, S5M	Confirmed
ovenbird	<i>Seiurus aurocapilla</i>	-	-	-	S5B, S5M	Confirmed
northern waterthrush	<i>Parkesia noveboracensis</i>	-	-	-	S4B, S5M	Possible



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**Table 5.2 Bird Species Observed During June Breeding Bird Surveys (Area Searches and Point Counts)**

Common Name	Scientific Name	SARA Rank <sup>1</sup>	COSEWIC Rating <sup>1</sup>	NB SARA Rank <sup>1</sup>	AC CDC S Rank <sup>2</sup>	Highest Breeding Status (Stantec)
common yellowthroat	<i>Geothlypis trichas</i>	-	-	-	S5B, S5M	Possible
Wilson's warbler	<i>Cardellina pusilla</i>	-	-	-	S4B, S5M	Possible
<b>Canada warbler</b>	<b><i>Cardellina canadensis</i></b>	<b>T</b>	<b>T</b>	<b>T</b>	<b>S3B, S3M</b>	<b>Possible</b>
white-throated sparrow	<i>Zonotrichia albicollis</i>	-	-	-	S5B, S5M	Probable
dark-eyed junco	<i>Junco hyemalis</i>	-	-	-	S5	Possible
rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	-	-	-	S4B, S4M	Possible
red-winged blackbird	<i>Agelaius phoeniceus</i>	-	-	-	S4B, S4M	Possible
common grackle	<i>Quiscalus quiscula</i>	-	-	-	S5B, S5M	Confirmed
<b>pine siskin</b>	<b><i>Spinus pinus</i></b>	-	-	-	<b>S3</b>	<b>Possible</b>
American goldfinch	<i>Spinus tristis</i>	-	-	-	S5	Possible
<b>evening grosbeak</b>	<b><i>Coccothraustes vespertinus</i></b>	<b>NS</b>	<b>SC</b>	-	<b>S3B, S3S4N, SUM</b>	<b>Possible</b>
gray jay	<i>Perisoreus canadensis</i>	-	-	-	S4	Probable
winter wren	<i>Troglodytes hiemalis</i>	-	-	-	S5B, S5M	Possible
purple finch	<i>Haemorhous purpureus</i>	-	-	-	S4S5B, SUN, S5M	Possible

Note: Species in **bold** text are SAR or SOCC.

<sup>1</sup> For SARA, COSEWIC, and NB SARA ranks, T = Threatened, SC = Special Concern, NS = No Status

<sup>2</sup> S1 = critically imperiled, S2 = imperiled, S3 = vulnerable, S4 = apparently secure, S5 = secure, SU = unrankable (due to lack of or conflicting information). S#S# = indicates a range of uncertainty about the status of the species or community. B = breeding, N = non-breeding, M = migrant. (AC CDC 2018a)

Most of the habitats in the PDAs and surrounding LAA were included in the point count or area search surveys. Birds in several additional habitats were captured only through incidental observations. The number of bird species observed in each habitat (during surveys, and, in parentheses, with the addition of incidental observations) is provided in Table 5.3.



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**Table 5.3 Bird Species Richness by Habitat Type**

Land Classification	Species Richness	Area within the Stage 1 PDA (ha)	Area within the Stage 2 PDA (ha)	Area within the LAA (ha)
Industrial	9 (14)	1.26	11.70	79.34
Infrastructure	0 (1)	-	0.77	9.63
Rural	0	-	0.57	0.57
<b>Forest Types</b>				
Regeneration-sapling Hardwood	30 (32)	5.48	17.90	122.64
Regeneration-sapling Mixedwood	0	-	0.30	5.26
Regeneration-sapling Softwood	0	-	0.42	31.49
Young-immature Hardwood	25 (28)	6.36	16.65	175.86
Young-immature Mixedwood	0 (1)	0.19	3.22	95.58
Young-immature Softwood	24 (25)	0.07	0.88	122.93
Mature-overmature Hardwood	8 (9)	-	2.92	112.57
Mature-overmature Mixedwood	29 (29)	12.62	21.20	136.47
Mature-overmature Softwood	33 (35)	10.18	22.58	135.72
<b>Wetlands</b>				
Shallow Water Wetland	0 (1)	0.87	0.20	2.40
Freshwater Marsh	4	0.55	1.99	8.54
Low Shrub Swamp	0	-	-	0.32
Tall Shrub Swamp	5 (10)	3.40	3.26	14.22
Treed Swamp	2	1.70	3.51	39.41
Waterbody	1	-	6.60	2.57

Note: Species Richness values are the number of species recorded in each habitat during point counts and transect surveys. Values in parentheses indicate all observations, including incidentals.

**5.2.3.1 Bird Species at Risk and Species of Conservation Concern**

Of the species observed during June breeding bird surveys, four were SAR: chimney swift (*Chaetura pelagica*), barn swallow (*Hirundo rustica*), Canada warbler (*Cardellina canadensis*) and evening grosbeak (*Coccothraustes vespertinus*); and two were SOCC, Cape May warbler (*Dendroica tigrina*) and pine siskin (*Spinus pinus*) (Table 5.4, Figure 5.1). Cape May warbler was observed in the Stage 1 PDA, and Cape May warbler and Canada warbler were observed in the Stage 2 PDA. Other SAR and SOCC were observed outside of the Stage 1 and Stage 2 PDAs. Bird SAR observed during surveys are discussed below.



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**Table 5.4 SAR and SOCC Observed During June Breeding Bird Surveys**

Common Name	SARA Rank <sup>1</sup>	COSEWIC Rank <sup>1</sup>	NB SARA Rank <sup>1</sup>	AC CDC S Rank <sup>2</sup>	Number of Individuals Observed	Highest Breeding Evidence (MBBA <sup>3</sup> )	Highest Breeding Evidence (Stantec)	SAR/SOCC
chimney swift	T	T	T	S2S3B, S2M	4	-	Probable	SAR
barn swallow	T	T	T	S2B, S2M	6	Possible	Confirmed	SAR
Canada warbler	T	T	T	S3B, S3M	2	Possible	Possible	SAR
evening grosbeak	-	SC	-	S3B, S3S4N, SUM	3	-	Possible	SAR
Cape May warbler	-	-	-	S3B, S4S5M	9	Possible	Possible	SOCC
pine siskin	-	-	-	S3	8	Probable	Possible	SOCC

<sup>1</sup> For SARA, COSEWIC, and NB SARA ranks, T = Threatened, SC = Special Concern, NS = No Status

<sup>2</sup> S1 = critically imperiled, S2 = imperiled, S3 = vulnerable, S4 = apparently secure, S5 = secure, SU = unrankable (due to lack of or conflicting information). S#S# = indicates a range of uncertainty about the status of the species or community. B = breeding, N = non-breeding, M = migrant. (AC CDC 2018a)

<sup>3</sup> MBBA = Maritimes Breeding Bird Atlas

### Chimney Swift

Chimney swifts are small aerial insectivores that nest in Canada from the Maritime Provinces as far west as eastern Saskatchewan. Chimney swift is ranked as *threatened* on Schedule 1 of SARA and under NB SARA, and S2S3B, S3M by the AC CDC, indicating that the breeding populations of this species are considered imperiled to vulnerable and migrating populations are considered *vulnerable* in New Brunswick.

Chimney swifts are unable to perch horizontally on branches or other objects. Instead they perch on vertical surfaces such as the interiors of hollow trees and chimneys. Prior to European colonization of North America, chimney swifts traditionally nested in large hollow trees. Widespread harvesting of old growth forests reduced the availability of potential nesting sites; however, the extensive construction of masonry chimneys in the 19<sup>th</sup> and early 20<sup>th</sup> centuries provided abundant nesting and roosting sites. As masonry chimneys came into disuse and were demolished, suitable nesting and roosting sites for chimney swifts were greatly reduced, which is one of the factors believed to be contributing to declines in chimney swift populations. Chimney swifts were observed in a young-immature hardwood stand in the southern part of the LAA near the South Tributary Tailings Pond (the existing tailings pond) and flying around one of the mine site buildings. Both observations were made in the LAA, outside of the Stage 1 and Stage 2 PDAs. This species was not previously reported by the AC CDC within 5 km of the PDA (AC CDC 2018b).

It is unlikely that chimney swifts are currently nesting in the PDA. No loss of chimney swift nesting habitat is anticipated to occur as a result of development of the PDA.



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## Barn Swallow

The barn swallow is a mid-sized passerine that is closely associated with rural human settlements. This species is the most widespread swallow in the world and is known to breed in all provinces and territories in Canada (COSEWIC 2011). The barn swallow is ranked as *threatened* under Schedule 1 of SARA and under NB SARA, and S2B, S2M by the AC CDC indicating that the breeding and migrating populations of this species are considered imperiled in New Brunswick (AC CDC 2017).

Following European settlement of North America, barn swallows shifted from nesting in caves and on ledges to nesting largely in man-made structures. This insectivorous species prefers open habitats for foraging such as pastoral lands, shorelines, and cleared rights-of-way. No suitable nesting habitat was found in the PDA during the field surveys. The aquatic habitats present in and near the PDA provide foraging habitat for barn swallows. Barn swallows were observed at the mine site, within the LAA, and one occupied nest was recorded in one of the buildings. It is likely that other barn swallow nests may be found on other structures on the active mine site. The most recent MBBA (Stewart et al. 2015) data suggests the relative abundance of barn swallow in the area of the Project is approximately 0.01-0.02 birds per 15 point counts, compared with a relative abundance of 1.6+ birds per 15 point counts in the most densely populated areas. This species was also reported by the AC CDC within 5 km of the PDA (AC CDC 2018b).

Given the lack of suitable nesting habitat within the PDA, no loss of barn swallow nesting habitat is anticipated to occur as a result of development of the PDA. Nesting sites are associated with structures on the active mine site. The surrounding LAA (aside from the mine site) contains no suitable structures on which barn swallows could nest.

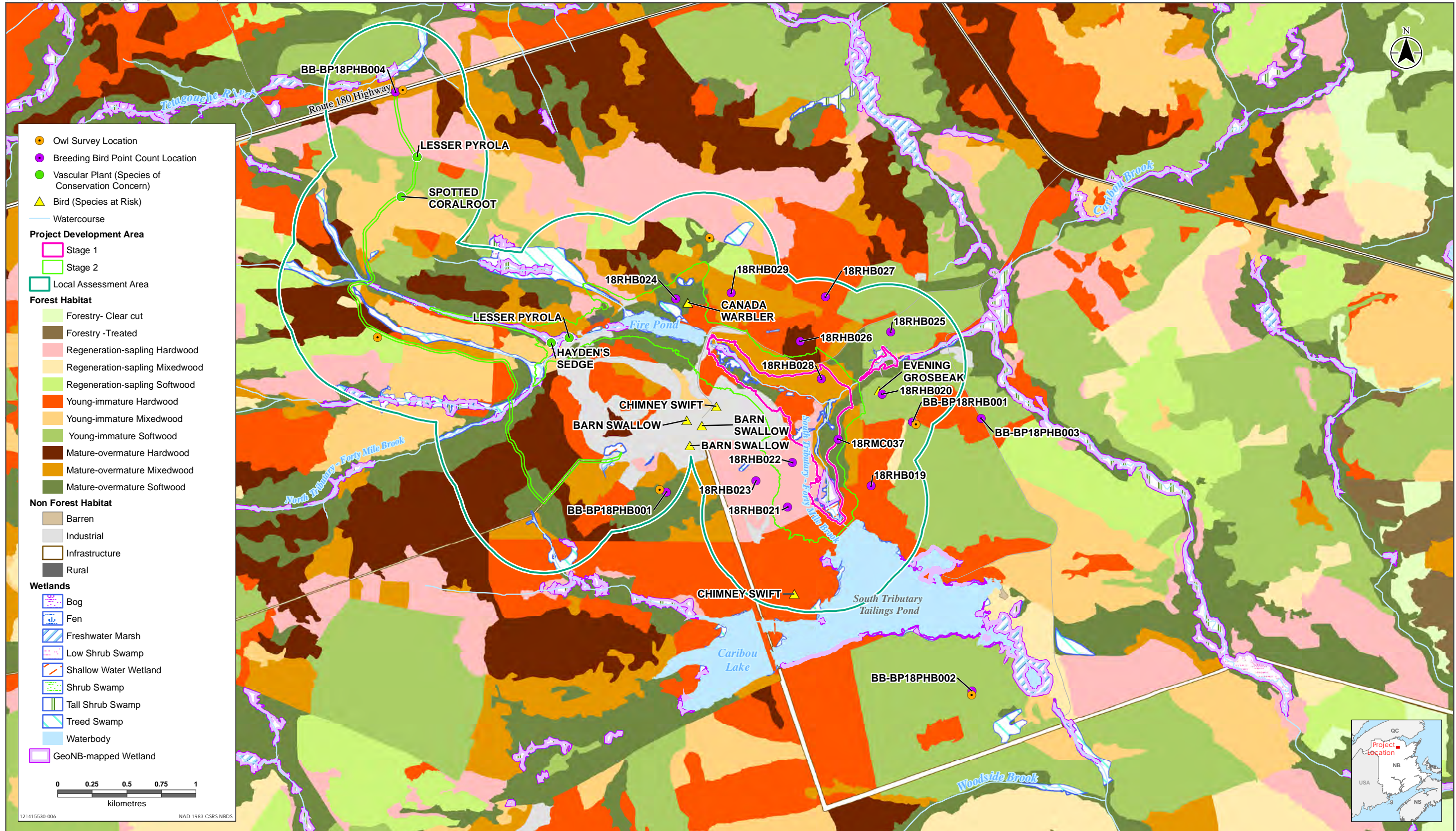
## Canada Warbler

Canada warbler is a small and brightly-coloured passerine. Approximately 80% of the entire breeding range of this species is located in Canada (COSEWIC 2008), where it can be found breeding in every province and territory except Newfoundland and Labrador and Nunavut. Canada warbler is ranked as *threatened* on Schedule 1 of SARA and under NB SARA, and S3B, S3M by the AC CDC, indicating that the breeding and migrating populations of this species are considered vulnerable in New Brunswick (AC CDC 2017).

Canada warblers breed in a wide range of forest types, including hardwood, softwood, and mixedwood forests. It is often associated with moist mixedwood forest, mature cedar swamps, and riparian shrub forests on slopes and ravines (COSEWIC 2008). The presence of a well-developed shrub layer also seems to be associated with preferred Canada warbler habitat. There is potentially suitable habitat for this species within the PDA and LAA, and the species was observed in the Stage 2 PDA, in a mature-overmature softwood stand north of the Fire Pond (Figure 5.1). The most recent MBBA (Stewart et al. 2015) data suggests the relative abundance of Canada Warbler in the area of the Project is approximately 0.28-0.55 birds per 15 point counts, compared with a relative abundance of 1.1+ per 15 point counts in the most densely populated areas. This species was also reported by the AC CDC within 5 km of the PDA (AC CDC 2018b).







Sources: Base Data - from the Government of New Brunswick and Atlantic Canada Conservation Data Centre, and Stantec.  
Service Layer Credits:

Locations of Bird Species at Risk, Species of Conservation Concern, and Point Counts



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The loss of terrestrial habitat as a result of the Project could potentially reduce the availability of habitat used by Canada warbler, though the extent of removal will be small in comparison to available habitat in and near the LAA. There are no features of the terrestrial habitat within the PDA affected by the Project that would eliminate habitat for Canada warbler that is not available elsewhere in the LAA and the surrounding Crown land.

## Evening Grosbeak

Evening grosbeak is a brightly-coloured, heavysset finch species of northern coniferous forests. This species breeds in all of the Canadian provinces and territories except Nunavut (COSEWIC 2016a). Evening grosbeak is ranked as *special concern* by COSEWIC, and as *S3B, S3S4N* by the AC CDC, indicating that the breeding population of this species are considered vulnerable in New Brunswick, and that the migrating population is considered between vulnerable and apparently secure in New Brunswick (AC CDC 2017).

This species is dependent upon insect outbreaks, which makes defining its preferred nesting habitat difficult. It is generally associated with older coniferous and mixed forests but can utilize various habitats if insect prey are abundant (Stewart et al. 2015). Outside of breeding season, this species relies upon seed crops from various trees in boreal forests but is also attracted to ornamental trees which produce seeds or fruit, and bird feeders stocked with sunflower seeds. There is potentially suitable habitat for this species in the PDA and LAA. This species was observed in a young-immature softwood stand within the LAA, west of the Stage 2 PDA. The most recent MBBA (Stewart et al. 2015) data suggests the relative abundance of evening grosbeak in the area of the Project is approximately 0.5-1 bird per 15 point counts, compared with a relative abundance of 1+ in the most densely populated areas. This species was also reported by the AC CDC within 5 km of the PDA (AC CDC 2018b).

The loss of terrestrial habitat as a result of the Project could potentially reduce the availability of habitat used by evening grosbeak, though the extent of removal will be small in comparison to available habitat in and near the LAA. There are no features of the terrestrial habitat within the PDA affected by the Project that would eliminate habitat for evening grosbeak that is not available elsewhere in the LAA and the surrounding Crown land.

## 5.2.4 Other Wildlife

During 2018 field surveys 16 non-avian wildlife species (or sign of) were observed (Table 5.5). These included 10 mammals and six herpetiles, all of which are ranked S5 (i.e., secure) in New Brunswick by the AC CDC.

**Table 5.5 Non-Avian Wildlife Species Observed in the PDA and LAA**

Common Name	Scientific Name	S rank <sup>1</sup>
snowshoe hare	<i>Lepus Americanus</i>	S5
eastern chipmunk	<i>Tamias striatus</i>	S5
red squirrel	<i>Tamiasciurus hudsonicus</i>	S5



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**Table 5.5 Non-Avian Wildlife Species Observed in the PDA and LAA**

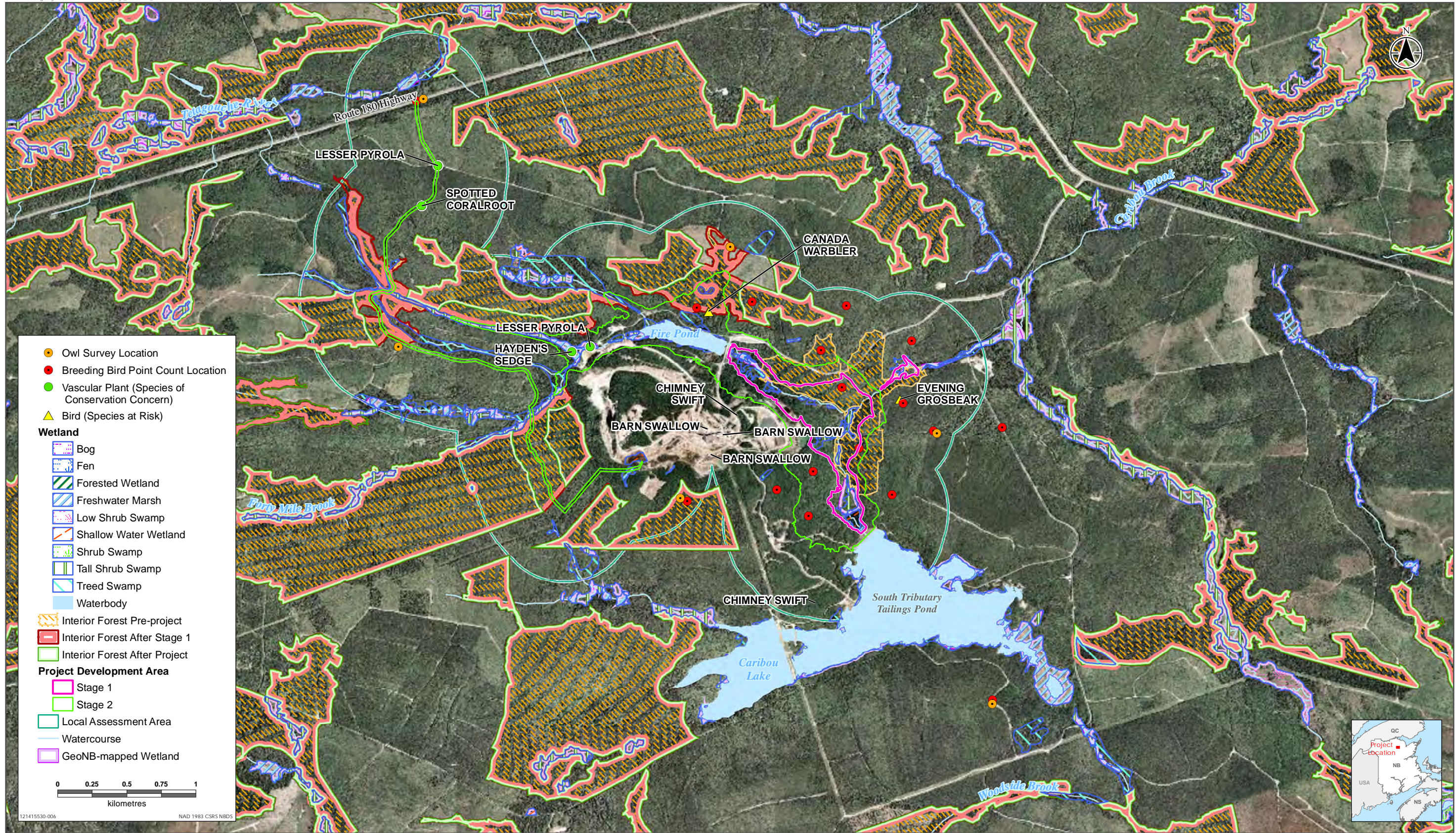
Common Name	Scientific Name	S rank <sup>1</sup>
American beaver	<i>Castor canadensis</i>	S5
North American porcupine	<i>Erethizon dorsatum</i>	S5
eastern coyote	<i>Canis latrans</i>	S5
American black bear	<i>Ursus Americanus</i>	S5
northern raccoon	<i>Procyon lotor</i>	S5
moose	<i>Alces Americanus</i>	S5
white-tailed deer	<i>Odocoileus virginianus</i>	S5
northern two-lined salamander	<i>Eurycea bislineata</i>	S5
American toad	<i>Anaxyrus Americanus</i>	S5
spring peeper	<i>Pseudacris crucifer</i>	S5
pickerel frog	<i>Lithobates palustris</i>	S5
mink frog	<i>Lithobates septentrionalis</i>	S5
wood frog	<i>Lithobates sylvaticus</i>	S5
<sup>1</sup> a rank of S5 indicates the species is secure: common, widespread, and abundant in the province.		

Moose are very common in the area; moose activity was observed at many locations within the PDA (S. Ward, pers. comm. 2018).

### 5.2.5 Interior forest

Based on the updated habitat metrics, there are currently eight patches of approximately 3,520.6 ha of interior forest contiguous with the LAA (Figure 5.2). These patches range in size from 38.4 ha to 2,762.0 ha. One of these patches overlaps Stage 1, and four additional stands overlap or will be affected by (i.e., are within 100 m of) Stage 2. The implementation of Stage 1 will result in the loss of approximately 53.6 ha of interior forest, all from a single patch (Figure 5.2). Following the loss of interior forest in Stage 1, Stage 2 will result in the loss of approximately 98.7 ha of interior forest, but all four affected patches will retain interior forest. One stand will be reduced from 38.4 ha to 38.2 ha, a second stand will be reduced from 84.6 ha to two stands of 33.3 ha and 21.2 ha, a third stand will be reduced from 211.5 ha to two stands of 183.4 ha and 12.1 ha, and a fourth stand will be reduced from 51.9 ha to two stands of 16.4 ha and 16.0 ha.





Sources: Base Data - from the Government of New Brunswick, Atlantic Canada Conservation Data Centre and Stantec.  
 Service Layer Credits: Service New Brunswick/Service Nouveau Brunswick

Interior Forest Contiguous with the Local Assessment Area



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## 5.3 DISCUSSION

Wildlife surveys conducted in 2018 have provided new information to aid in the assessment of the Project. Early and June breeding bird surveys have recorded the presence of 27 and 65 bird species, respectively, in and around the two PDAs for the Project. There were 71 bird species recorded in total, as there was considerable overlap between species observed in May and June. Of the recorded bird species, four are SAR and two are SOCC. Of the SAR and SOCC, only Cape May warbler (SOCC) was observed in the Stage 1 PDA. Canada warbler and several Cape May warbler observations were made in the Stage 2 PDA. The chimney swifts, barn swallows, and the evening grosbeak were observed in the LAA, outside of both the Stage 1 and Stage 2 PDAs. With the mitigation outlined in the EIA, no direct interactions between the Project and SAR or SOCC are expected. Although the flooding of the PDAs represents a loss of 42.68 ha of wildlife habitat, including potential habitat for two SAR (Canada warbler and evening grosbeak) and two SOCC (Cape May warbler and pine siskin), there will be abundant habitat to support these species in the LAA and surrounding area.

No additional mitigation measures beyond what is presented in the EIA are deemed necessary based on the updated information presented in this technical data report, nor does this new information change the conclusions of the EIA, with respect to wildlife and wildlife habitat. Relevant mitigation measures will be added to a Project Specific Environmental Protection Plan (PSEPP) for use by contractors during the construction phase. Examples of such mitigation from the EIA include avoiding certain activities (e.g., land clearing, flooding) during the breeding season for migratory birds and establishing protective buffers of appropriate size around any active nests discovered in construction areas (e.g., nests of common nighthawks (*Chordeiles minor*) or killdeers (*Charadrius vociferus*) could be established in previously cleared areas). The conclusions of the EIA remain unchanged: with the implementation of mitigation, the potential interactions between the Project and wildlife and wildlife habitat during construction, operation, and closure are not expected to be substantive on the local, regional, or provincial scale.

## 6.0 HERITAGE RESOURCES

An Archaeological Impact Assessment (AIA) was completed by Stantec Consulting Ltd (Stantec) in support of the regulatory approval process for the development of the northern tributary tailings pond at Trevali mine. The AIA included background historical research and the field survey of approximately 158 ha of land surrounding the existing facility. This includes approximately 43 ha associated with the Stage 1 PDA and an additional 115 ha associated with the Stage 2 PDA (collectively referred to as “the PDA”, which is the LAA for Heritage Resources).

## 6.1 METHODS

The PDA was assessed through a combination of background historical research and an archaeological field walkover. The methods for both of these activities followed the Guidelines and Procedures for Conducting Professional Archaeological Assessments in New Brunswick (“the Guidelines”) (Archaeological Services 2012). The background information gathered applies primarily to the general



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area of the PDA as no specific historical research was found that specifically discussed the history of the PDA prior to the start of mining operations in 1969.

The AIA was conducted under Archaeological Field Research Permit 2018NB68 issued to Vincent Bourgeois, M.A., RPA. The field walkover assessment portion of the AIA was completed within the PDA by a team of Stantec archaeologists including the permit holder and archaeological technicians who were accompanied by an Indigenous Archaeological technician. In areas depicted as having low potential for archaeological resources ("low potential") on the Archaeological Potential Map generated for the Project and provided by Archaeological Services (AS), the teams walked pre-defined transects parallel to the long axis of the PDA at a spacing based on the density of vegetation (as described in the Guidelines). In areas depicted as having high or medium potential for archaeological resources ("high," "medium," or "elevated potential") on the AS Archaeological Potential Map, and in areas determined by the Stantec archaeology team to have elevated potential for archaeological resources, transect spacing were decreased accordingly. The Stantec Archaeology Team based any recommendations for shovel test pitting on the findings of the walkover based on the interpretation of the topographical and ground conditions, as well as proximity to resources, and other factors based on professional judgment.

All field data was collected using an F4 Flint Mobile Geographic Information Systems (GIS) device (Flint) running Stantec's proprietary Archaeological Electronic Observation and Notation (AEON) application using the ESRI ArcMobile data collection and field mapping software. Digital field maps were generated for the Flints that combined relevant environmental data and the AS Archaeological Potential Map in GIS-based layers including; archaeological site locations, site buffers, cemeteries, plane crashes, ship wrecks, high and medium potential layers, and portage routes.

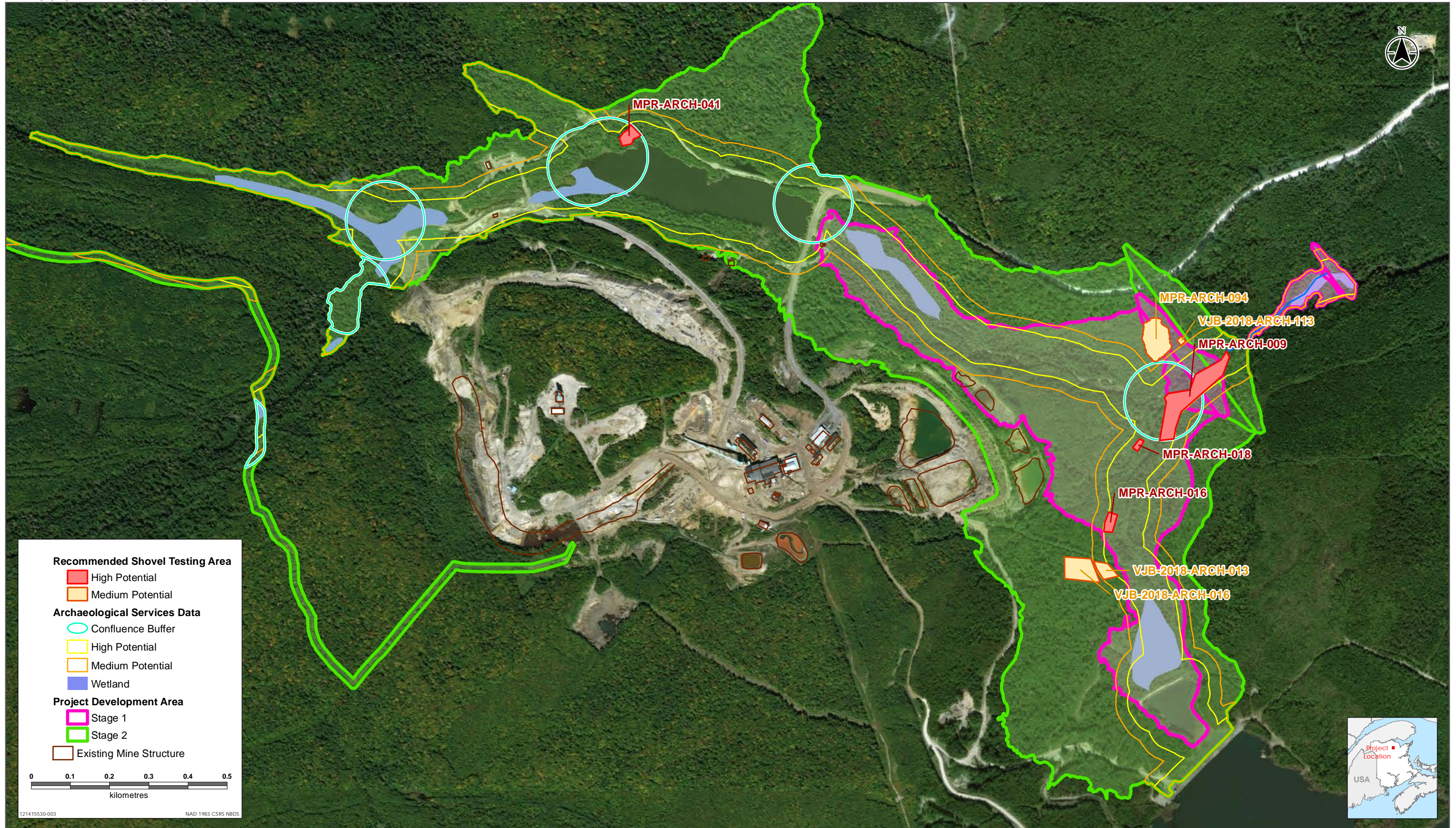
## 6.2 RESULTS

The PDA included both areas of the Project, Stage 1 and Stage 2, as identified on Figure 1.1. The landscape within the PDA consists largely of undeveloped forested terrain characterized by long steep slopes on both sides of the watercourses within the PDA that make up the majority of the land area within the high and medium archaeological potential, as identified on the AS Archaeological Potential Maps. In addition, portions of these areas also exhibit extensive disturbance relating to previous mining activities.

Following the completion of the walkover component of the AIA, in combination with the background research, eight areas of elevated archaeological potential were identified within both Stage 1 and Stage 2 areas of the PDA (Figure 6.1). Generally, these areas consist of well-drained, flat terraces along the slopes leading to the watercourses within the Project Stage 1 and 2 footprints.







Sources: Base Data from the Government of New Brunswick  
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Areas of Elevated Archaeological Potential within the North Tributary Tailings Pond Project Development Area



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In order to mitigate against the potential for accidental impacts to archaeological resources, it is recommended that the areas identified in Table 6.1 be subject to archaeological shovel testing. Shovel testing will determine if archaeological resources are present and allow for the development of appropriate mitigation, in consultation with Provincial agencies and First Nations, as applicable. Figure 6.1 shows the locations of the eight areas recommended for shovel testing within the PDA. Shovel testing will be completed as per the Provincial Guidelines. Shovel testing intervals are either at 5 m intervals to 10 m intervals, depending on the placement of the testing location within the AS high (i.e., 5 m) and medium (i.e., 10 m) archaeological potential buffers. In addition, some of the shovel testing areas are located on landscape features outside the AS buffers. These will be tested at 10 m intervals.

**Table 6.1 Summary of Shovel Testing Recommendations**

Testing Polygon	Description	Testing Interval	Estimated # of Test Pits
VJB-2018-ARCH-013	Flat and well drained terrace in Medium Potential Buffer	10 m	16
VJB-2018-ARCH-016	Flat and well drained terrace on Land Form Feature	10 m	46
VJB-2018-ARCH-113	Flat and well drained terrace on Land Form Feature	10 m	9
MPR-ARCH-009	Flat and well drained terrace in High Potential Buffer	5 m	268
MPR-ARCH-016	Flat and well drained terrace in High Potential Buffer	5 m	49
MPR-ARCH-018	Flat and well drained terrace in High Potential Buffer	5 m	10
MPR-ARCH-041	Flat and well drained terrace in High Potential Buffer	5 m	47
MPR-ARCH-094	Flat and well drained terrace on Land Form Feature	10 m	71

Stantec recommends that approximately 500 shovel test pits be excavated in the Stage 1 and Stage 2 areas, to determine if archaeological resources are present. It is further recommended that the shovel testing be completed before any ground disturbing activities related to project construction are implemented. If any construction activities, such as clearing of vegetation, are planned to be implemented before the shovel testing is implemented it is recommended that additional mitigation be developed in consultation with Provincial regulatory agencies and First Nations.

The results of the archaeological field survey and the recommended shovel testing are subject to the review and approval of the Provincial archaeological permitting agency, Archaeological Services Branch.

## 6.3 DISCUSSION

There are no documented archaeological resources within the Project PDA and no archaeological resources were identified during field survey of the areas to be affected by Stage 1 or Stage 2 activities. Overall, much of the land within the PDA (Stage 1 and Stage 2) had low potential for archaeological resources due to the unsuitability of the terrain for habitation or other activities that would leave an identifiable archaeological footprint, such as a living floor, or camp site. However, some areas were identified that would be suitable for such activities (Table 6.1) and these eight areas are recommended for shovel testing in order to mitigate against the potential for an accidental discovery of an archaeological resource during construction. Due to snow cover and frozen ground conditions, the recommended shovel



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testing could not be carried out in 2018, therefore will need to be deferred to spring of 2019 or at some time before groundbreaking activities take place. Shovel testing will be completed as per the Guidelines and the results reported to First Nations, the Province, and stakeholders.

## 7.0 SUMMARY

Updated data for surface water, fish and fish habitat, vegetation and wetlands, wildlife and wildlife habitat, and heritage resources was collected in 2018 and is presented herein. No changes to the conclusions presented in the EIA Registration for this Project (Stantec 2018) have been made based on the updated information provided herein.



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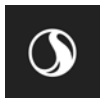




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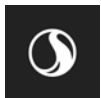
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**Appendix A VEGETATION AND WETLAND DATA**



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Appendix A Vegetation and Wetland Data  
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**Table A.1 Vascular Plants Observed in the PDA and LAA**

Scientific Name	Common Name	AC CDC S Rank
<i>Abies balsamea</i>	balsam fir	S5
<i>Acer pensylvanicum</i>	striped maple	S5
<i>Acer rubrum</i>	red maple	S5
<i>Acer saccharum</i>	sugar maple	S5
<i>Acer spicatum</i>	mountain maple	S5
<i>Achillea millefolium</i>	common yarrow	S5
<i>Actaea pachypoda</i>	white baneberry	S4
<i>Actaea rubra</i>	red baneberry	S5
<i>Agrostis capillaris</i>	colonial bent grass	SNA
<i>Agrostis perennans</i>	upland bent grass	S5
<i>Agrostis scabra</i>	rough bent grass	S5
<i>Alnus incana</i>	speckled alder	S5
<i>Alnus viridis</i>	green alder	S5
<i>Alopecurus aequalis</i>	short-awned foxtail	S4S5
<i>Amelanchier bartramiana</i>	Bartram's serviceberry	S5
<i>Anaphalis margaritacea</i>	pearly everlasting	S5
<i>Apocynum androsaemifolium</i>	spreading dogbane	S5
<i>Aralia nudicaulis</i>	wild sarsaparilla	S5
<i>Arctium minus</i>	common burdock	SNA
<i>Athyrium filix-femina</i>	common lady fern	S5
<i>Betula alleghaniensis</i>	yellow birch	S5
<i>Betula papyrifera</i>	paper birch	S5
<i>Betula papyrifera var. cordifolia</i>	heart-leaved birch	S5
<i>Betula papyrifera var. papyrifera</i>	heart-leaved birch	S5
<i>Bidens cernua</i>	nodding beggarticks	S5
<i>Bidens frondosa</i>	devil's beggarticks	S5
<i>Brachyelytrum septentrionale</i>	northern shorthusk	S5
<i>Bromus ciliatus</i>	fringed brome	S5
<i>Calamagrostis canadensis</i>	bluejoint reed grass	S5
<i>Callitriche heterophylla</i>	large water-starwort	S4S5
<i>Callitriche palustris</i>	marsh water-starwort	S5
<i>Caltha palustris</i>	yellow marsh marigold	S4S5
<i>Cardamine pensylvanica</i>	Pennsylvania bittercress	S5
<i>Cardamine pratensis</i>	cuckoo flower	SNA
<i>Carex arctata</i>	black sedge	S5



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Scientific Name	Common Name	AC CDC S Rank
<i>Carex bebbii</i>	Bebb's sedge	S4
<i>Carex brunnescens</i>	brownish sedge	S5
<i>Carex canescens</i>	silvery sedge	S5
<i>Carex communis</i>	fibrous-root sedge	S5
<i>Carex debilis</i>	white-edged sedge	S5
<i>Carex deweyana</i>	Dewey's sedge	S5
<i>Carex echinata</i>	star sedge	S5
<i>Carex gynandra</i>	nodding sedge	S5
<i>Carex haydenii</i>	Hayden's sedge	S3
<i>Carex intumescens</i>	bladder sedge	S5
<i>Carex lurida</i>	sallow sedge	S5
<i>Carex novae-angliae</i>	New England sedge	S5
<i>Carex projecta</i>	necklace sedge	S5
<i>Carex scoparia</i>	broom sedge	S5
<i>Carex stipata</i>	awl-fruited sedge	S5
<i>Carex tribuloides</i>	blunt broom sedge	S4S5
<i>Carex trisperma</i>	three-seeded sedge	S5
<i>Carex utriculata</i>	northern beaked sedge	S5
<i>Centaurea nigra</i>	black knapweed	SNA
<i>Chamerion angustifolium</i>	fireweed	S5
<i>Chimaphila umbellata</i>	common pipsissewa	S5
<i>Chrysosplenium Americanum</i>	American golden saxifrage	S5
<i>Cinna latifolia</i>	drooping wood reed grass	S5
<i>Circaea alpina</i>	small enchanter's nightshade	S5
<i>Cirsium arvense</i>	Canada thistle	SNA
<i>Cirsium muticum</i>	swamp thistle	S5
<i>Cirsium vulgare</i>	bull thistle	SNA
<i>Clematis virginiana</i>	Virginia clematis	S5
<i>Clintonia borealis</i>	yellow bluebead lily	S5
<i>Coptis trifolia</i>	goldthread	S5
<i>Corallorhiza maculata var. maculata</i>	spotted coralroot	S2S3
<i>Cornus alternifolia</i>	alternate-leaved dogwood	S5
<i>Cornus canadensis</i>	bunchberry	S5
<i>Cornus rugosa</i>	round-leaved dogwood	S4
<i>Cornus sericea</i>	red osier dogwood	S5
<i>Corylus cornuta</i>	beaked hazel	S5



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Scientific Name	Common Name	AC CDC S Rank
<i>Cystopteris fragilis</i>	fragile fern	S4
<i>Dactylis glomerata</i>	orchard grass	SNA
<i>Dalibarda repens</i>	dewdrop	S5
<i>Danthonia spicata</i>	poverty oat grass	S5
<i>Dennstaedtia punctilobula</i>	eastern hay-scented fern	S5
<i>Diervilla lonicera</i>	northern bush honeysuckle	S5
<i>Doellingeria umbellata</i>	hairy flat-top white aster	S5
<i>Dryopteris campyloptera</i>	mountain wood fern	S5
<i>Dryopteris carthusiana</i>	spinulose wood fern	S5
<i>Dryopteris cristata</i>	crested wood fern	S5
<i>Dryopteris intermedia</i>	evergreen wood fern	S5
<i>Eleocharis ovata</i>	ovate spikerush	S5
<i>Eleocharis palustris</i>	common spikerush	S5
<i>Epilobium ciliatum</i>	northern willowherb	S5
<i>Epipactis helleborine</i>	helleborine	SNA
<i>Equisetum arvense</i>	field horsetail	S5
<i>Equisetum fluviatile</i>	water horsetail	S5
<i>Equisetum sylvaticum</i>	woodland horsetail	S5
<i>Erigeron philadelphicus</i>	Philadelphia fleabane	S4
<i>Erigeron strigosus</i>	rough fleabane	S5
<i>Eupatorium maculatum</i>	spotted Joe-Pye-weed	S5
<i>Euphrasia nemorosa</i>	common eyebright	SNA
<i>Eurybia macrophylla</i>	large-leaved aster	S5
<i>Euthamia graminifolia</i>	grass-leaved goldenrod	S5
<i>Fragaria virginiana</i>	wild strawberry	S5
<i>Fraxinus nigra</i>	black ash	S4S5
<i>Galeopsis tetrahit</i>	common hemp-nettle	SNA
<i>Galium asprellum</i>	rough bedstraw	S5
<i>Galium triflorum</i>	three-flowered bedstraw	S5
<i>Gaultheria hispidula</i>	creeping snowberry	S5
<i>Geum canadense</i>	white avens	S5
<i>Geum macrophyllum</i>	large-leaved avens	S5
<i>Geum rivale</i>	water avens	S5
<i>Glyceria borealis</i>	northern manna grass	S5
<i>Glyceria canadensis</i>	Canada manna grass	S5
<i>Glyceria grandis</i>	common tall manna grass	S5



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Scientific Name	Common Name	AC CDC S Rank
<i>Glyceria melicaria</i>	slender manna grass	S5
<i>Glyceria striata</i>	fowl manna grass	S5
<i>Gnaphalium uliginosum</i>	marsh cudweed	SNA
<i>Gratiola neglecta</i>	clammy hedge-hyssop	S4
<i>Gymnocarpium dryopteris</i>	common oak fern	S5
<i>Heracleum maximum</i>	common cow parsnip	S5
<i>Hieracium caespitosum</i>	field hawkweed	SNA
<i>Hieracium pilosella</i>	mouse-ear hawkweed	SNA
<i>Hieracium scabrum</i>	rough hawkweed	S5
<i>Hypericum perforatum</i>	common St. John's-wort	SNA
<i>Impatiens capensis</i>	spotted jewelweed	S5
<i>Iris versicolor</i>	harlequin blue flag	S5
<i>Juncus articulatus</i>	jointed rush	S5
<i>Juncus brevicaudatus</i>	narrow-panicked rush	S5
<i>Juncus filiformis</i>	thread rush	S5
<i>Juncus tenuis</i>	slender rush	S5
<i>Kalmia angustifolia</i>	sheep laurel	S5
<i>Lactuca biennis</i>	tall blue lettuce	S5
<i>Leersia oryzoides</i>	rice cut grass	S5
<i>Leontodon autumnalis</i>	fall dandelion	SNA
<i>Leucanthemum vulgare</i>	oxeye daisy	SNA
<i>Linnaea borealis</i>	twinlineer	S5
<i>Lonicera canadensis</i>	Canada fly honeysuckle	S5
<i>Lotus corniculatus</i>	garden bird's-foot trefoil	SNA
<i>Lycopodium annotinum</i>	stiff clubmoss	S5
<i>Lycopodium dendroideum</i>	round-branched tree-clubmoss	S5
<i>Lycopodium hickeyi</i>	hickey's tree-clubmoss	S4
<i>Lycopodium obscurum</i>	flat-branched tree-clubmoss	S5
<i>Lycopus uniflorus</i>	northern water horehound	S5
<i>Maianthemum canadense</i>	wild lily-of-the-valley	S5
<i>Matteuccia struthiopteris</i>	ostrich fern	S5
<i>Melilotus albus</i>	white sweet-clover	SNA
<i>Mentha arvensis</i>	wild mint	S5
<i>Milium effusum</i>	tall millet grass	S4
<i>Mitella nuda</i>	naked bishop's-cap	S5
<i>Monotropa uniflora</i>	Indian pipe	S5



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Scientific Name	Common Name	AC CDC S Rank
<i>Myosotis laxa</i>	small forget-me-not	S5
<i>Myrica gale</i>	sweet gale	S5
<i>Oclemena acuminata</i>	whorled wood aster	S5
<i>Oenothera biennis</i>	common evening primrose	S5
<i>Omalotheca sylvatica</i>	woodland cudweed	S4S5
<i>Onoclea sensibilis</i>	sensitive fern	S5
<i>Orthilia secunda</i>	one-sided wintergreen	S5
<i>Oryzopsis asperifolia</i>	white-grained mountain rice	S5
<i>Osmunda cinnamomea</i>	cinnamon fern	S5
<i>Osmunda claytoniana</i>	interrupted fern	S5
<i>Oxalis montana</i>	common wood sorrel	S5
<i>Panicum capillare</i>	common witch grass	S5
<i>Phalaris arundinacea</i>	reed canary grass	S5
<i>Phegopteris connectilis</i>	northern beech fern	S5
<i>Phleum pratense</i>	common timothy	SNA
<i>Picea glauca</i>	white spruce	S5
<i>Picea mariana</i>	black spruce	S5
<i>Picea mariana x rubens</i>	eastern hybrid black spruce	SNA
<i>Picea rubens</i>	red spruce	S5
<i>Pinus banksiana</i>	jack pine	S5
<i>Pinus resinosa</i>	red pine	S4
<i>Pinus strobus</i>	eastern white pine	S5
<i>Plantago major</i>	common plantain	SNA
<i>Platanthera dilatata</i>	white bog orchid	S4
<i>Poa compressa</i>	Canada blue grass	SNA
<i>Poa palustris</i>	fowl blue grass	S5
<i>Poa saltuensis</i>	weak blue grass	S4S5
<i>Polygonum cilinode</i>	fringed black bindweed	S5
<i>Polygonum hydropiper</i>	marshpepper smartweed	SNA
<i>Polygonum lapathifolium</i>	pale smartweed	S5
<i>Polygonum persicaria</i>	spotted lady's-thumb	SNA
<i>Polystichum braunii</i>	Braun's holly fern	S4
<i>Populus balsamifera</i>	balsam poplar	S5
<i>Populus tremuloides</i>	trembling aspen	S5
<i>Potamogeton alpinus</i>	alpine pondweed	S5
<i>Potentilla intermedia</i>	downy cinquefoil	SNA



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Scientific Name	Common Name	AC CDC S Rank
<i>Prenanthes altissima</i>	tall rattlesnakeroot	S5
<i>Prenanthes trifoliolata</i>	three-leaved rattlesnakeroot	S5
<i>Prunella vulgaris</i>	common self-heal	S5
<i>Prunus pensylvanica</i>	pin cherry	S5
<i>Prunus virginiana</i>	chokecherry	S5
<i>Pteridium aquilinum</i>	bracken fern	S5
<i>Pyrola asarifolia</i>	pink pyrola	S5
<i>Pyrola elliptica</i>	shinleaf	S5
<i>Pyrola minor</i>	lesser pyrola	S3
<i>Ranunculus acris</i>	common buttercup	SNA
<i>Ranunculus hispidus</i>	bristly buttercup	S4S5
<i>Ranunculus recurvatus</i>	hooked buttercup	S4
<i>Ranunculus repens</i>	creeping buttercup	SNA
<i>Rhinanthus minor</i>	little yellow rattle	SNA
<i>Ribes glandulosum</i>	skunk currant	S5
<i>Ribes lacustre</i>	bristly black currant	S5
<i>Rubus canadensis</i>	smooth blackberry	S5
<i>Rubus idaeus</i>	red raspberry	S5
<i>Rubus pubescens</i>	dwarf red raspberry	S5
<i>Rumex acetosella</i>	sheep sorrel	SNA
<i>Salix bebbiana</i>	Bebb's willow	S5
<i>Salix discolor</i>	pussy willow	S5
<i>Salix humilis</i>	upland willow	S5
<i>Salix lucida</i>	shining willow	S5
<i>Sambucus nigra</i>	black elderberry	S5
<i>Sambucus racemosa</i>	red elderberry	S5
<i>Scirpus atrocinctus</i>	black-girdled bulrush	S5
<i>Scirpus cyperinus</i>	common woolly bulrush	S5
<i>Scirpus hattorianus</i>	mosquito bulrush	S5
<i>Scirpus microcarpus</i>	small-fruited bulrush	S5
<i>Scutellaria galericulata</i>	marsh skullcap	S5
<i>Scutellaria lateriflora</i>	mad-dog skullcap	S5
<i>Sisyrinchium montanum</i>	mountain blue-eyed-grass	S5
<i>Solidago canadensis</i>	Canada goldenrod	S5
<i>Solidago flexicaulis</i>	zigzag goldenrod	S5
<i>Solidago macrophylla</i>	large-leaved goldenrod	S4





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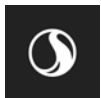
Scientific Name	Common Name	AC CDC S Rank
<i>Solidago rugosa</i>	rough-stemmed goldenrod	S5
<i>Sorbus Americana</i>	American mountain ash	S5
<i>Sorbus aucuparia</i>	European mountain ash	SNA
<i>Sparganium Americanum</i>	American burreed	S5
<i>Sparganium angustifolium</i>	narrow-leaved burreed	S5
<i>Sparganium emersum</i>	green-fruited burreed	S5
<i>Spergularia rubra</i>	ruby sandspurrey	SNA
<i>Spiraea alba</i>	white meadowsweet	S5
<i>Spiranthes romanzoffiana</i>	hooded ladies'-tresses	S4
<i>Streptopus amplexifolius</i>	clasping-leaved twisted-stalk	S5
<i>Streptopus lanceolatus</i>	rose twisted-stalk	S5
<i>Symphyotrichum cordifolium</i>	heart-leaved aster	S5
<i>Symphyotrichum puniceum</i>	purple-stemmed aster	S5
<i>Taxus canadensis</i>	Canada yew	S5
<i>Thalictrum pubescens</i>	tall meadow-rue	S5
<i>Thelypteris noveboracensis</i>	New York fern	S5
<i>Thuja occidentalis</i>	eastern white cedar	S5
<i>Torreyochloa pallida</i>	pale false manna grass	S5
<i>Toxicodendron rydbergii</i>	northern poison oak	S5
<i>Triadenum fraseri</i>	Fraser's marsh St John's-wort	S5
<i>Trientalis borealis</i>	northern starflower	S5
<i>Trifolium aureum</i>	yellow clover	SNA
<i>Trifolium repens</i>	white clover	SNA
<i>Trillium cernuum</i>	nodding trillium	S5
<i>Trillium erectum</i>	red trillium	S5
<i>Tussilago farfara</i>	coltsfoot	SNA
<i>Uvularia sessilifolia</i>	sessile-leaved bellwort	S5
<i>Vaccinium angustifolium</i>	late lowbush blueberry	S5
<i>Vaccinium myrtilloides</i>	velvet-leaved blueberry	S5
<i>Verbascum thapsus</i>	common mullein	SNA
<i>Veronica officinalis</i>	common speedwell	S5
<i>Veronica serpyllifolia ssp. serpyllifolia</i>	thyme-leaved speedwell	SNA
<i>Viburnum edule</i>	squashberry	S4?
<i>Vicia cracca</i>	tufted vetch	SNA
<i>Viola cucullata</i>	marsh blue violet	S5

<sup>1</sup> S1 = critically imperiled, S2 = imperiled, S3 = vulnerable. S#S# = indicates a range of uncertainty about the status of the species or community (AC CDC 2018a)



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**Table A.2 Functional Assessment Scores for Wetland 1**

<b>Wetland ID:</b>	<b>Caribou Wetland 1</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.276, 47.558</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	3.21	Moderate	2.15	Lower	4.20	2.22
Stream Flow Support (SFS)	10.00	Higher	10.00	Higher	5.72	6.13
Water Cooling (WC)	5.58	Higher	4.23	Moderate	3.72	2.54
Sediment Retention & Stabilization (SR)	3.15	Moderate	10.00	Higher	5.31	10.00
Phosphorus Retention (PR)	0.74	Lower	10.00	Higher	3.43	10.00
Nitrate Removal & Retention (NR)	3.50	Moderate	10.00	Higher	5.99	10.00
Carbon Sequestration (CS)	2.48	Lower			5.63	
Organic Nutrient Export (OE)	5.46	Higher			5.23	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	8.07	Higher	4.61	Higher	4.80	3.27
Aquatic Invertebrate Habitat (INV)	4.29	Moderate	5.77	Higher	5.38	4.36
Amphibian & Turtle Habitat (AM)	8.78	Higher	5.53	Moderate	7.94	5.45
Water bird Feeding Habitat (WBF)	7.97	Higher	10.00	Higher	6.34	10.00
Water bird Nesting Habitat (WBN)	8.26	Higher	10.00	Higher	7.06	10.00
Songbird, Raptor, & Mammal Habitat (SBM)	0.00	Lower	0.00	Lower	0.00	0.00
Pollinator Habitat (POL)	0.00	Lower	0.00	Lower	0.00	0.00
Native Plant Habitat (PH)	6.78	Higher	3.84	Moderate	5.82	3.33
Public Use & Recognition (PU)			5.01	Moderate		3.89
Wetland Sensitivity (Sens)			4.89	Moderate		3.67



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**Table A.2 Functional Assessment Scores for Wetland 1**

<b>Wetland ID:</b>	<b>Caribou Wetland 1</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.276, 47.558</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			6.14	Moderate		7.78
Wetland Stressors (STR) (higher score means more)			9.49	Higher		5.75
Summary Ratings for Grouped Functions:						
HYDROLOGIC Group (WS)	3.21	Moderate	2.15	Lower	4.20	2.22
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.99	Lower	10.00	Higher	5.54	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	8.17	Higher	8.33	Higher	5.37	5.24
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	7.69	Higher	8.01	Higher	6.58	7.87
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	4.52	Lower	2.56	Moderate	3.88	2.22
WETLAND CONDITION (EC)			6.14	Moderate		7.78
WETLAND RISK (average of Sensitivity & Stressors)			7.19	Higher		4.71
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



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**Table A.3 Functional Assessment Scores for Wetland 2**

<b>Wetland ID:</b>	<b>Caribou Wetland 2</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.276, 47.56</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	2.72	Moderate	2.16	Lower	3.82	2.23
Stream Flow Support (SFS)	10.00	Higher	10.00	Higher	6.28	6.03
Water Cooling (WC)	9.17	Higher	4.23	Moderate	6.11	2.55
Sediment Retention & Stabilization (SR)	2.20	Moderate	10.00	Higher	4.66	10.00
Phosphorus Retention (PR)	0.48	Lower	10.00	Higher	3.24	10.00
Nitrate Removal & Retention (NR)	2.62	Moderate	10.00	Higher	5.45	10.00
Carbon Sequestration (CS)	2.29	Lower			5.55	
Organic Nutrient Export (OE)	7.11	Higher			6.10	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	7.03	Higher	4.30	Moderate	4.18	3.05
Aquatic Invertebrate Habitat (INV)	4.09	Moderate	6.37	Higher	5.31	4.68
Amphibian & Turtle Habitat (AM)	5.89	Moderate	3.71	Moderate	6.41	4.34
Water bird Feeding Habitat (WBF)	6.59	Moderate	0.00	Lower	5.24	0.00
Water bird Nesting Habitat (WBN)	5.22	Moderate	0.00	Lower	4.46	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.39	Higher	0.00	Lower	7.78	0.00
Pollinator Habitat (POL)	8.93	Higher	0.00	Lower	7.19	0.00
Native Plant Habitat (PH)	7.15	Higher	5.75	Moderate	5.97	4.99
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			6.43	Higher		4.13



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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**Table A.3 Functional Assessment Scores for Wetland 2**

<b>Wetland ID:</b>	<b>Caribou Wetland 2</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.276, 47.56</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			7.59	Higher		8.61
Wetland Stressors (STR) (higher score means more)			7.70	Higher		5.09
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.72	Moderate	2.16	Lower	3.82	2.23
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.26	Lower	10.00	Higher	5.14	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	8.80	Higher	8.43	Higher	6.11	5.23
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	5.99	Moderate	2.95	Lower	5.24	2.91
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.94	Higher	3.83	Moderate	7.38	3.33
WETLAND CONDITION (EC)			7.59	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			7.07	Higher		4.61
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



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**Table A.4 Functional Assessment Scores for Wetland 3**

<b>Wetland ID:</b>	<b>Caribou Wetland 3</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.278, 47.562</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	2.61	Moderate	3.39	Moderate	3.74	3.45
Stream Flow Support (SFS)	10.00	Higher	10.00	Higher	5.72	5.99
Water Cooling (WC)	9.35	Higher	5.05	Higher	6.23	3.04
Sediment Retention & Stabilization (SR)	2.55	Moderate	10.00	Higher	4.90	10.00
Phosphorus Retention (PR)	0.38	Lower	10.00	Higher	3.17	10.00
Nitrate Removal & Retention (NR)	3.73	Moderate	10.00	Higher	6.13	10.00
Carbon Sequestration (CS)	0.86	Lower			4.93	
Organic Nutrient Export (OE)	8.04	Higher			6.60	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	5.67	Moderate	3.79	Moderate	3.37	2.69
Aquatic Invertebrate Habitat (INV)	6.49	Higher	4.46	Moderate	6.16	3.65
Amphibian & Turtle Habitat (AM)	5.59	Moderate	3.26	Moderate	6.25	4.07
Water bird Feeding Habitat (WBF)	4.33	Moderate	2.50	Moderate	3.45	2.50
Water bird Nesting Habitat (WBN)	2.97	Moderate	2.50	Moderate	2.54	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	7.56	Higher	2.50	Lower	6.27	2.50
Pollinator Habitat (POL)	7.95	Higher	0.00	Lower	6.41	0.00
Native Plant Habitat (PH)	6.43	Higher	4.87	Moderate	5.68	4.22
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			6.78	Higher		4.23



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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**Table A.4 Functional Assessment Scores for Wetland 3**

<b>Wetland ID:</b>	<b>Caribou Wetland 3</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.278, 47.562</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			7.59	Higher		8.61
Wetland Stressors (STR) (higher score means more)			5.78	Higher		4.39
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.61	Moderate	3.39	Moderate	3.74	3.45
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.81	Lower	10.00	Higher	5.46	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	9.24	Higher	8.25	Higher	6.39	5.11
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.69	Moderate	3.10	Lower	4.69	3.21
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.63	Higher	3.66	Moderate	6.26	3.23
WETLAND CONDITION (EC)			7.59	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			6.28	Higher		4.31
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						





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**Table A.5 Functional Assessment Scores for Wetland 4**

<b>Wetland ID:</b>	<b>Caribou Wetland 4</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.279, 47.564</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	1.75	Lower	5.94	Higher	3.08	5.98
Stream Flow Support (SFS)	10.00	Higher	10.00	Higher	6.44	5.99
Water Cooling (WC)	8.85	Higher	5.89	Higher	5.90	3.55
Sediment Retention & Stabilization (SR)	0.34	Lower	10.00	Higher	3.39	10.00
Phosphorus Retention (PR)	0.99	Lower	10.00	Higher	3.60	10.00
Nitrate Removal & Retention (NR)	2.16	Lower	10.00	Higher	5.16	10.00
Carbon Sequestration (CS)	0.92	Lower			4.96	
Organic Nutrient Export (OE)	9.80	Higher			7.53	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	6.06	Moderate	3.73	Moderate	3.61	2.65
Aquatic Invertebrate Habitat (INV)	4.99	Moderate	4.74	Moderate	5.63	3.80
Amphibian & Turtle Habitat (AM)	4.95	Moderate	5.31	Moderate	5.91	5.31
Water bird Feeding Habitat (WBF)	4.06	Moderate	5.00	Moderate	3.23	5.00
Water bird Nesting Habitat (WBN)	2.74	Moderate	5.00	Moderate	2.35	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.30	Higher	5.00	Moderate	7.71	5.00
Pollinator Habitat (POL)	8.55	Higher	0.00	Lower	6.89	0.00
Native Plant Habitat (PH)	7.84	Higher	5.61	Moderate	6.25	4.87
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			9.41	Higher		5.02



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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**Table A.5 Functional Assessment Scores for Wetland 4**

<b>Wetland ID:</b>	<b>Caribou Wetland 4</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.279, 47.564</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			6.63	Higher		8.06
Wetland Stressors (STR) (higher score means more)			7.53	Higher		5.03
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.75	Lower	5.94	Higher	3.08	5.98
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	1.63	Lower	10.00	Higher	4.72	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	9.20	Higher	8.44	Higher	6.95	5.22
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.81	Moderate	4.56	Moderate	4.47	4.45
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.93	Higher	4.57	Moderate	7.33	4.14
WETLAND CONDITION (EC)			6.63	Higher		8.06
WETLAND RISK (average of Sensitivity & Stressors)			8.47	Higher		5.02
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



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**Table A.6 Functional Assessment Scores for Wetland 5**

<b>Wetland ID:</b>	<b>Caribou Wetland 5</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.277, 47.565</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	2.66	Moderate	5.21	Moderate	3.77	5.25
Stream Flow Support (SFS)	10.00	Higher	9.88	Higher	5.94	5.76
Water Cooling (WC)	8.60	Higher	6.10	Higher	5.73	3.67
Sediment Retention & Stabilization (SR)	2.77	Moderate	10.00	Higher	5.06	10.00
Phosphorus Retention (PR)	0.83	Lower	10.00	Higher	3.49	10.00
Nitrate Removal & Retention (NR)	2.75	Moderate	10.00	Higher	5.53	10.00
Carbon Sequestration (CS)	2.86	Lower			5.80	
Organic Nutrient Export (OE)	8.69	Higher			6.95	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	5.85	Moderate	3.76	Moderate	3.48	2.67
Aquatic Invertebrate Habitat (INV)	4.83	Moderate	4.81	Moderate	5.57	3.84
Amphibian & Turtle Habitat (AM)	4.80	Moderate	5.47	Moderate	5.84	5.41
Water bird Feeding Habitat (WBF)	4.20	Moderate	5.00	Moderate	3.34	5.00
Water bird Nesting Habitat (WBN)	2.89	Moderate	5.00	Moderate	2.47	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.51	Higher	5.00	Moderate	7.89	5.00
Pollinator Habitat (POL)	9.03	Higher	0.00	Lower	7.27	0.00
Native Plant Habitat (PH)	7.26	Higher	5.82	Moderate	6.01	5.05
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			9.56	Higher		5.07



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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**Table A.6 Functional Assessment Scores for Wetland 5**

<b>Wetland ID:</b>	<b>Caribou Wetland 5</b>					
<b>Date:</b>	<b>August 21, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.277, 47.565</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			7.59	Higher		8.61
Wetland Stressors (STR) (higher score means more)			6.76	Higher		4.74
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.66	Moderate	5.21	Moderate	3.77	5.25
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.58	Lower	10.00	Higher	5.38	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	9.01	Higher	8.40	Higher	6.50	5.09
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.70	Moderate	4.66	Moderate	4.43	4.51
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.06	Higher	4.71	Moderate	7.47	4.20
WETLAND CONDITION (EC)			7.59	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			8.16	Higher		4.91
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



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**Table A.7 Functional Assessment Scores for Wetland 6**

<b>Wetland ID:</b>	<b>Caribou Wetland 6</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.272, 47.568</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	1.90	Lower	3.32	Moderate	3.20	3.38
Stream Flow Support (SFS)	10.00	Higher	10.00	Higher	8.11	5.99
Water Cooling (WC)	10.00	Higher	3.13	Moderate	7.10	1.88
Sediment Retention & Stabilization (SR)	1.91	Moderate	10.00	Higher	4.46	10.00
Phosphorus Retention (PR)	2.15	Lower	10.00	Higher	4.43	10.00
Nitrate Removal & Retention (NR)	2.22	Lower	10.00	Higher	5.20	10.00
Carbon Sequestration (CS)	4.84	Moderate			6.65	
Organic Nutrient Export (OE)	9.80	Higher			7.53	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	5.66	Moderate	3.69	Moderate	3.37	2.62
Aquatic Invertebrate Habitat (INV)	9.02	Higher	4.76	Moderate	7.05	3.81
Amphibian & Turtle Habitat (AM)	3.64	Moderate	8.10	Higher	5.22	7.01
Water bird Feeding Habitat (WBF)	3.87	Moderate	10.00	Higher	3.08	10.00
Water bird Nesting Habitat (WBN)	3.82	Moderate	0.00	Lower	3.26	0.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.58	Higher	10.00	Higher	7.94	10.00
Pollinator Habitat (POL)	8.44	Higher	0.00	Lower	6.80	0.00
Native Plant Habitat (PH)	7.82	Higher	5.66	Moderate	6.24	4.91
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			8.38	Higher		4.71



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**Table A.7 Functional Assessment Scores for Wetland 6**

<b>Wetland ID:</b>	<b>Caribou Wetland 6</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.272, 47.568</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			10.00	Higher		10.00
Wetland Stressors (STR) (higher score means more)			1.78	Lower		2.92
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.90	Lower	3.32	Moderate	3.20	3.38
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.81	Moderate	10.00	Higher	5.92	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	9.85	Higher	7.98	Higher	7.78	4.94
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.53	Moderate	7.18	Higher	4.11	6.96
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	9.09	Higher	7.61	Higher	7.46	7.49
WETLAND CONDITION (EC)			10.00	Higher		10.00
WETLAND RISK (average of Sensitivity & Stressors)			5.08	Higher		3.81
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



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**Table A.8 Functional Assessment Scores for Wetland 7**

<b>Wetland ID:</b>	<b>Caribou Wetland 7</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.278, 47.566</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	5.03	Moderate	2.06	Lower	5.60	2.13
Stream Flow Support (SFS)	2.99	Moderate	9.70	Higher	1.59	5.66
Water Cooling (WC)	4.50	Moderate	0.83	Lower	3.00	0.50
Sediment Retention & Stabilization (SR)	2.94	Moderate	10.00	Higher	5.17	10.00
Phosphorus Retention (PR)	2.37	Lower	10.00	Higher	4.59	10.00
Nitrate Removal & Retention (NR)	2.25	Lower	10.00	Higher	5.22	10.00
Carbon Sequestration (CS)	5.73	Higher			7.03	
Organic Nutrient Export (OE)	6.01	Higher			5.52	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	4.10	Moderate	3.47	Moderate	2.44	2.46
Aquatic Invertebrate Habitat (INV)	6.05	Higher	3.95	Moderate	6.00	3.37
Amphibian & Turtle Habitat (AM)	3.78	Moderate	3.91	Moderate	5.29	4.47
Water bird Feeding Habitat (WBF)	2.89	Moderate	5.00	Moderate	2.30	5.00
Water bird Nesting Habitat (WBN)	4.81	Moderate	5.00	Moderate	4.11	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.36	Higher	5.00	Moderate	6.10	5.00
Pollinator Habitat (POL)	8.76	Higher	0.00	Lower	7.06	0.00
Native Plant Habitat (PH)	6.09	Higher	5.05	Moderate	5.54	4.38
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			6.82	Higher		4.25



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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**Table A.8 Functional Assessment Scores for Wetland 7**

<b>Wetland ID:</b>	<b>Caribou Wetland 7</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.278, 47.566</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			4.94	Moderate		7.08
Wetland Stressors (STR) (higher score means more)			2.41	Moderate		3.15
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	5.03	Moderate	2.06	Lower	5.60	2.13
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	4.53	Moderate	10.00	Higher	6.27	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	5.47	Moderate	7.27	Higher	5.01	4.42
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	3.96	Moderate	4.24	Moderate	4.06	4.19
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.08	Higher	4.20	Moderate	6.64	4.06
WETLAND CONDITION (EC)			4.94	Moderate		7.08
WETLAND RISK (average of Sensitivity & Stressors)			4.62	Higher		3.70
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						





**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
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**Table A.9 Functional Assessment Scores for Wetland 8**

<b>Wetland ID:</b>	<b>Caribou Wetland 8</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.28, 47.566</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	1.78	Lower	2.07	Lower	3.10	2.14
Stream Flow Support (SFS)	9.48	Higher	9.90	Higher	5.06	5.77
Water Cooling (WC)	5.45	Higher	4.18	Moderate	3.63	2.51
Sediment Retention & Stabilization (SR)	1.00	Lower	10.00	Higher	3.84	10.00
Phosphorus Retention (PR)	1.42	Lower	10.00	Higher	3.91	10.00
Nitrate Removal & Retention (NR)	1.15	Lower	10.00	Higher	4.54	10.00
Carbon Sequestration (CS)	4.85	Moderate			6.66	
Organic Nutrient Export (OE)	7.66	Higher			6.40	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	4.88	Moderate	3.50	Moderate	2.90	2.48
Aquatic Invertebrate Habitat (INV)	6.16	Higher	4.56	Moderate	6.04	3.70
Amphibian & Turtle Habitat (AM)	4.60	Moderate	4.70	Moderate	5.54	4.95
Water bird Feeding Habitat (WBF)	3.14	Moderate	5.00	Moderate	2.41	5.00
Water bird Nesting Habitat (WBN)	4.72	Moderate	5.00	Moderate	3.92	5.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.01	Higher	5.00	Moderate	7.43	5.00
Pollinator Habitat (POL)	8.24	Higher	0.00	Lower	6.64	0.00
Native Plant Habitat (PH)	6.43	Higher	5.40	Moderate	5.63	4.69
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			6.72	Higher		4.22



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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**Table A.9 Functional Assessment Scores for Wetland 8**

<b>Wetland ID:</b>	<b>Caribou Wetland 8</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.28, 47.566</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			4.94	Moderate		7.08
Wetland Stressors (STR) (higher score means more)			1.92	Lower		2.97
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.78	Lower	2.07	Lower	3.10	2.14
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.48	Moderate	10.00	Higher	5.70	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	8.33	Higher	8.05	Higher	5.84	4.88
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.17	Moderate	4.32	Moderate	4.25	4.24
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.45	Higher	4.44	Moderate	7.00	4.11
WETLAND CONDITION (EC)			4.94	Moderate		7.08
WETLAND RISK (average of Sensitivity & Stressors)			4.32	Moderate		3.59
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
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**Table A.10 Functional Assessment Scores for Wetland 9**

<b>Wetland ID:</b>	<b>Caribou Wetland 9</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.281, 47.566</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	1.39	Lower	2.10	Lower	2.80	2.16
Stream Flow Support (SFS)	10.00	Higher	9.80	Higher	8.39	5.71
Water Cooling (WC)	7.85	Higher	3.16	Moderate	5.23	1.90
Sediment Retention & Stabilization (SR)	1.00	Lower	10.00	Higher	3.84	10.00
Phosphorus Retention (PR)	0.96	Lower	10.00	Higher	3.59	10.00
Nitrate Removal & Retention (NR)	2.13	Lower	10.00	Higher	5.14	10.00
Carbon Sequestration (CS)	2.90	Lower			5.81	
Organic Nutrient Export (OE)	7.96	Higher			6.55	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	5.51	Moderate	3.65	Moderate	3.28	2.59
Aquatic Invertebrate Habitat (INV)	3.30	Moderate	4.25	Moderate	5.03	3.54
Amphibian & Turtle Habitat (AM)	5.47	Moderate	2.04	Lower	6.19	3.33
Water bird Feeding Habitat (WBF)	3.68	Moderate	2.50	Moderate	2.93	2.50
Water bird Nesting Habitat (WBN)	4.98	Moderate	2.50	Moderate	4.26	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	5.49	Moderate	2.50	Lower	4.55	2.50
Pollinator Habitat (POL)	8.35	Higher	0.00	Lower	6.72	0.00
Native Plant Habitat (PH)	4.52	Moderate	4.33	Moderate	4.91	3.76
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			7.39	Higher		4.42



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT**

Appendix A Vegetation and Wetland Data  
January 29, 2019

**Table A.10 Functional Assessment Scores for Wetland 9**

<b>Wetland ID:</b>	<b>Caribou Wetland 9</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.281, 47.566</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			4.94	Moderate		7.08
Wetland Stressors (STR) (higher score means more)			1.92	Lower		2.97
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.39	Lower	2.10	Lower	2.80	2.16
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.32	Lower	10.00	Higher	5.20	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	8.64	Higher	7.77	Higher	7.35	4.71
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.72	Moderate	2.89	Lower	4.76	2.75
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.23	Moderate	3.30	Moderate	6.06	2.92
WETLAND CONDITION (EC)			4.94	Moderate		7.08
WETLAND RISK (average of Sensitivity & Stressors)			4.65	Higher		3.69
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
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**Table A.11 Functional Assessment Scores for Wetland 10**

<b>Wetland ID:</b>	<b>Caribou Wetland 10</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.284, 47.566</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	0.08	Lower	7.23	Higher	1.79	7.25
Stream Flow Support (SFS)	10.00	Higher	8.82	Higher	7.89	5.14
Water Cooling (WC)	5.25	Moderate	5.31	Higher	3.50	3.19
Sediment Retention & Stabilization (SR)	0.00	Lower	8.24	Higher	1.94	5.00
Phosphorus Retention (PR)	0.15	Lower	5.16	Higher	3.01	5.00
Nitrate Removal & Retention (NR)	0.00	Lower	10.00	Higher	3.80	10.00
Carbon Sequestration (CS)	1.13	Lower			5.05	
Organic Nutrient Export (OE)	4.73	Moderate			4.84	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	0.00	Lower	0.00	Lower	0.00	0.00
Aquatic Invertebrate Habitat (INV)	0.00	Lower	3.04	Moderate	3.86	2.88
Amphibian & Turtle Habitat (AM)	4.94	Moderate	2.53	Moderate	5.91	3.63
Water bird Feeding Habitat (WBF)	2.82	Moderate	2.50	Moderate	2.25	2.50
Water bird Nesting Habitat (WBN)	3.53	Moderate	2.50	Moderate	3.01	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	7.40	Higher	2.50	Lower	6.14	2.50
Pollinator Habitat (POL)	7.33	Moderate	0.00	Lower	5.91	0.00
Native Plant Habitat (PH)	4.12	Moderate	4.63	Moderate	4.75	4.01
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			5.10	Moderate		3.73



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
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**Table A.11 Functional Assessment Scores for Wetland 10**

<b>Wetland ID:</b>	<b>Caribou Wetland 10</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.284, 47.566</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			4.22	Moderate		6.67
Wetland Stressors (STR) (higher score means more)			1.61	Lower		2.85
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	0.08	Lower	7.23	Higher	1.79	7.25
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	0.73	Lower	8.90	Higher	4.25	8.33
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.50	Higher	7.27	Higher	6.46	4.44
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	3.60	Moderate	2.02	Lower	4.07	2.68
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	6.84	Moderate	3.50	Moderate	5.87	3.09
WETLAND CONDITION (EC)			4.22	Moderate		6.67
WETLAND RISK (average of Sensitivity & Stressors)			3.36	Moderate		3.29
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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**Table A.12 Functional Assessment Scores for Wetland 11**

<b>Wetland ID:</b>	<b>Caribou Wetland 11</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.284, 47.567</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	2.94	Moderate	2.12	Lower	3.99	2.19
Stream Flow Support (SFS)	7.86	Higher	9.66	Higher	4.19	5.63
Water Cooling (WC)	7.85	Higher	1.27	Lower	5.23	0.77
Sediment Retention & Stabilization (SR)	1.47	Lower	10.00	Higher	4.17	10.00
Phosphorus Retention (PR)	1.14	Lower	10.00	Higher	3.71	10.00
Nitrate Removal & Retention (NR)	1.83	Lower	10.00	Higher	4.96	10.00
Carbon Sequestration (CS)	3.64	Moderate			6.13	
Organic Nutrient Export (OE)	7.73	Higher			6.44	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	4.97	Moderate	3.58	Moderate	2.96	2.54
Aquatic Invertebrate Habitat (INV)	2.04	Lower	4.43	Moderate	4.59	3.63
Amphibian & Turtle Habitat (AM)	5.45	Moderate	2.58	Moderate	6.18	3.66
Water bird Feeding Habitat (WBF)	3.41	Moderate	2.50	Moderate	2.71	2.50
Water bird Nesting Habitat (WBN)	4.90	Moderate	2.50	Moderate	4.19	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	6.95	Moderate	2.50	Lower	5.76	2.50
Pollinator Habitat (POL)	8.05	Higher	0.00	Lower	6.48	0.00
Native Plant Habitat (PH)	3.85	Lower	4.70	Moderate	4.64	4.08
Public Use & Recognition (PU)			0.84	Lower		0.93



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
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**Table A.12 Functional Assessment Scores for Wetland 11**

<b>Wetland ID:</b>	<b>Caribou Wetland 11</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.284, 47.567</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Sensitivity (Sens)			4.02	Moderate		3.41
Wetland Ecological Condition (EC)			2.77	Lower		5.83
Wetland Stressors (STR) (higher score means more)			1.43	Lower		2.79
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.94	Moderate	2.12	Lower	3.99	2.19
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.83	Lower	10.00	Higher	5.44	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.12	Higher	7.39	Higher	5.77	4.49
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.60	Moderate	2.91	Lower	4.69	2.95
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.17	Moderate	3.55	Moderate	6.05	3.14
WETLAND CONDITION (EC)			2.77	Lower		5.83
WETLAND RISK (average of Sensitivity & Stressors)			2.73	Moderate		3.10
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						





**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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**Table A.13 Functional Assessment Scores for Wetland 12**

<b>Wetland ID:</b>	<b>Caribou Wetland 12</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.285, 47.567</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	2.48	Lower	2.14	Lower	3.64	2.21
Stream Flow Support (SFS)	7.60	Higher	10.00	Higher	4.06	5.83
Water Cooling (WC)	7.35	Higher	1.28	Lower	4.90	0.77
Sediment Retention & Stabilization (SR)	0.99	Lower	10.00	Higher	3.83	10.00
Phosphorus Retention (PR)	1.32	Lower	10.00	Higher	3.84	10.00
Nitrate Removal & Retention (NR)	1.64	Lower	10.00	Higher	4.84	10.00
Carbon Sequestration (CS)	3.71	Moderate			6.16	
Organic Nutrient Export (OE)	8.16	Higher			6.66	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	4.81	Moderate	3.73	Moderate	2.86	2.65
Aquatic Invertebrate Habitat (INV)	5.04	Moderate	4.98	Moderate	5.65	3.93
Amphibian & Turtle Habitat (AM)	5.34	Moderate	3.76	Moderate	6.12	4.37
Water bird Feeding Habitat (WBF)	4.07	Moderate	2.50	Moderate	3.24	2.50
Water bird Nesting Habitat (WBN)	4.66	Moderate	2.50	Moderate	3.98	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	8.89	Higher	2.50	Lower	7.37	2.50
Pollinator Habitat (POL)	9.15	Higher	0.00	Lower	7.37	0.00
Native Plant Habitat (PH)	4.74	Moderate	5.66	Moderate	5.00	4.92
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			8.30	Higher		4.69



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
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**Table A.13 Functional Assessment Scores for Wetland 12**

<b>Wetland ID:</b>	<b>Caribou Wetland 12</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.285, 47.567</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			7.59	Higher		8.61
Wetland Stressors (STR) (higher score means more)			1.43	Lower		2.79
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.48	Lower	2.14	Lower	3.64	2.21
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	2.81	Lower	10.00	Higher	5.41	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	7.60	Higher	7.71	Higher	5.99	4.67
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.56	Moderate	3.13	Lower	4.68	3.39
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.38	Higher	4.19	Moderate	6.98	3.69
WETLAND CONDITION (EC)			7.59	Higher		8.61
WETLAND RISK (average of Sensitivity & Stressors)			4.86	Higher		3.74
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT**

Appendix A Vegetation and Wetland Data  
January 29, 2019

**Table A.14 Functional Assessment Scores for Wetland 13**

<b>Wetland ID:</b>	<b>Caribou Wetland 13</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.286, 47.568</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	1.33	Lower	3.44	Moderate	2.76	3.50
Stream Flow Support (SFS)	7.86	Higher	10.00	Higher	4.19	5.88
Water Cooling (WC)	10.00	Higher	1.29	Lower	7.43	0.78
Sediment Retention & Stabilization (SR)	0.51	Lower	10.00	Higher	3.51	10.00
Phosphorus Retention (PR)	2.26	Lower	10.00	Higher	4.50	10.00
Nitrate Removal & Retention (NR)	0.45	Lower	10.00	Higher	4.11	10.00
Carbon Sequestration (CS)	4.98	Moderate			6.71	
Organic Nutrient Export (OE)	9.10	Higher			7.16	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	4.61	Moderate	3.86	Moderate	2.75	2.74
Aquatic Invertebrate Habitat (INV)	4.65	Moderate	5.06	Moderate	5.51	3.97
Amphibian & Turtle Habitat (AM)	4.75	Moderate	4.30	Moderate	5.81	4.70
Water bird Feeding Habitat (WBF)	4.62	Moderate	2.50	Moderate	3.68	2.50
Water bird Nesting Habitat (WBN)	4.30	Moderate	2.50	Moderate	3.67	2.50
Songbird, Raptor, & Mammal Habitat (SBM)	9.57	Higher	2.50	Lower	7.93	2.50
Pollinator Habitat (POL)	7.97	Higher	0.00	Lower	6.42	0.00
Native Plant Habitat (PH)	3.14	Lower	5.51	Moderate	4.35	4.78
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			9.13	Higher		4.94



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
January 29, 2019

**Table A.14 Functional Assessment Scores for Wetland 13**

<b>Wetland ID:</b>	<b>Caribou Wetland 13</b>					
<b>Date:</b>	<b>August 22, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.286, 47.568</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			0.00	Lower		2.50
Wetland Stressors (STR) (higher score means more)			1.43	Lower		2.79
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	1.33	Lower	3.44	Moderate	2.76	3.50
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.52	Moderate	10.00	Higher	5.71	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	8.95	Higher	7.73	Higher	6.75	4.71
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.20	Moderate	3.47	Moderate	4.50	3.59
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.23	Higher	4.09	Moderate	7.08	3.61
WETLAND CONDITION (EC)			0.00	Lower		2.50
WETLAND RISK (average of Sensitivity & Stressors)			5.28	Higher		3.86
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
January 29, 2019

**Table A.15 Functional Assessment Scores for Wetland 14**

<b>Wetland ID:</b>	<b>Caribou Wetland 14</b>					
<b>Date:</b>	<b>August 23, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.288, 47.569</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	2.18	Lower	7.24	Higher	3.41	7.27
Stream Flow Support (SFS)	4.79	Moderate	10.00	Higher	2.56	6.02
Water Cooling (WC)	5.60	Higher	5.92	Higher	3.73	3.56
Sediment Retention & Stabilization (SR)	2.61	Moderate	10.00	Higher	4.94	10.00
Phosphorus Retention (PR)	1.34	Lower	10.00	Higher	3.85	10.00
Nitrate Removal & Retention (NR)	2.35	Moderate	10.00	Higher	5.28	10.00
Carbon Sequestration (CS)	3.59	Moderate			6.11	
Organic Nutrient Export (OE)	7.25	Higher			6.18	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	6.02	Moderate	4.38	Moderate	3.58	3.11
Aquatic Invertebrate Habitat (INV)	4.13	Moderate	6.62	Higher	5.33	4.82
Amphibian & Turtle Habitat (AM)	7.84	Higher	8.56	Higher	7.44	7.28
Water bird Feeding Habitat (WBF)	6.96	Higher	10.00	Higher	5.54	10.00
Water bird Nesting Habitat (WBN)	7.06	Higher	10.00	Higher	6.03	10.00
Songbird, Raptor, & Mammal Habitat (SBM)	7.61	Higher	10.00	Higher	6.31	10.00
Pollinator Habitat (POL)	7.55	Moderate	10.00	Higher	6.08	10.00
Native Plant Habitat (PH)	6.53	Higher	8.60	Higher	5.72	7.46
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			5.06	Moderate		3.72



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
January 29, 2019

**Table A.15 Functional Assessment Scores for Wetland 14**

<b>Wetland ID:</b>	<b>Caribou Wetland 14</b>					
<b>Date:</b>	<b>August 23, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.288, 47.569</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			5.66	Moderate		7.50
Wetland Stressors (STR) (higher score means more)			6.38	Higher		4.61
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	2.18	Lower	7.24	Higher	3.41	7.27
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.03	Lower	10.00	Higher	5.58	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	6.35	Higher	8.76	Higher	5.32	5.41
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	6.71	Higher	8.29	Higher	5.98	8.04
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	7.42	Moderate	9.77	Higher	6.17	9.58
WETLAND CONDITION (EC)			5.66	Moderate		7.50
WETLAND RISK (average of Sensitivity & Stressors)			5.72	Higher		4.16
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
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Appendix A Vegetation and Wetland Data  
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**Table A.16 Functional Assessment Scores for Wetland 15**

<b>Wetland ID:</b>	<b>Caribou Wetland 15</b>					
<b>Date:</b>	<b>August 23, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.287, 47.569</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Surface Water Storage (WS)	3.33	Moderate	5.32	Moderate	4.29	5.36
Stream Flow Support (SFS)	2.76	Lower	9.87	Higher	1.47	5.75
Water Cooling (WC)	5.60	Higher	2.14	Moderate	3.73	1.29
Sediment Retention & Stabilization (SR)	3.45	Moderate	10.00	Higher	5.52	10.00
Phosphorus Retention (PR)	1.26	Lower	10.00	Higher	3.79	10.00
Nitrate Removal & Retention (NR)	2.91	Moderate	10.00	Higher	5.63	10.00
Carbon Sequestration (CS)	4.61	Moderate			6.55	
Organic Nutrient Export (OE)	4.97	Moderate			4.97	
Anadromous Fish Habitat (FA)	0.00	Lower	0.00	Lower	0.00	0.00
Resident Fish Habitat (FR)	4.08	Moderate	4.05	Moderate	2.43	2.88
Aquatic Invertebrate Habitat (INV)	4.12	Moderate	5.40	Moderate	5.32	4.15
Amphibian & Turtle Habitat (AM)	5.29	Moderate	8.78	Higher	6.10	7.42
Water bird Feeding Habitat (WBF)	5.50	Moderate	10.00	Higher	4.38	10.00
Water bird Nesting Habitat (WBN)	4.87	Moderate	10.00	Higher	4.16	10.00
Songbird, Raptor, & Mammal Habitat (SBM)	9.49	Higher	10.00	Higher	7.87	10.00
Pollinator Habitat (POL)	8.85	Higher	10.00	Higher	7.13	10.00
Native Plant Habitat (PH)	6.25	Higher	9.60	Higher	5.61	8.33
Public Use & Recognition (PU)			0.84	Lower		0.93
Wetland Sensitivity (Sens)			7.61	Higher		4.48



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTTP) AT THE CARIBOU MINE, NEW BRUNSWICK:  
SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT**

Appendix A Vegetation and Wetland Data  
January 29, 2019

**Table A.16 Functional Assessment Scores for Wetland 15**

<b>Wetland ID:</b>	<b>Caribou Wetland 15</b>					
<b>Date:</b>	<b>August 23, 2018</b>					
<b>Observer:</b>	<b>Heather Button and Michael Crowell</b>					
<b>Latitude &amp; Longitude:</b>	<b>-66.287, 47.569</b>					
<b>Wetland Functions or Other Attributes:</b>	<b>Function Score (normalized)</b>	<b>Function Rating</b>	<b>Benefits Score (normalized)</b>	<b>Benefits Rating</b>	<b>Function Score (raw)</b>	<b>Benefits Score (raw)</b>
Wetland Ecological Condition (EC)			4.70	Moderate		6.94
Wetland Stressors (STR) (higher score means more)			3.55	Moderate		3.56
<b>Summary Ratings for Grouped Functions:</b>						
HYDROLOGIC Group (WS)	3.33	Moderate	5.32	Moderate	4.29	5.36
WATER QUALITY SUPPORT Group (max+avg/2 of SR, PR, NR, CS)	3.84	Moderate	10.00	Higher	5.96	10.00
AQUATIC SUPPORT Group (max+avg/2 of SFS, INV, OE, WC)	4.98	Moderate	7.83	Higher	4.60	4.74
AQUATIC HABITAT Group (max+avg/2 of FA, FR, AM, WBF, WBN)	4.73	Moderate	8.28	Higher	4.75	8.03
TRANSITION HABITAT Group (max+avg/2 of SBM, PH, POL)	8.84	Higher	9.93	Higher	7.37	9.72
WETLAND CONDITION (EC)			4.70	Moderate		6.94
WETLAND RISK (average of Sensitivity & Stressors)			5.58	Higher		4.02
NOTE: A score of 0 does not mean the function or benefit is absent from the wetland. It means only that this wetland has a capacity that is equal or less than the lowest-scoring one, for that function or benefit, from among the 98 NB calibration wetlands that were assessed previously.						





**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE,  
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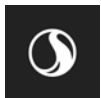
Appendix B Avian Survey Data  
1/29/2019 12:00:00 AM

**Appendix B AVIAN SURVEY DATA**



**DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE,  
NEW BRUNSWICK: SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT**

Appendix B Avian Survey Data  
January 29, 2019



DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK: SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT

Appendix B Avian Survey Data  
January 29, 2019

**Table B.1 Data Collected During June Breeding Bird Point Count Surveys**

Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	American robin	1	Male	Adult				Yes	Yes	104	235	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	black-and-white warbler	1	Male	Adult				Yes		64	220	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	black-capped chickadee	1	Male	Adult				Yes		44	265	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	hermit thrush	1	Male	Adult				Yes		91	152	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes		41	85	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes		92	211	Young-immature Hardwood
<b>6/26/2018 6:14</b>	<b>18RHB019</b>	<b>Young-immature Hardwood</b>	<b>5270998</b>	<b>5</b>	<b>Calm - &lt; 1 km/h</b>	<b>Moderate Noise (constant, not overwhelming)</b>	<b>pine siskin</b>	<b>1</b>	<b>Male</b>	<b>Adult</b>				<b>Yes</b>		<b>66</b>	<b>56</b>	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	red-eyed vireo	1	Male	Adult				Yes		68	37	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	ruby-crowned kinglet	1	Male	Adult				Yes		56	168	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	Swainson's thrush	1	Unknown	Adult			Yes			53	337	Young-immature Hardwood
6/26/2018 6:14	18RHB019	Young-immature Hardwood	5270998	5	Calm - < 1 km/h	Moderate Noise (constant, not overwhelming)	yellow-bellied sapsucker	1	Unknown	Adult			Yes			60	299	Young-immature Hardwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	bay-breasted warbler	1	Male	Adult				Yes		85	59	Young-immature Softwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	black-and-white warbler	1	Male	Adult				Yes		65	336	Young-immature Softwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	black-and-white warbler	1	Male	Adult				Yes		71	197	Young-immature Softwood
<b>6/26/2018 6:53</b>	<b>18RHB020</b>	<b>Young-immature Softwood</b>	<b>5271662</b>	<b>6</b>	<b>Light air - 1 to 5 km/h</b>	<b>Heavy noise (constant distraction)</b>	<b>evening grosbeak</b>	<b>3</b>	<b>Unknown</b>	<b>Adult</b>	<b>Yes</b>		<b>Yes</b>			<b>35</b>	<b>324</b>	Young-immature Softwood



DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK: SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT

Appendix B Avian Survey Data  
January 29, 2019

**Table B.1 Data Collected During June Breeding Bird Point Count Surveys**

Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	golden-crowned kinglet	1	Male	Adult				Yes		53	35	Young-immature Softwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	hermit thrush	1	Male	Adult				Yes		88	77	Young-immature Softwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	magnolia warbler	1	Male	Adult				Yes		84	153	Young-immature Softwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	Nashville warbler	1	Male	Adult				Yes		60	242	Young-immature Softwood
6/26/2018 6:53	18RHB020	Young-immature Hardwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	ovenbird	1	Male	Adult				Yes		92	342	Young-immature Hardwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	pileated woodpecker	1	Unknown	Adult			Yes		Yes	121	165	Young-immature Softwood
<b>6/26/2018 6:53</b>	<b>18RHB020</b>	<b>Young-immature Softwood</b>	<b>5271662</b>	<b>6</b>	<b>Light air - 1 to 5 km/h</b>	<b>Heavy noise (constant distraction)</b>	<b>pine siskin</b>	<b>1</b>	<b>Male</b>	<b>Adult</b>				<b>Yes</b>		<b>54</b>	<b>125</b>	<b>Young-immature Softwood</b>
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	red-breasted nuthatch	1	Male	Adult				Yes		75	302	Young-immature Softwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	red-eyed vireo	1	Male	Adult				Yes		97	16	Young-immature Softwood
6/26/2018 6:53	18RHB020	Young-immature Softwood	5271662	6	Light air - 1 to 5 km/h	Heavy noise (constant distraction)	winter wren	1	Male	Adult				Yes		79	167	Young-immature Softwood
6/26/2018 7:33	18RMC037	Mature-overmature Softwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	American robin	1	Unknown	Adult			Yes			98	10	Mature-overmature Softwood
6/26/2018 7:33	18RMC037	Mature-overmature Softwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	golden-crowned kinglet	1	Male	Adult				Yes		11	61	Mature-overmature Softwood
6/26/2018 7:33	18RMC037	Mature-overmature Softwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	golden-crowned kinglet	1	Male	Adult				Yes		19	44	Mature-overmature Softwood
6/26/2018 7:33	18RMC037	Mature-overmature Softwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	Nashville warbler	1	Male	Adult				Yes		71	35	Mature-overmature Softwood
6/26/2018 7:33	18RMC037	Mature-overmature Softwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	northern parula	1	Male	Adult				Yes		57	280	Mature-overmature Softwood



DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK: SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT

Appendix B Avian Survey Data  
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**Table B.1 Data Collected During June Breeding Bird Point Count Surveys**

Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/26/2018 7:33	18RMC037	Mature-overmature Softwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	pine siskin	1	Unknown	Adult	Yes		Yes			41	46	Mature-overmature Softwood
6/26/2018 7:33	18RMC037	Mature-overmature Mixedwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	Swainson's thrush	1	Male	Adult				Yes		82	49	Mature-overmature Mixedwood
6/26/2018 7:33	18RMC037	Mature-overmature Softwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	Swainson's thrush	1	Unknown	Adult			Yes			90	347	Mature-overmature Softwood
6/26/2018 7:33	18RMC037	Mature-overmature Mixedwood	5271327	10	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	winter wren	1	Male	Adult				Yes		99	27	Mature-overmature Mixedwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	American goldfinch	1	Unknown	Adult	Yes		Yes			33	169	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	American redstart	1	Male	Adult				Yes		67	65	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	black-throated blue warbler	1	Male	Adult				Yes		66	213	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	blue jay	1	Unknown	Adult			Yes			94	204	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	blue-headed vireo	1	Male	Adult				Yes		85	7	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	blue-headed vireo	1	Male	Adult				Yes	Yes	114	301	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	chestnut-sided warbler	1	Male	Adult				Yes		60	327	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	common yellowthroat	1	Male	Adult				Yes		98	266	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	downy woodpecker	1	Female	Adult		Yes				16	297	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	downy woodpecker	1	Male	Adult		Yes	Yes			36	29	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	hermit thrush	1	Male	Adult				Yes		74	101	Regeneration-sapling Hardwood



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Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	magnolia warbler	1	Male	Adult				Yes		70	287	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	Nashville warbler	1	Male	Adult				Yes		65	248	Regeneration-sapling Hardwood
<b>6/26/2018 7:34</b>	<b>18RHB021</b>	<b>Regeneration-sapling Hardwood</b>	<b>5270824</b>	<b>6</b>	<b>Light air - 1 to 5 km/h</b>	<b>Light Noise (temporary, not distracting)</b>	<b>pine siskin</b>	<b>1</b>	<b>Unknown</b>	<b>Adult</b>	<b>Yes</b>		<b>Yes</b>			<b>27</b>	<b>112</b>	<b>Regeneration-sapling Hardwood</b>
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	red-eyed vireo	1	Male	Adult				Yes		78	141	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	Swainson's thrush	1	Unknown	Adult			Yes			85	330	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	veery	1	Male	Adult				Yes	Yes	103	47	Regeneration-sapling Hardwood
6/26/2018 7:34	18RHB021	Regeneration-sapling Hardwood	5270824	6	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	white-throated sparrow	1	Male	Adult				Yes	Yes	123	227	Regeneration-sapling Hardwood
6/26/2018 8:01	18RHB022	Regeneration-sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	American redstart	1	Male	Adult				Yes		28	271	Regeneration-sapling Hardwood
6/26/2018 8:01	18RHB022	Regeneration-sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	American redstart	1	Male	Adult				Yes		58	42	Regeneration-sapling Hardwood
6/26/2018 8:01	18RHB022	Regeneration-sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	blue-headed vireo	1	Male	Adult				Yes		90	36	Regeneration-sapling Hardwood
<b>6/26/2018 8:01</b>	<b>18RHB022</b>	<b>Regeneration-sapling Hardwood</b>	<b>5271148</b>	<b>9</b>	<b>Light Breeze - 6 to 11 km/h</b>	<b>Moderate Noise (constant, not overwhelming)</b>	<b>Cape May warbler</b>	<b>1</b>	<b>Male</b>	<b>Adult</b>				<b>Yes</b>		<b>35</b>	<b>101</b>	Regeneration-sapling Hardwood
6/26/2018 8:01	18RHB022	Regeneration-sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	cedar waxwing	1	Unknown	Adult			Yes			54	318	Regeneration-sapling Hardwood
6/26/2018 8:01	18RHB022	Regeneration-sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	chestnut-sided warbler	1	Male	Adult				Yes		45	245	Regeneration-sapling Hardwood
6/26/2018 8:01	18RHB022	Mature-overmature Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	hermit thrush	1	Male	Adult				Yes		96	6	Mature-overmature Hardwood
6/26/2018 8:01	18RHB022	Regeneration-sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	magnolia warbler	1	Male	Adult				Yes		62	287	Regeneration-sapling Hardwood



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Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/26/2018 8:01	18RHB022	Regeneration -sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes		79	142	Regeneration-sapling Hardwood
6/26/2018 8:01	18RHB022	Regeneration -sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes		89	297	Regeneration-sapling Hardwood
6/26/2018 8:01	18RHB022	Regeneration -sapling Hardwood	5271148	9	Light Breeze - 6 to 11 km/h	Moderate Noise (constant, not overwhelming)	veery	1	Male	Adult				Yes		90	226	Regeneration-sapling Hardwood
6/26/2018 8:24	18RHB023	Regeneration -sapling Hardwood	5271008	9	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	American redstart	1	Female	Adult		Yes				17	358	Regeneration-sapling Hardwood
6/26/2018 8:24	18RHB023	Regeneration -sapling Hardwood	5271008	9	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-throated blue warbler	1	Male	Adult				Yes		81	218	Regeneration-sapling Hardwood
6/26/2018 8:24	18RHB023	Regeneration -sapling Hardwood	5271008	9	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	hermit thrush	1	Male	Adult				Yes		87	24	Regeneration-sapling Hardwood
6/26/2018 8:24	18RHB023	Regeneration -sapling Hardwood	5271008	9	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	hermit thrush	1	Male	Adult				Yes		94	237	Regeneration-sapling Hardwood
6/26/2018 8:24	18RHB023	Regeneration -sapling Hardwood	5271008	9	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Unknown	Adult		Yes				35	65	Regeneration-sapling Hardwood
6/26/2018 8:24	18RHB023	Regeneration -sapling Hardwood	5271008	9	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes		77	99	Regeneration-sapling Hardwood
6/26/2018 8:24	18RHB023	Regeneration -sapling Hardwood	5271008	9	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	red-eyed vireo	1	Male	Adult				Yes		72	143	Regeneration-sapling Hardwood
6/26/2018 8:24	18RHB023	Regeneration -sapling Hardwood	5271008	9	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	veery	1	Unknown	Adult		Yes				41	8	Regeneration-sapling Hardwood
6/26/2018 9:14	18RHB024	Treed Swamp	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	American redstart	1	Male	Adult				Yes		57	202	Treed Swamp
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	American redstart	1	Male	Adult				Yes		73	87	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	American robin	1	Unknown	Adult			Yes			80	148	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	black-and-white warbler	1	Male	Adult		Yes		Yes		16	101	Mature-overmature Softwood



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Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/26/2018 9:14	18RHB024	Treed Swamp	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	black-and-white warbler	1	Male	Adult				Yes		84	234	Treed Swamp
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	blackburnian warbler	1	Male	Adult				Yes		90	79	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	black-capped chickadee	1	Unknown	Adult			Yes			35	337	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	black-throated blue warbler	1	Male	Adult				Yes		81	65	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	black-throated blue warbler	1	Male	Adult				Yes		86	338	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	blue-headed vireo	1	Male	Adult				Yes		50	104	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	blue-headed vireo	1	Male	Adult				Yes		67	325	Mature-overmature Softwood
<b>6/26/2018 9:14</b>	<b>18RHB024</b>	<b>Mature-overmature Softwood</b>	<b>5272302</b>	<b>10</b>	<b>Light air - 1 to 5 km/h</b>	<b>Light Noise (temporary, not distracting)</b>	<b>Canada warbler</b>	<b>1</b>	<b>Male</b>	<b>Adult</b>				<b>Yes</b>		<b>88</b>	<b>110</b>	Mature-overmature Softwood
<b>6/26/2018 9:14</b>	<b>18RHB024</b>	<b>Mature-overmature Softwood</b>	<b>5272302</b>	<b>10</b>	<b>Light air - 1 to 5 km/h</b>	<b>Light Noise (temporary, not distracting)</b>	<b>Cape May warbler</b>	<b>1</b>	<b>Male</b>	<b>Adult</b>				<b>Yes</b>	<b>Yes</b>	<b>84</b>	<b>320</b>	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	magnolia warbler	1	Male	Adult				Yes		47	262	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Mixedwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	Nashville warbler	1	Male	Adult				Yes		87	351	Mature-overmature Mixedwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	northern parula	1	Male	Adult				Yes		88	286	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	red-breasted nuthatch	1	Male	Adult				Yes		83	19	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	ruby-crowned kinglet	1	Male	Adult				Yes		43	307	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	Swainson's thrush	1	Male	Adult				Yes		65	51	Mature-overmature Softwood





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Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/26/2018 9:14	18RHB024	Mature-overmature Softwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	white-throated sparrow	1	Male	Adult				Yes		98	300	Mature-overmature Softwood
6/26/2018 9:14	18RHB024	Mature-overmature Mixedwood	5272302	10	Light air - 1 to 5 km/h	Light Noise (temporary, not distracting)	winter wren	1	Male	Adult				Yes		100	349	Mature-overmature Mixedwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-and-white warbler	1	Male	Adult				Yes		79	87	Young-immature Softwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-and-white warbler	1	Male	Adult				Yes		80	148	Young-immature Softwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-capped chickadee	1	Unknown	Adult			Yes			69	229	Young-immature Softwood
<b>6/27/2018 6:17</b>	<b>18RHB025</b>	<b>Young-immature Softwood</b>	<b>5272112</b>	<b>14</b>	<b>Gentle Breeze - 12 to 19 km/h</b>	<b>Moderate Noise (constant, not overwhelming)</b>	<b>Cape May warbler</b>	<b>1</b>	<b>Male</b>	<b>Adult</b>				<b>Yes</b>	<b>Yes</b>	<b>120</b>	<b>162</b>	Young-immature Softwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	golden-crowned kinglet	1	Unknown	Adult			Yes			52	275	Young-immature Softwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	golden-crowned kinglet	1	Male	Adult				Yes		83	304	Young-immature Softwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	magnolia warbler	1	Male	Adult				Yes		67	328	Young-immature Softwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	ruby-crowned kinglet	1	Male	Adult				Yes		47	23	Young-immature Softwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	ruby-crowned kinglet	1	Male	Adult				Yes		79	109	Young-immature Softwood
6/27/2018 6:17	18RHB025	Young-immature Softwood	5272112	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	white-throated sparrow	1	Male	Adult				Yes		99	65	Young-immature Softwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	American robin	1	Male	Adult				Yes		52	91	Mature-overmature Hardwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-throated blue warbler	1	Male	Adult				Yes		80	122	Mature-overmature Hardwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-throated blue warbler	1	Male	Adult				Yes		97	323	Mature-overmature Hardwood



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Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-throated green warbler	1	Male	Adult				Yes		84	80	Mature-overmature Hardwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	Nashville warbler	1	Male	Adult				Yes		55	217	Mature-overmature Hardwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	northern parula	1	Male	Adult				Yes		27	296	Mature-overmature Hardwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes		74	288	Mature-overmature Hardwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes		94	150	Mature-overmature Hardwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	red-eyed vireo	1	Male	Adult				Yes		86	41	Mature-overmature Hardwood
6/27/2018 6:41	18RHB026	Mature-overmature Hardwood	5272024	14	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	yellow-bellied sapsucker	1	Female	Adult		Yes	Yes			50	346	Mature-overmature Hardwood
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-and-white warbler	1	Male	Adult				Yes		83	307	Young-immature Hardwood
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	blackburnian warbler	1	Male	Adult				Yes		90	162	Young-immature Hardwood
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-throated blue warbler	1	Male	Adult				Yes		68	132	Young-immature Hardwood
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-throated green warbler	1	Male	Adult				Yes		13	225	Young-immature Hardwood
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	brown creeper	1	Male	Adult				Yes		91	72	Young-immature Hardwood
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	hermit thrush	1	Unknown	Adult		Yes				30	343	Young-immature Hardwood
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	hermit thrush	1	Male	Adult				Yes		75	219	Young-immature Hardwood
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	Nashville warbler	1	Male	Adult				Yes		67	97	Young-immature Hardwood



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Appendix B Avian Survey Data  
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**Table B.1 Data Collected During June Breeding Bird Point Count Surveys**

Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/27/2018 7:04	18RHB027	Young-immature Hardwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes		80	34	Young-immature Hardwood
6/27/2018 7:04	18RHB027	Mature-overmature Mixedwood	5272352	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	ovenbird	1	Male	Adult				Yes	Yes	113	201	Mature-overmature Mixedwood
6/27/2018 7:31	18RHB028	Mature-overmature Mixedwood	5271759	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	American robin	1	Male	Adult				Yes		85	110	Mature-overmature Mixedwood
6/27/2018 7:31	18RHB028	Mature-overmature Mixedwood	5271759	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-capped chickadee	1	Unknown	Adult			Yes			15	350	Mature-overmature Mixedwood
6/27/2018 7:31	18RHB028	Mature-overmature Mixedwood	5271759	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	black-capped chickadee	1	Unknown	Adult			Yes			24	277	Mature-overmature Mixedwood
6/27/2018 7:31	18RHB028	Mature-overmature Mixedwood	5271759	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	northern parula	1	Male	Adult				Yes		72	34	Mature-overmature Mixedwood
6/27/2018 7:31	18RHB028	Mature-overmature Mixedwood	5271759	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	northern parula	1	Male	Adult				Yes		75	162	Mature-overmature Mixedwood
6/27/2018 7:31	18RHB028	Mature-overmature Mixedwood	5271759	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	purple finch	1	Male	Adult				Yes		63	316	Mature-overmature Mixedwood
6/27/2018 7:31	18RHB028	Mature-overmature Mixedwood	5271759	15	Gentle Breeze - 12 to 19 km/h	Moderate Noise (constant, not overwhelming)	Swainson's thrush	1	Male	Adult				Yes		78	235	Mature-overmature Mixedwood
6/27/2018 8:04	18RHB029	Mature-overmature Mixedwood	5272359	15	Gentle Breeze - 12 to 19 km/h	Heavy noise (constant distraction)	black-throated blue warbler	1	Male	Adult				Yes		51	299	Mature-overmature Mixedwood
6/27/2018 8:04	18RHB029	Mature-overmature Mixedwood	5272359	15	Gentle Breeze - 12 to 19 km/h	Heavy noise (constant distraction)	black-throated green warbler	1	Male	Adult				Yes		67	85	Mature-overmature Mixedwood
6/27/2018 8:04	18RHB029	Mature-overmature Mixedwood	5272359	15	Gentle Breeze - 12 to 19 km/h	Heavy noise (constant distraction)	brown creeper	1	Male	Adult				Yes		65	66	Mature-overmature Mixedwood
6/27/2018 8:04	18RHB029	Mature-overmature Mixedwood	5272359	15	Gentle Breeze - 12 to 19 km/h	Heavy noise (constant distraction)	northern parula	1	Male	Adult				Yes		65	29	Mature-overmature Mixedwood
6/27/2018 8:04	18RHB029	Mature-overmature Mixedwood	5272359	15	Gentle Breeze - 12 to 19 km/h	Heavy noise (constant distraction)	ovenbird	1	Male	Adult				Yes		38	51	Mature-overmature Mixedwood
6/27/2018 8:04	18RHB029	Mature-overmature Mixedwood	5272359	15	Gentle Breeze - 12 to 19 km/h	Heavy noise (constant distraction)	ovenbird	1	Male	Adult				Yes		75	212	Mature-overmature Mixedwood



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**Table B.1 Data Collected During June Breeding Bird Point Count Surveys**

Survey Date & Time	Waypoint ID	Habitat Type	Northing (UTM Zone 19)	Temp (°C)	Wind	Noise	Common Name	Number Observed	Sex	Age	Fly By?	Seen	Calling	Singing	Incidental	Distance (m)	Bearing (°)	Habitat Type
6/27/2018 8:04	18RHB029	<b>Mature-overmature Mixedwood</b>	5272359	15	Gentle Breeze - 12 to 19 km/h	Heavy noise (constant distraction)	pine siskin	4	Unknown	Adult	Yes		Yes			24	130	Mature-overmature Mixedwood
6/27/2018 8:04	18RHB029	Mature-overmature Mixedwood	5272359	15	Gentle Breeze - 12 to 19 km/h	Heavy noise (constant distraction)	red-eyed vireo	1	Male	Adult				Yes		81	136	Mature-overmature Mixedwood

Note: Species in **bold** text are SAR or SOCC.



DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK: SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT

Appendix B Avian Survey Data  
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**Table B.2 Data Collected During June Breeding Bird Area Searches**

Date & Time	Common Name	Number Observed	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observer Habitat	Survey Location
6/26/2018 6:11	American redstart	1	Singing male present	Immature Hardwood	2517042	7617692	Young-immature Hardwood	Stage 1 PDA
6/26/2018 6:14	red-eyed vireo	1	Singing male present	Immature Hardwood	2517041	7617694	Young-immature Hardwood	Stage 1 PDA
6/26/2018 6:15	white-throated sparrow	1	Singing male present	Immature Hardwood	2517041	7617694	Young-immature Hardwood	Stage 1 PDA
6/26/2018 6:17	ruby-crowned kinglet	1	Singing male present	Immature Hardwood	2517024	7617716	Young-immature Hardwood	Stage 1 PDA
6/26/2018 6:19	ovenbird	1	Singing male present	Immature Hardwood	2517013	7617724	Young-immature Hardwood	LAA (outside PDA)
6/26/2018 6:21	northern parula	1	Singing male present	Mature Hardwood	2516989	7617744	Young-immature Hardwood	LAA (outside PDA)
6/26/2018 6:25	blackburnian warbler	1	Singing male present	Immature Hardwood	2516949	7617755	Young-immature Hardwood	LAA (outside PDA)
6/26/2018 6:26	alder flycatcher	1	Singing male present	Immature Hardwood	2516926	7617752	Young-immature Hardwood	LAA (outside PDA)
6/26/2018 6:27	American redstart	1	Singing male present	Immature Hardwood	2516916	7617745	Young-immature Hardwood	LAA (outside PDA)
6/26/2018 6:32	magnolia warbler	1	Habitat	Immature Hardwood	2516914	7617744	Young-immature Hardwood	LAA (outside PDA)
6/26/2018 6:32	yellow-rumped warbler	1	Singing male present	Immature Hardwood	2516879	7617755	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:38	white-throated sparrow	1	Agitated	Tall Shrub Swamp	2516879	7617770	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:38	American robin	1	Habitat	Tall Shrub Swamp	2516878	7617770	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:41	pileated woodpecker	1	Habitat	Mature Mixedwood	2516873	7617784	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:42	ruby-crowned kinglet	1	Singing male present	Immature Hardwood	2516869	7617796	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:43	veery	1	Singing male present	Immature Hardwood	2516863	7617809	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:44	northern waterthrush	1	Singing male present	Tall Shrub Swamp	2516863	7617809	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:45	Swainson's thrush	1	Singing male present	Immature Hardwood	2516863	7617810	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:46	common yellowthroat	1	Singing male present	Tall Shrub Swamp	2516863	7617811	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:47	common loon	1	No indication Breeding	Flew Over	2516863	7617811	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:49	northern parula	1	Singing male present	Immature Hardwood	2516861	7617815	Tall Shrub Swamp	Stage 2 PDA
6/26/2018 6:49	blackburnian warbler	1	Singing male present	Immature Hardwood	2516861	7617815	Tall Shrub Swamp	Stage 2 PDA
6/26/2018 6:53	magnolia warbler	1	Singing male present	Immature Hardwood	2516852	7617863	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:54	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516857	7617879	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:55	downy woodpecker	1	Habitat	Mature Mixedwood	2516857	7617880	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:55	ruby-crowned kinglet	1	Singing male present	Mature Mixedwood	2516857	7617880	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:56	northern parula	1	Singing male present	Mature Mixedwood	2516857	7617880	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:58	red-breasted nuthatch	1	Habitat	Mature Mixedwood	2516854	7617904	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 6:59	black-and-white warbler	1	Singing male present	Mature Mixedwood	2516854	7617905	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:03	Swainson's thrush	1	Singing male present	Mature Mixedwood	2516822	7617966	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:06	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516812	7617994	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:08	Nashville warbler	1	Singing male present	Mature Mixedwood	2516796	7618015	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 7:10	ruby-crowned kinglet	1	Singing male present	Mature Mixedwood	2516783	7618039	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:11	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516772	7618061	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:12	American goldfinch	1	No indication Breeding	Flew Over	2516773	7618062	Mature-overmature Softwood	Stage 2 PDA



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**Table B.2 Data Collected During June Breeding Bird Area Searches**

Date & Time	Common Name	Number Observed	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observer Habitat	Survey Location
6/26/2018 7:13	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516773	7618062	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:17	magnolia warbler	1	Singing male present	Mature Mixedwood	2516785	7618098	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:20	American robin	1	Singing male present	Mature Mixedwood	2516797	7618119	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:25	yellow-rumped warbler	1	Singing male present	Mature Mixedwood	2516857	7618156	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:29	winter wren	1	Singing male present	Mature Mixedwood	2516897	7618171	Mature-overmature Softwood	LAA (outside PDA)
6/26/2018 7:30	American robin	1	Singing male present	Mature Mixedwood	2516896	7618172	Mature-overmature Softwood	LAA (outside PDA)
6/26/2018 7:30	Nashville warbler	1	Singing male present	Mature Mixedwood	2516896	7618172	Mature-overmature Softwood	LAA (outside PDA)
6/26/2018 7:30	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516896	7618172	Mature-overmature Softwood	LAA (outside PDA)
6/26/2018 7:54	magnolia warbler	1	Singing male present	Mature Mixedwood	2516873	7618213	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:57	Nashville warbler	1	Singing male present	Mature Mixedwood	2516861	7618268	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 7:59	ruby-crowned kinglet	1	Singing male present	Mature Mixedwood	2516847	7618289	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 8:00	golden-crowned kinglet	2	Singing male present	Mature Mixedwood	2516847	7618289	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 8:04	ruby-crowned kinglet	1	Singing male present	Mature Mixedwood	2516825	7618335	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 8:04	winter wren	1	Singing male present	Mature Mixedwood	2516825	7618336	Mature-overmature Softwood	Stage 2 PDA
6/26/2018 8:06	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516829	7618358	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 8:07	northern parula	1	Singing male present	Mature Mixedwood	2516829	7618358	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 8:08	Nashville warbler	1	Singing male present	Mature Mixedwood	2516840	7618394	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 8:09	Swainson's thrush	1	Singing male present	Mature Mixedwood	2516855	7618422	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 8:11	northern parula	1	Singing male present	Mature Mixedwood	2516871	7618454	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 8:13	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516894	7618473	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 8:14	winter wren	1	Singing male present	Mature Mixedwood	2516894	7618473	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 8:15	Swainson's thrush	1	Singing male present	Mature Mixedwood	2516905	7618486	Mature-overmature Mixedwood	Stage 2 PDA
6/26/2018 8:19	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516978	7618539	Mature-overmature Mixedwood	LAA (outside PDA)
6/26/2018 8:21	Nashville warbler	1	Singing male present	Mature Mixedwood	2516978	7618539	Mature-overmature Mixedwood	LAA (outside PDA)
6/26/2018 8:21	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516979	7618539	Mature-overmature Mixedwood	LAA (outside PDA)
6/26/2018 8:24	black-and-white warbler	1	Singing male present	Immature Mixedwood	2517001	7618548	Mature-overmature Softwood	LAA (outside PDA)
6/26/2018 8:25	yellow-rumped warbler	1	Singing male present	Immature Mixedwood	2517033	7618580	Mature-overmature Softwood	LAA (outside PDA)
6/26/2018 8:27	golden-crowned kinglet	1	Singing male present	Immature Mixedwood	2517047	7618589	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:28	white-throated sparrow	1	Singing male present	Immature Mixedwood	2517069	7618598	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:31	ruby-crowned kinglet	1	Singing male present	Immature Mixedwood	2517136	7618641	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:33	golden-crowned kinglet	1	Singing male present	Immature Mixedwood	2517170	7618655	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:35	blackburnian warbler	1	Singing male present	Immature Mixedwood	2517203	7618673	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:36	American redstart	1	Singing male present	Immature Mixedwood	2517203	7618673	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:37	northern parula	1	Singing male present	Immature Mixedwood	2517203	7618673	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:37	magnolia warbler	1	Singing male present	Immature Mixedwood	2517203	7618673	Mature-overmature Softwood	Stage 1 PDA



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Appendix B Avian Survey Data  
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**Table B.2 Data Collected During June Breeding Bird Area Searches**

Date & Time	Common Name	Number Observed	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observer Habitat	Survey Location
6/26/2018 8:38	Swainson's thrush	1	Singing male present	Immature Mixedwood	2517203	7618674	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:42	American redstart	1	Singing male present	Immature Mixedwood	2517275	7618715	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:43	red-eyed vireo	1	Singing male present	Immature Mixedwood	2517275	7618715	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:43	yellow-rumped warbler	1	Singing male present	Immature Mixedwood	2517275	7618715	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:47	ruby-crowned kinglet	1	Singing male present	Immature Mixedwood	2517344	7618731	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:47	northern parula	1	Singing male present	Immature Mixedwood	2517344	7618731	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:48	red-breasted nuthatch	1	Singing male present	Immature Mixedwood	2517346	7618731	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:52	hermit thrush	1	Habitat	Immature Mixedwood	2517347	7618731	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:53	blue-headed vireo	1	Singing male present	Immature Mixedwood	2517404	7618741	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:54	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2517427	7618740	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:55	ruby-crowned kinglet	1	Singing male present	Mature Mixedwood	2517428	7618740	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 8:59	bay-breasted warbler	1	Singing male present	Mature Mixedwood	2517504	7618763	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:01	dark-eyed junco	1	Singing male present	Mature Softwood	2517535	7618788	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:07	red-breasted nuthatch	4	Fledged young	Mature Softwood	2517582	7618808	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:07	gray jay	1	Pair in suitable nest	Mature Softwood	2517582	7618808	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:08	Swainson's thrush	1	Habitat	Mature Softwood	2517583	7618808	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:10	black-capped chickadee	1	Singing male present	Mature Softwood	2517584	7618808	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:11	hairy woodpecker	1	Habitat	Mature Softwood	2517584	7618808	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:11	American robin	1	Singing male present	Mature Softwood	2517586	7618809	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:13	black-capped chickadee	4	Fledged young	Mature Softwood	2517586	7618809	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:13	ruby-crowned kinglet	1	Singing male present	Mature Softwood	2517586	7618809	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:17	American robin	1	Singing male present	Mature Mixedwood	2517638	7618843	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:19	blue-headed vireo	1	Singing male present	Mature Mixedwood	2517638	7618843	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:19	wilson's warbler	1	Singing male present	Tall shrub Thicket	2517638	7618843	Mature-overmature Softwood	Stage 1 PDA
6/26/2018 9:26	white-throated sparrow	1	Habitat	Mature Mixedwood	2517660	7618885	Freshwater Marsh	Stage 1 PDA
6/26/2018 9:26	American redstart	1	Singing male present	Mature Mixedwood	2517660	7618885	Freshwater Marsh	Stage 1 PDA
6/26/2018 9:28	bay-breasted warbler	1	Singing male present	Mature Mixedwood	2517655	7618889	Freshwater Marsh	Stage 1 PDA
6/26/2018 9:28	red-eyed vireo	1	Singing male present	Mature Mixedwood	2517654	7618889	Freshwater Marsh	Stage 1 PDA
6/26/2018 9:33	ruby-crowned kinglet	1	Singing male present	Immature Mixedwood	2517587	7618877	Young-immature Hardwood	Stage 1 PDA
6/26/2018 9:36	American redstart	1	Singing male present	Tall Shrub Swamp	2517562	7618851	Young-immature Hardwood	Stage 1 PDA
6/26/2018 9:37	blue-headed vireo	1	Singing male present	Mature Mixedwood	2517562	7618851	Young-immature Hardwood	Stage 1 PDA
6/26/2018 9:40	American robin	1	Fledged young	Mature Softwood	2517524	7618869	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:41	boreal chickadee	1	Habitat	Mature Softwood	2517523	7618869	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:41	red-breasted nuthatch	1	Habitat	Mature Softwood	2517523	7618869	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:45	magnolia warbler	1	Singing male present	Mature Softwood	2517454	7618873	Young-immature Softwood	Stage 1 PDA



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Appendix B Avian Survey Data  
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**Table B.2 Data Collected During June Breeding Bird Area Searches**

Date & Time	Common Name	Number Observed	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observer Habitat	Survey Location
6/26/2018 9:47	ruby-crowned kinglet	1	Singing male present	Immature Softwood	2517410	7618833	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:47	gray jay	1	Habitat	Immature Softwood	2517410	7618833	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:48	yellow-rumped warbler	1	Singing male present	Immature Softwood	2517410	7618833	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:49	Swainson's thrush	2	Habitat	Immature Softwood	2517410	7618833	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:49	boreal chickadee	1	Habitat	Immature Softwood	2517410	7618833	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:53	bay-breasted warbler	1	Singing male present	Immature Mixedwood	2517319	7618812	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:56	golden-crowned kinglet	1	Singing male present	Immature Softwood	2517279	7618821	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:56	golden-crowned kinglet	1	Singing male present	Mature Softwood	2517279	7618821	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:57	magnolia warbler	1	Singing male present	Mature Softwood	2517278	7618821	Young-immature Softwood	Stage 1 PDA
6/26/2018 9:59	black-capped chickadee	1	Habitat	Immature Mixedwood	2517243	7618817	Young-immature Softwood	Stage 2 PDA
6/26/2018 9:59	American redstart	1	Singing male present	Immature Mixedwood	2517243	7618817	Young-immature Softwood	Stage 2 PDA
6/26/2018 10:02	white-throated sparrow	1	Singing male present	Immature Mixedwood	2517230	7618810	Young-immature Softwood	Stage 2 PDA
6/26/2018 10:03	Swainson's thrush	1	Singing male present	Immature Mixedwood	2517230	7618810	Young-immature Softwood	Stage 2 PDA
6/26/2018 10:05	American redstart	1	Singing male present	Tall Shrub Swamp	2517193	7618804	Tall Shrub Swamp	Stage 1 PDA
6/26/2018 10:06	broad-winged hawk	1	No indication Breeding	Flew Over	2517193	7618804	Tall Shrub Swamp	Stage 1 PDA
6/26/2018 10:12	blackpoll warbler	1	Singing male present	Immature Softwood	2517152	7618779	Young-immature Softwood	Stage 1 PDA
6/26/2018 10:13	magnolia warbler	1	Singing male present	Immature Softwood	2517151	7618779	Young-immature Softwood	Stage 1 PDA
6/26/2018 10:13	pileated woodpecker	1	No indication Breeding	Immature Softwood	2517151	7618779	Young-immature Softwood	Stage 1 PDA
6/26/2018 10:14	winter wren	1	Singing male present	Immature Softwood	2517151	7618779	Young-immature Softwood	Stage 1 PDA
6/26/2018 10:17	ruby-crowned kinglet	1	Singing male present	Immature Mixedwood	2517082	7618717	Young-immature Softwood	Stage 1 PDA
6/27/2018 6:12	red-eyed vireo	1	Singing male present	Mature Hardwood	2516764	7617687	Young-immature Hardwood	Stage 2 PDA
6/27/2018 6:13	white-throated sparrow	1	Singing male present	Mature Hardwood	2516764	7617687	Young-immature Hardwood	Stage 2 PDA
6/27/2018 6:14	northern waterthrush	1	Singing male present	Tall Shrub Swamp	2516763	7617688	Young-immature Hardwood	Stage 2 PDA
6/27/2018 6:17	white-throated sparrow	1	Singing male present	Mature Hardwood	2516760	7617692	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:18	green-winged teal	1	No indication Breeding	Open Water	2516758	7617699	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:21	American redstart	1	Singing male present	Tall shrub Thicket	2516751	7617730	Tall Shrub Swamp	Stage 2 PDA
6/27/2018 6:23	American redstart	1	Singing male present	Tall Shrub Swamp	2516741	7617751	Tall Shrub Swamp	Stage 2 PDA
6/27/2018 6:30	white-throated sparrow	1	Singing male present	Tall shrub Thicket	2516722	7617830	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:30	American redstart	1	Singing male present	Tall shrub Thicket	2516722	7617830	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:37	magnolia warbler	1	Singing male present	Mature Mixedwood	2516717	7617863	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:37	American robin	1	Singing male present	Mature Mixedwood	2516718	7617864	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:39	magnolia warbler	1	Singing male present	Mature Mixedwood	2516736	7617884	Regeneration-sapling Hardwood	LAA (outside PDA)
6/27/2018 6:41	northern parula	1	Singing male present	Immature Mixedwood	2516756	7617883	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:42	ruby-crowned kinglet	1	Singing male present	Immature Mixedwood	2516757	7617883	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:42	Swainson's thrush	1	Singing male present	Immature Mixedwood	2516757	7617883	Regeneration-sapling Hardwood	Stage 2 PDA





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**Table B.2 Data Collected During June Breeding Bird Area Searches**

Date & Time	Common Name	Number Observed	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observer Habitat	Survey Location
6/27/2018 6:43	northern waterthrush	1	Singing male present	Immature Mixedwood	2516757	7617884	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:43	American redstart	1	Singing male present	Immature Mixedwood	2516758	7617883	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:46	blackburnian warbler	1	Singing male present	Immature Mixedwood	2516781	7617914	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:50	Swainson's thrush	1	Singing male present	Habitat Unknown	2516783	7617939	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:54	black-and-white warbler	1	Singing male present	Mature Hardwood	2516743	7618008	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 6:57	ruby-crowned kinglet	1	Singing male present	Mature Mixedwood	2516718	7618036	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 6:57	black-throated blue warbler	1	Singing male present	Immature Hardwood	2516718	7618037	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 6:59	northern parula	1	Singing male present	Mature Mixedwood	2516711	7618043	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:00	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516712	7618043	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 7:03	yellow-rumped warbler	1	Singing male present	Mature Softwood	2516693	7618070	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:03	ovenbird	1	Singing male present	Habitat Unknown	2516692	7618070	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:04	red-breasted nuthatch	1	No indication Breeding	Mature Softwood	2516692	7618072	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:04	American robin	1	Singing male present	Immature Mixedwood	2516693	7618073	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:05	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516693	7618075	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:07	Nashville warbler	1	Singing male present	Mature Mixedwood	2516690	7618124	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:10	American robin	1	Singing male present	Mature Mixedwood	2516707	7618154	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 7:10	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516708	7618157	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 7:11	northern parula	1	Singing male present	Mature Mixedwood	2516707	7618172	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 7:16	magnolia warbler	1	Singing male present	Immature Mixedwood	2516697	7618244	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:20	blackburnian warbler	1	Singing male present	Immature Mixedwood	2516695	7618301	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:26	winter wren	1	Singing male present	Immature Mixedwood	2516702	7618344	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:27	magnolia warbler	1	Singing male present	Immature Mixedwood	2516702	7618344	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:27	American robin	1	Singing male present	Immature Mixedwood	2516703	7618345	Regeneration-sapling Hardwood	Stage 2 PDA
6/27/2018 7:36	black-and-white warbler	1	Singing male present	Immature Mixedwood	2516657	7618499	Treed Swamp	Stage 2 PDA
<b>6/27/2018 7:50</b>	<b>Cape May warbler</b>	<b>1</b>	<b>Singing male present</b>	<b>Immature Softwood</b>	<b>2516606</b>	<b>7618491</b>	<b>Young-immature Hardwood</b>	Stage 2 PDA
6/27/2018 7:52	Swainson's thrush	1	Singing male present	Mature Mixedwood	2516598	7618491	Young-immature Hardwood	Stage 2 PDA
6/27/2018 7:55	Swainson's thrush	1	Singing male present	Immature Mixedwood	2516545	7618496	Young-immature Hardwood	Stage 2 PDA
6/27/2018 7:55	American redstart	1	Singing male present	Immature Mixedwood	2516543	7618497	Young-immature Hardwood	Stage 2 PDA
6/27/2018 8:00	blackburnian warbler	1	Singing male present	Mature Hardwood	2516446	7618505	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:01	red-eyed vireo	1	Singing male present	Immature Hardwood	2516446	7618505	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:02	American goldfinch	1	No indication Breeding	Mature Hardwood	2516445	7618505	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:02	northern parula	1	Singing male present	Mature Hardwood	2516444	7618506	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:06	white-throated sparrow	2	Agitated	Mature Hardwood	2516403	7618485	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:11	spotted sandpiper	1	Agitated	Disturbed Area	2516388	7618427	Industrial	Stage 2 PDA
6/27/2018 8:12	least flycatcher	1	Singing male present	Mature Hardwood	2516388	7618425	Industrial	Stage 2 PDA



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**Table B.2 Data Collected During June Breeding Bird Area Searches**

Date & Time	Common Name	Number Observed	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observer Habitat	Survey Location
6/27/2018 8:14	spotted sandpiper	1	Agitated	Open Water	2516361	7618488	Industrial	Stage 2 PDA
6/27/2018 8:18	American redstart	1	Singing male present	Mature Hardwood	2516329	7618515	Industrial	Stage 2 PDA
6/27/2018 8:18	white-throated sparrow	1	Singing male present	Immature Hardwood	2516329	7618515	Industrial	Stage 2 PDA
6/27/2018 8:19	black-throated blue warbler	1	Singing male present	Mature Hardwood	2516329	7618520	Industrial	Stage 2 PDA
6/27/2018 8:20	red-eyed vireo	1	Singing male present	Mature Hardwood	2516329	7618520	Industrial	Stage 2 PDA
6/27/2018 8:23	northern parula	1	Singing male present	Mature Hardwood	2516311	7618539	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:25	black-capped chickadee	3	Fledged young	Mature Hardwood	2516310	7618539	Industrial	Stage 2 PDA
6/27/2018 8:28	black-capped chickadee	3	Adult carrying food	Mature Hardwood	2516300	7618541	Industrial	Stage 2 PDA
6/27/2018 8:29	American redstart	1	Singing male present	Mature Hardwood	2516300	7618541	Industrial	Stage 2 PDA
6/27/2018 8:31	American robin	1	Singing male present	Mature Hardwood	2516292	7618545	Industrial	Stage 2 PDA
<b>6/27/2018 8:36</b>	<b>Cape May warbler</b>	<b>1</b>	<b>Singing male present</b>	<b>Immature Softwood</b>	<b>2516217</b>	<b>7618586</b>	<b>Mature-overmature Softwood</b>	Stage 2 PDA
6/27/2018 8:37	golden-crowned kinglet	1	Singing male present	Immature Softwood	2516216	7618588	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:38	dark-eyed junco	1	Singing male present	Immature Softwood	2516215	7618590	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:38	golden-crowned kinglet	1	Pair in suitable nest	Immature Softwood	2516215	7618590	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:39	Nashville warbler	1	Singing male present	Immature Softwood	2516214	7618592	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:39	American robin	1	Singing male present	Immature Softwood	2516214	7618595	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:46	blue-headed vireo	1	Singing male present	Mature Mixedwood	2516138	7618655	Young-immature Hardwood	Stage 2 PDA
6/27/2018 8:46	northern parula	1	Singing male present	Mature Mixedwood	2516138	7618655	Young-immature Hardwood	Stage 2 PDA
6/27/2018 8:47	purple finch	1	Singing male present	Mature Mixedwood	2516138	7618656	Young-immature Hardwood	Stage 2 PDA
6/27/2018 8:47	Nashville warbler	1	Singing male present	Mature Mixedwood	2516137	7618657	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:47	white-throated sparrow	1	Singing male present	Mature Mixedwood	2516137	7618657	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:52	northern parula	1	Singing male present	Mature Mixedwood	2516094	7618690	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:55	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516051	7618727	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:55	Swainson's thrush	1	Singing male present	Mature Mixedwood	2516052	7618728	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:55	ruby-crowned kinglet	1	Singing male present	Mature Mixedwood	2516052	7618730	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:56	red-breasted nuthatch	1	Habitat	Mature Mixedwood	2516052	7618730	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 8:56	white-throated sparrow	1	Singing male present	Mature Mixedwood	2516051	7618730	Mature-overmature Softwood	Stage 2 PDA
6/27/2018 9:02	red-eyed vireo	1	Singing male present	Mature Mixedwood	2515998	7618793	Young-immature Hardwood	Stage 2 PDA
6/27/2018 9:02	Nashville warbler	1	Singing male present	Mature Softwood	2515998	7618794	Young-immature Hardwood	Stage 2 PDA
6/27/2018 9:03	dark-eyed junco	1	Singing male present	Mature Mixedwood	2515998	7618794	Young-immature Hardwood	Stage 2 PDA
6/27/2018 9:04	Swainson's thrush	1	Singing male present	Mature Mixedwood	2515998	7618794	Young-immature Hardwood	Stage 2 PDA
6/27/2018 9:04	American redstart	1	Singing male present	Mature Mixedwood	2515998	7618794	Young-immature Hardwood	Stage 2 PDA
6/27/2018 9:11	spotted sandpiper	1	Habitat	Open Water	2515922	7618893	Industrial	LAA (outside PDA)
6/27/2018 9:12	northern goshawk	1	No indication Breeding	Flew Over	2515922	7618893	Industrial	LAA (outside PDA)
6/27/2018 9:17	red-eyed vireo	1	Singing male present	Mature Mixedwood	2516003	7618947	Mature-overmature Mixedwood	LAA (outside PDA)



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**Table B.2 Data Collected During June Breeding Bird Area Searches**

Date & Time	Common Name	Number Observed	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observer Habitat	Survey Location
6/27/2018 9:17	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516003	7618946	Mature-overmature Mixedwood	LAA (outside PDA)
6/27/2018 9:21	bay-breasted warbler	1	Singing male present	Mature Mixedwood	2516023	7618916	Mature-overmature Mixedwood	LAA (outside PDA)
6/27/2018 9:21	Swainson's thrush	1	Singing male present	Mature Mixedwood	2516025	7618914	Mature-overmature Mixedwood	LAA (outside PDA)
6/27/2018 9:22	white-throated sparrow	1	Singing male present	Mature Mixedwood	2516036	7618908	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:23	northern parula	1	Singing male present	Mature Mixedwood	2516037	7618907	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:24	Nashville warbler	1	Singing male present	Mature Mixedwood	2516058	7618891	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:28	red-eyed vireo	1	Singing male present	Mature Mixedwood	2516093	7618858	Mature-overmature Mixedwood	Stage 2 PDA
<b>6/27/2018 9:28</b>	<b>Cape May warbler</b>	<b>1</b>	<b>Singing male present</b>	<b>Mature Mixedwood</b>	<b>2516095</b>	<b>7618857</b>	<b>Mature-overmature Mixedwood</b>	Stage 2 PDA
6/27/2018 9:28	American robin	1	Singing male present	Mature Mixedwood	2516095	7618857	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:30	dark-eyed junco	1	Singing male present	Mature Mixedwood	2516097	7618853	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:33	magnolia warbler	1	Singing male present	Mature Mixedwood	2516122	7618838	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:34	American robin	1	Habitat	Mature Mixedwood	2516122	7618838	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:36	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516151	7618818	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:41	Nashville warbler	2	Singing male present	Mature Mixedwood	2516218	7618741	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:42	winter wren	1	Singing male present	Mature Softwood	2516218	7618740	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:43	bay-breasted warbler	1	Singing male present	Mature Softwood	2516220	7618737	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:46	American robin	1	Singing male present	Mature Mixedwood	2516247	7618697	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:48	American robin	1	Singing male present	Mature Mixedwood	2516285	7618658	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:49	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516287	7618658	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:49	northern parula	1	Singing male present	Mature Mixedwood	2516288	7618657	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:50	Swainson's thrush	1	Singing male present	Mature Mixedwood	2516288	7618657	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 9:53	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516340	7618610	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:02	dark-eyed junco	1	Singing male present	Mature Mixedwood	2516516	7618574	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:04	Swainson's thrush	1	Habitat	Mature Mixedwood	2516549	7618568	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:08	blackburnian warbler	1	Singing male present	Mature Mixedwood	2516587	7618548	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:09	red-eyed vireo	1	Singing male present	Mature Mixedwood	2516590	7618547	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:09	bay-breasted warbler	1	Singing male present	Mature Mixedwood	2516590	7618547	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:13	white-throated sparrow	1	Agitated	Mature Mixedwood	2516632	7618542	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:14	golden-crowned kinglet	1	Singing male present	Mature Softwood	2516635	7618540	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:17	golden-crowned kinglet	1	Singing male present	Mature Mixedwood	2516703	7618515	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:18	blue jay	1	Habitat	Immature Mixedwood	2516704	7618514	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:18	ovenbird	1	Singing male present	Immature Mixedwood	2516704	7618514	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:18	yellow-rumped warbler	1	Singing male present	Mature Mixedwood	2516705	7618514	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:23	American robin	1	Singing male present	Mature Mixedwood	2516788	7618486	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:23	bay-breasted warbler	1	Singing male present	Mature Mixedwood	2516788	7618486	Mature-overmature Mixedwood	Stage 2 PDA



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**Table B.2 Data Collected During June Breeding Bird Area Searches**

Date & Time	Common Name	Number Observed	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observer Habitat	Survey Location
6/27/2018 10:28	golden-crowned kinglet	1	Singing male present	Immature Mixedwood	2516792	7618549	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:28	blue-headed vireo	1	Singing male present	Immature Mixedwood	2516792	7618549	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:29	black-backed woodpecker	1	Habitat	Immature Softwood	2516792	7618549	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:29	Nashville warbler	1	Singing male present	Immature Softwood	2516792	7618549	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:30	cedar waxwing	1	Singing male present	Flew Over	2516792	7618549	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:31	dark-eyed junco	1	Singing male present	Immature Mixedwood	2516792	7618549	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:31	magnolia warbler	1	Singing male present	Immature Softwood	2516792	7618550	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:32	golden-crowned kinglet	1	Singing male present	Immature Softwood	2516792	7618550	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:32	northern parula	1	Singing male present	Immature Mixedwood	2516792	7618550	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:33	Swainson's thrush	1	Singing male present	Immature Mixedwood	2516792	7618550	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:33	northern parula	1	Singing male present	Immature Mixedwood	2516792	7618551	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:34	yellow-rumped warbler	1	Singing male present	Immature Mixedwood	2516792	7618551	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:34	winter wren	1	Singing male present	Immature Mixedwood	2516792	7618551	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:35	red-breasted nuthatch	1	Habitat	Immature Mixedwood	2516792	7618552	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:35	blue jay	1	Habitat	Immature Mixedwood	2516792	7618552	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:36	magnolia warbler	1	Singing male present	Immature Mixedwood	2516792	7618552	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:36	red-breasted nuthatch	1	Habitat	Immature Mixedwood	2516793	7618553	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:37	golden-crowned kinglet	1	Habitat	Immature Mixedwood	2516793	7618553	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:38	American goldfinch	1	No indication Breeding	Flew Over	2516793	7618553	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:38	Swainson's thrush	1	Singing male present	Immature Mixedwood	2516793	7618554	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:39	northern parula	1	Singing male present	Immature Mixedwood	2516793	7618554	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:39	magnolia warbler	1	Singing male present	Immature Mixedwood	2516793	7618554	Mature-overmature Mixedwood	Stage 2 PDA
6/27/2018 10:41	ruffed grouse	1	Fledged young	Mature Mixedwood	2516794	7618557	Mature-overmature Mixedwood	Stage 2 PDA

Note: Species in **bold** text are SAR or SOCC.



DEVELOPMENT OF THE NORTH TRIBUTARY TAILINGS POND (NTP) AT THE CARIBOU MINE, NEW BRUNSWICK: SUPPLEMENTAL BASELINE TECHNICAL DATA REPORT

Appendix B Avian Survey Data  
January 29, 2019

**Table B.3 Incidental Bird Observation Data**

Observation Date	Observer	Common Name	Scientific Name	Count	Breeding Evidence	Habitat	Easting (NAD 1983 CSRS NBDS)	Northing (NAD 1983 CSRS NBDS)	Observation Location
6/26/2018	H. Button	tree swallow	<i>Tachycineta bicolor</i>	1	Habitat	Mature-overmature Softwood	2515738	7619038	Stage 2 PDA
6/26/2018	H. Button	northern parula	<i>Parula americana</i>	1	Singing male present	Mature-overmature Softwood	2515232	7619070	Stage 2 PDA
6/26/2018	H. Button	yellow warbler	<i>Dendroica petechia</i>	1	Singing male present	Mature-overmature Softwood	2515243	7619094	Stage 2 PDA
<b>6/26/2018</b>	<b>H. Button</b>	<b>Cape May warbler</b>	<b><i>Dendroica tigrina</i></b>	<b>1</b>	<b>Singing male present</b>	<b>Mature-overmature Softwood</b>	<b>2515618</b>	<b>7619089</b>	<b>Stage 2 PDA</b>
6/26/2018	H. Button	rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	1	Singing male present	Young-immature Mixedwood	2518398	7616198	Outside LAA
6/26/2018	H. Button	least flycatcher	<i>Empidonax minimus</i>	2	Adult carrying food	Regeneration-sapling Hardwood	2516250	7617802	LAA (outside PDA)
<b>6/26/2018</b>	<b>H. Button</b>	<b>barn swallow</b>	<b><i>Hirundo rustica</i></b>	<b>1</b>	<b>Pair in suitable nest</b>	<b>Industrial</b>	<b>2515897</b>	<b>7618288</b>	<b>LAA (outside PDA)</b>
<b>6/26/2018</b>	<b>H. Button</b>	<b>barn swallow</b>	<b><i>Hirundo rustica</i></b>	<b>1</b>	<b>Habitat</b>	<b>Industrial</b>	<b>2515788</b>	<b>7618328</b>	<b>LAA (outside PDA)</b>
6/26/2018	H. Button	northern flicker	<i>Colaptes auratus</i>	1	Habitat	Industrial	2515964	7618386	LAA (outside PDA)
6/26/2018	H. Button	tree swallow	<i>Tachycineta bicolor</i>	2	Habitat	Tall Shrub Swamp	2518459	7616235	Outside LAA
6/26/2018	H. Button	common grackle	<i>Quiscalus quiscula</i>	1	Adult carrying food	Tall Shrub Swamp	2518459	7616211	Outside LAA
6/26/2018	H. Button	ring-necked duck	<i>Aythya collaris</i>	2	Pair in suitable nest	Tall Shrub Swamp	2518075	7619150	LAA (outside PDA)
6/26/2018	H. Button	red-winged blackbird	<i>Agelaius phoeniceus</i>	1	Singing male present	Tall Shrub Swamp	2518062	7619187	LAA (outside PDA)
6/26/2018	H. Button	northern waterthrush	<i>Seiurus noveboracensis</i>	1	Habitat	Tall Shrub Swamp	2517984	7619133	LAA (outside PDA)
6/26/2018	H. Button	northern waterthrush	<i>Seiurus noveboracensis</i>	1	Singing male present	Shallow Water Wetland	2515735	7619067	<b>Stage 2 PDA</b>
6/27/2018	M. Crowell	least flycatcher	<i>Empidonax minimus</i>	2	Singing male present	Young-immature Hardwood	2516713	7617520	<b>Stage 2 PDA</b>
<b>6/27/2018</b>	<b>M. Crowell</b>	<b>chimney swift</b>	<b><i>Chaetura pelagica</i></b>	<b>2</b>	<b>Pair in suitable nest</b>	<b>Industrial</b>	<b>2516001</b>	<b>7618428</b>	<b>LAA (outside PDA)</b>
<b>6/27/2018</b>	<b>M. Crowell</b>	<b>barn swallow</b>	<b><i>Hirundo rustica</i></b>	<b>4</b>	<b>Adult at nesting site</b>	<b>Industrial</b>	<b>2515809</b>	<b>7618145</b>	<b>LAA (outside PDA)</b>
6/27/2018	M. Crowell	mallard	<i>Anas platyrhynchos</i>	2	No indication Breeding	Waterbody	2516903	7617505	LAA (outside PDA)
<b>6/27/2018</b>	<b>H. Button</b>	<b>Cape May warbler</b>	<b><i>Dendroica tigrina</i></b>	<b>1</b>	<b>Singing male present</b>	<b>Young-immature Hardwood</b>	<b>2516958</b>	<b>7617636</b>	<b>Stage 2 PDA</b>
6/27/2018	H. Button	black-capped chickadee	<i>Poecile atricapilla</i>	1	Singing male present	Young-immature Hardwood	2516793	7619220	LAA (outside PDA)
6/27/2018	H. Button	ruffed grouse	<i>Bonasa umbellus</i>	1	No indication Breeding	Young-immature Softwood	2517216	7618988	LAA (outside PDA)
6/27/2018	H. Button	brown creeper	<i>Certhia Americana</i>	1	Habitat	Mature-overmature Hardwood	2516586	7618826	LAA (outside PDA)
<b>6/27/2018</b>	<b>H. Button</b>	<b>chimney swift</b>	<b><i>Chaetura pelagica</i></b>	<b>2</b>	<b>Pair in suitable nest</b>	<b>Young-immature Hardwood</b>	<b>2516565</b>	<b>7617073</b>	<b>LAA (outside PDA)</b>
6/27/2018	H. Button	Nashville warbler	<i>Vermivora ruficapilla</i>	1	Singing male present	Regeneration-sapling Hardwood	2519245	7616417	Outside LAA
6/27/2018	H. Button	dark-eyed junco	<i>Junco hyemalis</i>	1	Singing male present	Regeneration-sapling Hardwood	2518867	7616294	Outside LAA
6/27/2018	H. Button	American crow	<i>Corvus brachyrhynchos</i>	1	No indication Breeding	Industrial	2515803	7618359	LAA (outside PDA)
6/27/2018	H. Button	red-tailed hawk	<i>Buteo jamaicensis</i>	1	Habitat	Infrastructure	2518680	7616191	Outside LAA

Note: Species in **bold** text are SAR or SOCC.

