MARATHON PALLADIUM PROJECT

TERRESTRIAL ENVIRONMENT
BASELINE REPORT UPDATE

Report prepared for:

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1 INTRODUCTION

Generation PGM Inc. (GenPGM) proposes to develop the Marathon Palladium Project (the "Project"), which is a platinum group metals (PGM) and copper (Cu) open-pit mine and milling operation near the Town of Marathon, Ontario. The Project is being assessed in accordance with the *Canadian Environmental Assessment Act* (CEAA, 2012) and Ontario's *Environmental Assessment Act* (EA Act) through a Joint Review Panel (the Panel) pursuant to the *Canada-Ontario Agreement on Environmental Assessment Cooperation* (2004).

Northern Bioscience has been retained by GenPGM to conduct an updated assessment of vegetation and wildlife baseline conditions (including species at risk – SAR) for the Project. This report provides an update to the baseline conditions as described in the information currently on the record, including:

- Supporting Information Document No. 24: Harris, A.G., and R.F. Foster. 2009. Marathon PGM Terrestrial Baseline Assessment 2009. Report prepared for Ecometrix Inc. by Northern Bioscience, Thunder Bay, ON. 70 p.
- Supporting Information Document No. 25: Harris, A.G., and R.F. Foster. 2012. Stillwater PGM-CU Project Bird Studies. Report prepared for Stillwater Canada Inc. by Northern Bioscience, Thunder Bay, ON. 70 p.
- Supporting Information Document No. 26: Foster, R.F. and A.G. Harris. 2012. Marathon Platinum Group Metals and Copper Mine Project – Woodland Caribou Impact Assessment. Report prepared for Stillwater Canada Inc. by Northern Bioscience, Thunder Bay, ON. 103 p.
- Harris, A.G., and R.F. Foster. 2013. Stillwater PGM-Cu Project Whip-poor-will and Common Nighthawk Survey 2013. Prepared for Stillwater Canada Inc. by Northern Bioscience, Thunder Bay, ON. 7 p. Available at: https://iaac-aeic.gc.ca/050/documents/p54755/95127E.pdf
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This vegetation, wildlife baseline, and species at risk study has been completed to inform the Addendum to the Marathon PGM-cu Environmental Impact Statement (EIS Addendum) as input to the Joint Review Panel process. It has been prepared pursuant to the *Canadian Environmental Assessment Act, 2012* and in consideration of the *Guidelines for the Preparation of an Environmental Impact Statement – Marathon Platinum Group Metals and Copper Mine Project* (EIS Guidelines) (Canadian Environmental Assessment Agency (CEAA) and Ontario Ministry of Environment (MOE), 2011).

The information presented in this report is intended to summarize and document any changes to the existing environmental conditions relating to vegetation and wildlife, relative to those conditions considered in the previous assessment, in order to support the updated assessment of potential environmental effects provided in the EIS Addendum.

The information presented herein was obtained from a review of historical and newly available information, supplemental field studies conducted by Northern Bioscience in 2020 and the updated design plans for the Project provided by GenPGM.

This document should be read in conjunction with the EIS Addendum.

1.1 Project Location and Setting

The Project is located approximately 10 km north of the Town of Marathon, Ontario (Figure 1). Marathon is a community of approximately 3,300 people (Statistics Canada, 2017) located adjacent to the Trans-Canada Highway (Highway 17) on the northeast shore of Lake Superior approximately 300 km east of Thunder Bay and 400 km northwest of Sault Ste-Marie. The centre of the Project footprint sits at approximately 48° 47’ N latitude, 86° 19’ W longitude (UTM NAD83 N16 Easting 550197 and Northing 5403595). The footprint of the proposed mine location is roughly bounded by the Highway 17 and the Marathon Airport to the south, the Pic River and Camp 19 Road to the east, Hare Lake to the west, and Bamoos Lake to the north (Figure 1). Access is currently gained through Camp 19 Road.

The Project is proposed within an area characterized by relatively dense vegetation, comprised largely of a birch and spruce-dominated mixed wood forest. The terrain is moderate to steep, with frequent bedrock outcrops and prominent east-west oriented valleys. Several watercourses and lakes traverse the area, with drainage flowing either eastward to the Pic River or westward to Lake Superior. The climate of this area is typical of northern areas within the Canadian Shield, with long winters and short, warm summers.

The Project is proposed on Crown Land, with GenPGM holding surface and mineral rights for the area. Regional land-use activities in the area include hunting, fishing, trapping and snowmobiling, as well as mineral exploration (and mining) and forestry. Other localized land uses in the area include several licensed aggregate pits, the Marathon Municipal Airport, the Marathon Landfill, a municipal works yard and several commercial and residential properties.

The primary industries in the area have historically been forestry, pulp and paper, mining and tourism. Exploration for copper and nickel deposits in the area extend as far back as the 1920s. A large copper-PGM deposit was discovered in 1963. Advanced exploration programs have continued across the site since then. These programs have been supported by various feasibility studies to confirm the economic viability of extracting the deposits.

Several First Nation and Métis groups were originally identified as having a potential interest in the Project based on Treaty Rights, asserted traditional territory and proximity to the Project. Traditional uses which they have identified as occurring in the area include hunting, trapping, fishing and plant harvesting, with activities generally focused on the larger waterways, such as the Pic River, Bamoos Lake and Hare Lake.

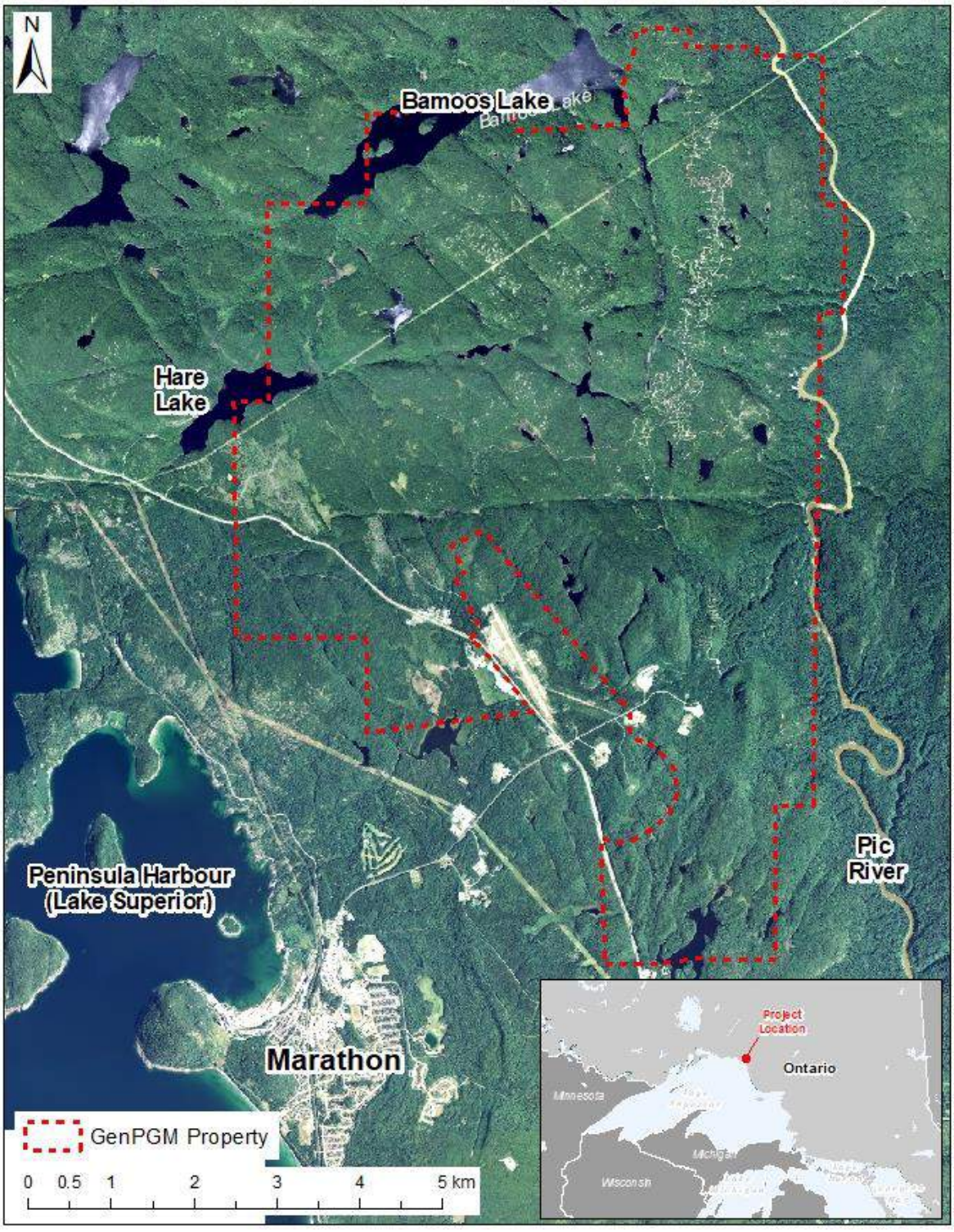

Figure 1. Generation PGM Marathon Palladium Project location.

1.1.1 Project Overview

The Project is based on the development of an open pit mining and milling operation for copper and platinum group metals. Ore will be mined from the pits and processed (crushed, ground, concentrated) at an on-site processing facility. Final concentrates containing copper and platinum group metals will be transported off-site via existing roadways and/or rail to a smelter and refinery for subsequent metal extraction and separation. Iron sulfide, magnetite and vanadium concentrates may also be produced, depending upon the results of further metallurgical testing and market conditions at that time.

The construction workforce will average approximately 450-550 people, with a peak workforce of an estimated 900 people, and will be required for between 18 and 24 months. During operations, the workforce will comprise an estimated 350 workers. The mine workforce will reside in local and surrounding communities, as well as in an accommodations complex that will be constructed off-site.

Most of the mine rock[1] produced through mining activities is non-acid generating (NAG) and will be permanently stored in a purposefully built Mine Rock Storage Area (MRSA). The NAG (also referred to as Type 1 mine rock) will also be used in the construction of access roads, dams and other site infrastructure, as needed. Drainage from the MRSA will be collected in a series of collection basins and treated, as necessary, to meet applicable water quality criteria prior to discharge to the Pic River. The remaining small portion of the mine rock is considered to be potentially acid generating (PAG) (also referred to as Type 2 mine rock) and will be stored in the open pits or the Process Solids Management Facility (PSMF). This will ensure that drainage from the Type 2 mine rock will be contained during operations. Following closure, the Type 2 mine rock will be permanently stored below water by flooding the open pits and maintaining saturated conditions in the PSMF to prevent acid generation in the future.

Most of the process solids[2] produced at the site will be NAG (Type 1 process solids) with the minority being PAG (Type 2 process solids). Both the Type 1 and Type 2 process solids will be stored in the PSMF and potentially within the open pits. In both cases, the Type 2 process solids will be managed to prevent acid generation during both the operation and closure phases of the Project. Water collected within the PSMF as well as water collected around the mine site (other than the MRSA), such as water pumped from the pits or run-off collected from the plant site, will be managed within the PSMF. Excess water not needed for processing ore will be discharged, following treatment as necessary, to Hare Lake.

Access to the Project is currently provided by the Camp 19 Road, opposite Peninsula Road at Highway 17. The existing road will be upgraded and utilized from its junction with the Highway 17 to a new road running north that will be constructed to access the Project site. The Project will also require the construction of a 115 kV transmission line that will connect to the Terrace Bay-Manitouwadge transmission line (M2W Line). The width of the transmission corridor will be approximately 30 m.

Disturbed areas of the Project footprint will be reclaimed in a progressive manner during all Project phases. Natural drainage patterns will be restored as much as possible. The ultimate goal of mine decommissioning will be to reclaim land within the Project footprint to permit future use by resident biota

[1] Mine rock: rock that has been excavated from active mining areas but does not have sufficient ore grades to process for mineral extraction.
[2] Process solids: solids generated during the ore milling process following extraction of the ore (minerals) from the host material.

and as determined through consultation with the public, Indigenous people and government. A certified Closure Plan for the Project will be prepared as required by Ontario Regulation (O.Reg.) 240/00 as amended by O.Reg.194/06 “Mine Development and Closure under Part VII of the Mining Act” and “Mine Rehabilitation Code of Ontario”.

A further description of the Project and associated activities and phases will be provided under separate cover in the EIS Addendum.

1.1.2 Study Objectives

This report presents the results of both the updated vegetation and wildlife baseline study. The vegetation and wildlife baseline study provides information required to complete the EIS Addendum for the Project. The objectives of the vegetation and wildlife baseline study were to describe and present available information and characterize the baseline conditions of vegetation and wildlife, including species at risk (SAR) in the study area. The scope of the vegetation and wildlife baseline study includes the following:

- collection and review of available background information and data
- conduct a field study
- analysis of baseline vegetation and wildlife to determine any changes that have occurred since 2013
- preparation of a baseline study report section summarizing changes to existing conditions.

2 REGULATORY SETTING

2.1.1 Federal

2.1.1.1 Species at Risk Act (SARA)

The SARA includes prohibitions against killing, harming, harassing, capturing, or taking individuals of species listed as Threatened, Endangered, or Extirpated on Schedule 1 of the Act, or damaging or destroying their residences. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC), an independent body of experts, assesses each species according to a broad range of scientific data and recommends their appropriate status (e.g., Extirpated, Endangered, Threatened, Special Concern, Not at Risk, Data Deficient) to the federal minister. After any necessary consultation with affected stakeholders or other groups, the federal Cabinet then decides whether those species should get legal protection under the SARA; not all species recommended as SAR by COSEWIC end up being listed on Schedule 1.

Federal Recovery Strategies (RS) are developed for species designated as Extirpated, Endangered, or Threatened under Schedule 1 of SARA, and include the identification of Critical Habitat. Management plans are developed for species designated federally as Special Concern. Recovery strategies have been finalized for most of the threatened or endangered species that may be present at the Project (e.g., woodland caribou, little brown myotis, Canada warbler, olive-sided flycatcher), although critical habitat has not yet been identified for all. Management plans have been prepared by Environment Canada for most Special Concern species that may use the Project LSA such as monarch and common nighthawk, but not others e.g. eastern wood-pewee.

The SARA is administered throughout Canada by Environment and Climate Change Canada (ECCC; formerly Environment Canada [EC]) typically applies only to federally administered lands, however

recommendations by the federal minister can be made under Section 61 of the SARA if critical habitat of a species is not being adequately protected by provincial legislation (Government of Canada 2020c).

2.1.1.2 Migratory Birds Convention Act (MBCA)

The MBCA (Section 6) prohibits the harming, killing, disturbance or destruction of migratory birds, nests, and eggs (Section 6) of migratory birds as defined in Article 1 of the Act. In general, birds not falling under federal jurisdiction within Canada include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, jays, kingfishers, and some species of blackbirds. (Government of Canada 2020). The MBCA (Section 5[1]) also prohibits depositing oil, oily waters, or other substances harmful to migratory birds in areas that they may inhabit.

2.1.2 Provincial

2.1.2.1 Endangered Species Act (ESA)

Ontario's ESA protects species that are listed as Threatened or Endangered on the Species at Risk in Ontario (SARO) List. The SARO list is developed by the Committee on the Status of Species at Risk in Ontario (COSSARO) based on the best available scientific information, community knowledge and Aboriginal traditional knowledge using a suite of criteria similar, but not identical, to those used by COSEWIC. Section 9(1)(a) of the ESA protects individuals of Threatened and Endangered (but not Special Concern) species from being killed, harmed, or harassed harm or harassment and Section 10(1) protects their habitats from being damaged or destroyed. Listed species (i.e., Threatened and Endangered) receive immediate general habitat protection for areas on it depends, directly or indirectly, to carry out its life processes. Species-specific regulated habitat is supposed to be more precisely defined within 2-3 years and specific habitat features and geographic boundaries. Provincial recovery strategies for SARO-listed species are similarly supposed to be developed for Threatened and Endangered species within a prescribed time frame if federal recovery strategies are lacking; similarly, management plans are to be in place for Special Concern species. Where available, provincial recovery strategies or management plans have been considered in the development of appropriate mitigation measures to minimize impacts to listed species.

Under certain circumstances activities that are normally prohibited under the ESA (e.g., harming or harassing a SARO-listed species or damaging/destroying its habitat) may be allow. An "Overall Benefit" (OB) permit may be issued under Section 17(2)(c) of the Act if through specific and mandatory conditions outlined in the permit will result in an overall benefit to the species within a reasonable time (Government of Ontario 2020). Issuance of an OB permit also requires that reasonable alternatives were considered, reasonable steps were taken to minimize adverse effects on the species, and effectiveness monitoring is conducted. The ESA was formerly administered the OMECP (and formerly by the OMNRF) and protection under the ESA extends to both public and private lands in Ontario, including the Project site.

2.1.2.2 Fish and Wildlife Conservation Act

Ontario's Fish and Wildlife Conservation Act is administered by the OMNRF for planning, wildlife management, and wildlife enforcement. The Act provides protection for wildlife and wildlife residences, such as dens and nests (including those of species that are not protected under the MBCA e.g., raptors)

2.1.2.3 Provincial Policy Statement

The Provincial Policy Statement (PPS) (MMAH 2014) informs land use planning decisions under the Planning Act in Ontario, and in particular, Policy 2.1 of the PPS establishes a provincial interest in the

protection of natural heritage features. While EAs are not subject to Planning Act approval, the policy guidance and practice developed to support the PPS provides a framework for assessing the functions and sensitivities of natural features. Guidance to help identify and evaluate natural heritage features is provided in the Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement (OMNR 2010a), the Significant Wildlife Habitat Technical Guide (MNR 2000), and the relevant Ecoregion 3W Criteria Schedules (OMNRF 2017). This framework was considered in evaluating potential environmental effects and the identification of mitigation measures that will reduce or eliminate the environmental effect. The natural heritage features identified in the PPS that are considered in this chapter include habitat of provincially significant wetlands (PSWs), significant wildlife habitat (SWH), and the habitat of Threatened and Endangered species.

3 STUDY AREA

For this assessment, the spatial boundaries considered include the direct and indirect effects related to site preparation, construction, operation, and decommissioning / closure of the Project. These areas are generally consistent with the spatial boundaries used in the EIS (2012) and associated supporting information documents, with appropriate revisions / refinements and rationale provided below.

3.1 Site Study Area (SSA)

The Site Study Area (SSA) or project development area encompasses the direct footprint of the Project and is the is the anticipated area of physical disturbance (temporary or permanent) associated with the construction, operation, and closure of the Project. The SSA has been updated since the draft EIS to reflect refinement in the location and size of various project components such as pits, processed solids management facility (PSMF), transmission line, and access road. The SSA is consistent for each of the supporting baseline studies as well as the valued environmental/socio-economic components (VEC) of the EIS Addendum. With respect to vegetation, wildlife, and species at risk, the SSA represents the area with the greatest potential for direct effects such as the habitat loss due to forest clearing. The SSA encompasses approximately 1112 ha and is depicted on Figure 2. The one exception is the SSA for woodland caribou, where its SSA consists of the footprint plus a 500 m buffer in order to be consistent with caribou habitat and disturbance models used by OMNRF and Environment Canada (e.g., Environment Canada 2008, 2011).

3.2 Local Study Area (LSA)

The Local Study Area (LSA) for vegetation, wildlife, and species at risk comprises the area in which indirect effects are most likely to occur. The LSA for most vegetation, wildlife, and SAR encompasses the SSA and an additional buffer of 1000 m. Most indirect effects such impacts from dust, light, noise, and hydrology will likely not extend 1 km from the SSA, so in this sense the LSA is considered conservative particularly for vegetation and wildlife/SAR with relatively small home ranges. The LSA is approximately 4090 ha and encompasses the SSA.

Upon direction provided by OMNR (2011), a larger local study area was used for woodland caribou to better reflect their mobility and potential use of the surrounding landscape. The caribou LSA encompasses the portion of the Lake Superior Coastal Range (OMNR 2009) and nearshore islands, west of Pukaskwa National Park to the range's western boundary, including both the mainland and nearshore islands. It encompasses approximately 105,000 ha.

3.3 Regional Study Area (RSA)

The Regional Study Area (RSA) provides regional context for assessing the significance of residual effects on vegetation, wildlife, and species at risk from the GenPGM Project while taking into consideration cumulative effects that may arise with residual environmental effects from other past, present, and reasonably foreseeable projects in the RSA. Thus, the RSA is based on the potential for interactions between the Project and other existing or future potential projects. For most wildlife VECs, the Pic Forest Management Unit (FMU) is used for the RSA since wildlife habitat is managed by OMNRF at the landscape scale (i.e., coarse filter) based on FMUs (OMNRF 2014). The larger size of the RSA also recognizes the large home ranges of mobile species such as moose, grey wolf, and black bear, as well as the mobility of migratory birds. The same spatial extent was used for the vegetation RSA since the predominant vegetation community in the LSA if forest, are assessed for sustainability and managed at the FMU scale. Use of the same RSA also acknowledges the direct linkages between forests and other vegetation communities, and the wildlife habitat they represent. The RSA for vegetation, and most wildlife and SAR encompasses approximately 1,117,000 ha. Upon specific direction by OMNR (2011), the scale of analysis for woodland caribou encompasses the entire Lake Superior Coastal Range including offshore islands, and adjacent portions of the mainland Lake Superior Upland Linkage (OMNR 2008). The caribou RSA is therefore approximately 375,856 ha, not including the discontinuous range (Lake Superior Upland Linkage).

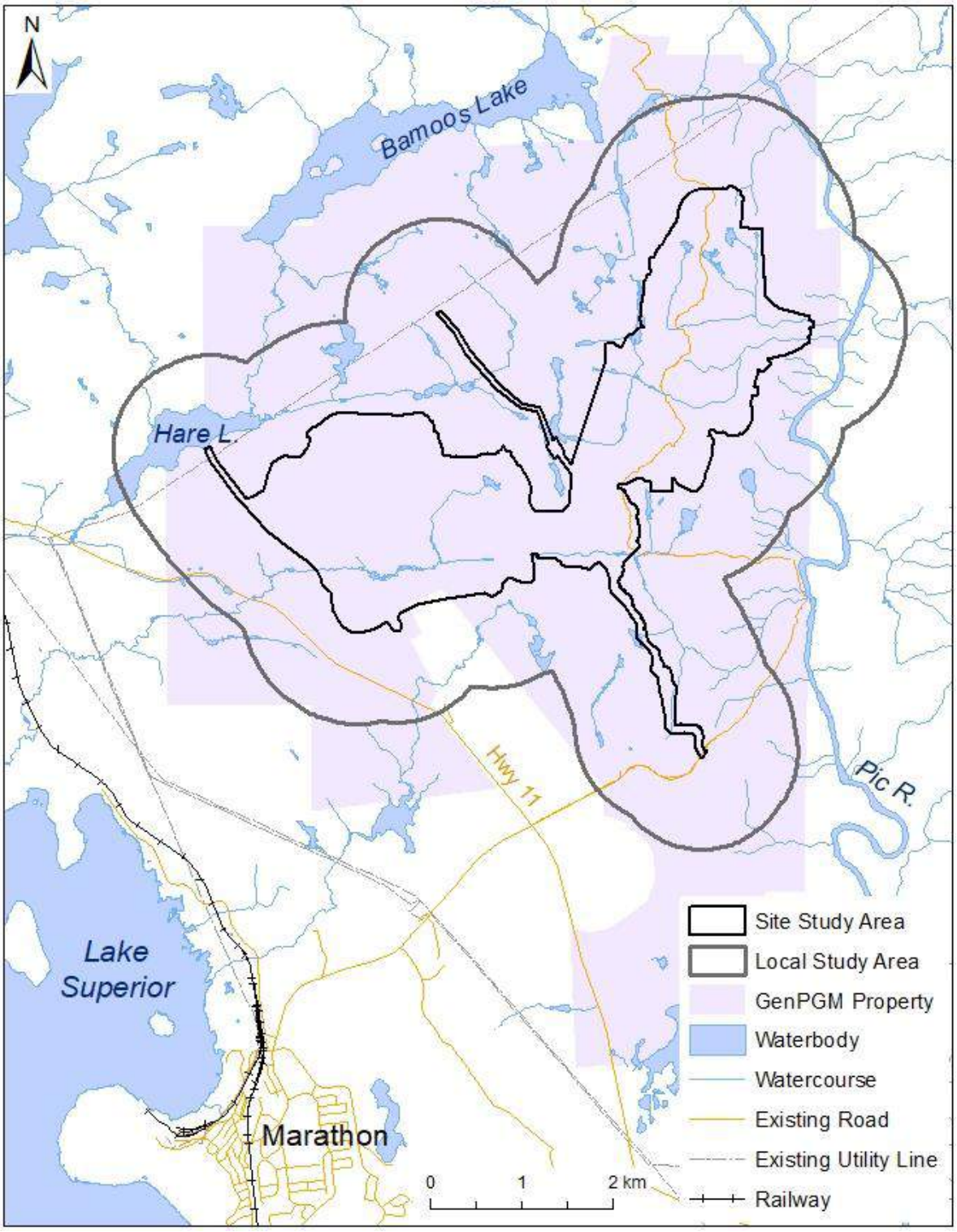

Figure 2. Site Study Area (SSA) and Local Study Areas (LSA) for selected vegetation, wildlife, and species at risk valued ecosystem components.

4 METHODOLOGY

A gap analysis was conducted to review new information on: 1) the current legal and conservation status of potential VECs, 2) any revised survey protocols, 3) any new information on their distribution and abundance in the study area 4) improved best management practices to mitigate and potential impacts on individual VECs due to the Project.

4.1.1 Desktop Review and Data Sources

A review of Schedule 1 of the federal SARA and the SARO list for provincial ESA were conducted to determine if there had been any changes in status of any species between late 2013 and 2020.

A review of available information was conducted for any new information on the presence or status of vegetation and wildlife in the study area including:

- recent field surveys and habitat modelling for other development projects in the LSA or RSA such as East-West Tie (EWT)
- any new values collection exercises for forest management planning in the LSA or RSA
- BugGuide (www.bugguide.net)
- Bumble Bees of North America (Williams et al. 2014)
- Bumble Bee Watch (https://www.bumblebeewatch.org/),
- eBird: An online database of bird distribution and abundance (https://ebird.org/home),
- eButterfly: a citizen-based butterfly database in the biological sciences. (http://www.e-butterfly.org/),
- iNaturalist (https://www.inaturalist.org/)
- Ontario Butterfly Atlas (http://www.ontarioinsects.org/atlas_online.htm)
- Ontario Reptile and Amphibian Atlas (https://ontarionature.org/programs/citizen-science/reptile-amphibian-atlas/)
- Natural Heritage Information Centre (https://www.ontario.ca/page/natural-heritage-information-centre)

A review of available information was also conducted for any new survey protocols for SAR and other VEC's within the study area, particularly for recently listed SAR. Recent draft Ecoregion Schedules for significant wildlife habitat, provincially significant wetlands, or other significant natural features under the Provincial Policy Statement (OMNRF 2017) were also reviewed.

In addition, the following were reviewed to assist in assessing vegetation, wildlife, and habitat in the Project area and developing appropriate mitigation:

- COSEWIC status reports or other relevant literature,
- provincial or federal recovery strategies,
- conservation plans,
- best management practices (BMPs)
- mitigation measures, or
- other relevant guidance documents.

Where appropriate, Indigenous Traditional Knowledge (ITK) of plants and animals was reviewed for consideration.

4.2 Field Surveys

Fieldwork was conducted in 2020 on 13 calendar days by Northern Bioscience personnel (R. Foster and B. Ratcliff) from June 4 – 9, July 7-10, and August 12-14. Survey methods and effort for vegetation and wildlife generally followed standardized protocols where appropriate and are discussed below.

4.2.1 Vegetation and Rare Plant Surveys

Vegetation mapping in the 2009 baseline report (SID #24) was based on Forest Resource Inventory (FRI) data for the Big Pic Forest supplemented with fieldwork, air photograph interpretation, and Northern Ontario Engineering Geology Terrain Study Maps (NOEGTS). Fieldwork in 2009-2010 focused on visiting representative vegetation types and communities and compiling notes on soils and vegetation to confirm and supplement FRI mapping. The FRI available at the time (based on pre-1990 imagery) lacked ecosites; Northwestern Ontario ecosite classifications (Racey et al. 1996) were therefore assigned based on 2009-2010 fieldwork, with some ecosites pooled to facilitate mapping (e.g., ES27/28). New FRI, based on 2008 imagery, became available from the OMNRF in late 2012; polygons in this FRI included the draft provincial ecosites (Banton et al. 2009). Where possible, fieldwork in 2020 confirmed the accuracy of these new ecosite designations and polygon boundaries within the study area.

Rare plant survey effort focused on habitats within the study area more likely to support provincially rare vascular plant species (NHIC 2020) using the controlled intuitive meander survey method (Alberta Native Plant Council 2000; BC MECCS 2018; Whitaker et al. 1998). Potential rare plant survey habitats along the north shore of Lake Superior can include cliffs, moist rock faces, talus slopes, seeps and springs, rocky floodplains, sand dunes, wetlands, and associated waterbodies (Bakowsky 2004; Harris and Foster 2006a). Particular effort was made to search for black ash (*Fraxinus nigra*), recently assessed as Threatened by COSEWIC (2018) in low-lying areas along and near waterbodies and watercourses.

Provincially rare species are those that are ranked as S1-S3 by OMRNF's Natural Heritage Information Centre (NHIC 2020). Subnational or S-ranks include the following:

> **SX — Presumed Extirpated.** Species or community is believed to be extirpated from the province or state.
>
> **SH — Possibly Extirpated (Historical).** Species or community occurred historically (i.e., >20 years ago) in the province or state, and there is some possibility that it may be rediscovered.
>
> **S1 — Critically Imperiled.** Critically imperilled in the province or state because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the province or state.
>
> **S2 — Imperiled.** Imperiled in the province or state because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the province or state.
>
> **S3 — Vulnerable.** Vulnerable in the province or state due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.
>
> **S4 — Apparently Secure.** Uncommon but not rare; some cause for long-term concern due to declines or other factors.
>
> **S5 — Secure.** Common, widespread, and abundant in the state or province.
>
> **SNR — Unranked.** Province or state conservation status not yet assessed.

SU — Unrankable. Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

SNA — Not Applicable. A conservation status rank is not applicable because the species is not a suitable target for conservation activities e.g., non-native species

A rank followed by "?" denotes some uncertainty by NHIC as to appropriateness of the rank based on known occurrences.

Regionally rare species are considered those that a known from five or fewer records in the Thunder Bay District Checklist (TBFN 2015). These species are generally secure or apparently secure elsewhere in their Ontario range (i.e., S4-S5).

4.2.2 Birds

4.2.2.1 Morning Point Counts

Songbird monitoring in 2020 consisted primarily of 110 point counts spaced at least 250 m apart in representative habitats in the study area (Figure 5, Appendix 1). In 2020, 40 stations had repeat visits, with the remaining 30 stations having a single point count in order maximize spatial distribution (rather than repeat visits to the same stations). Some single and repeat stations were conducted at the locations of previous point counts conducted in 2008-2010. Point counts were conducted on June 5-8, and July 7-10. As per Environment Canada (2014), birds observed or heard were recorded at 3, 2 and 5 minute increments at distances of <50 m, 50-100 m, and >100 m. Point counts were conducted from shortly after sunrise until 09:30 under good weather conditions (i.e., no rain, wind <Beaufort 3).

4.2.2.2 Crepuscular and Nocturnal Surveys

Surveys for eastern whip-poor-will and common nighthawk were conducted on June 4, June 6, and July 7, 2020 (Table 1). Methods generally followed OMNR (2013), with surveys timed to coincide with a week immediately preceding or after the full moons on June 5 and July 5, 2020. Whip-poor-will surveys used 5-minute survey stops, spaced approximately 500 m apart within the local study area, and farther apart on at selected sites (e.g., gravel pits) along the main access road outside the LSA (Figure 4). Visual and acoustic surveys for common nighthawk were also conducted along the same survey route at or just below sunset on the drive in before beginning the formal whip-poor-will survey approximately 30 minutes after sunset.

Table 1. Summary of 2020 nocturnal surveys for eastern whip-poor-will and common nighthawk for the Marathon Palladium Project.

Date	Start Time	End Time	Weather: Start	Weather: End
2020-06-04	10:15	12:05	10.1°C; Beaufort 2; 10% cloud cover	10.0°C; Beaufort 0; 0% cloud cover
2020-06-06	10:05	12:02	10.3°C; Beaufort 0; 90% cloud cover	10.1°C; Beaufort 0; 100% cloud cover
2020-07-07	10:37	12:23	13°C; Beaufort 0; 0% cloud cover	11°C; Beaufort 1-2; 0% cloud cover, some fog patches

Potential use of the LSA by crepuscular and nocturnal birds (i.e., eastern whip-poor-will, common nighthawk, marsh birds) was monitored in 2020 with eight Wildlife Acoustics acoustic recorders deployed at 12 locations in the LSA (Figure 3, Figure 4, Table 2). Six recorders were initially deployed in early June; these and an additional two units were redeployed to new locations in early July and left in place

until early August. Recorders were programmed to record acoustic call (i.e., birds and anurans) for 5-minute periods in the evening every hour on the hour from 20:00 through 24:00, and at 05:00. These recordings are analogous to point counts conducted during the dusk and dawn survey windows used in the Marsh Monitoring Program (MMP 2011). Sonograms were reviewed manually in Kaleidoscope Pro software (version 5.1.9g) and confirmed by ear. Due to health and safety issues of nocturnal access in remote areas of the LSA, acoustic recorders were preferable; they also allow multiple point counts to be conducted at each station each and every night for a much longer period of time that would be possible with in-person surveys. A total of 434 deployment-nights of acoustic recorders were conducted in 2020.

Table 2. Acoustic recorder deployments in the Marathon Palladium Project study area in 2020.

Unit #	Unit Type[3]	Date Deployed	Date Retrieved	Location	Easting	Northing
1a	SM Mini Bat	2020-06-07	2020-07-10	in rock barren overlooking Malpa Lake	550765	5403587
1b	SM Mini Bat	2020-07-10	2020-08-14	on shore of lake L12	550759	5406145
2a	SM Mini Bat	2020-06-07	2020-07-09	on shore of lake L16	550183	5405289
2b	SM Mini Bat	2020-07-09	2020-08-13	along shore of Two Duck Lake (L11)	550695	5405701
3a	SM Mini Bat	2020-06-08	2020-07-10	along shore of lake L8	549791	5405502
3b	SM Mini Bat	2020-07-10	2020-08-12	in valley along main access road	551105	5402544
4a	SM Mini Bat	2020-07-07	2020-08-13	in meadow marsh along stream S63	547506	5402808
5a	SM2	2020-06-06	2020-07-10	along shore of lake L26	548257	5403376
5b	SM2	2020-07-10	2020-08-13	along transmission line ROW at north end of property	550244	5407086
6a	SM2	2020-06-06	2020-07-10	along transmission line ROW at north end of property	550241	5407094
7a	SM2Bat	2020-06-07	2020-07-10	along shore of lake L14	549795	5404612
7b	SM2Bat	2020-07-10	2020-08-12	in clearing at radio antenna	549417	5403507
8a	SM Mini Bat	2020-07-06	2020-08-12	in meadow marsh along stream S15	546974	5402335

Figure 3. Wildlife Acoustics SM Mini-Bat acoustic recorder (left) and lakeside deployment (right).

[3] recorders used separate acoustic microphones for nocturnal birds and high-frequency microphones for bats

4.2.2.3 Marsh bird surveys

In addition to the use of acoustic recorders (discussed above), evening point counts were conducted at two locations (L8, L16)(Figure 4) between 20:30 and 21:30 on June 8, 2020. Ambient temperature was 20°C, and 100% cloud cover, and no wind (Beauf 0). Each survey took approximately 15 minutes with 3-minute passive listening periods followed by playback of the most likely marsh bird species in the LSA i.e., American bittern, pied-billed grebe, sora, and Virginia rail. The full Marsh Monitoring Program (MMP 2011) was not used since the wtlands in the SSA (see Appendix 2) do not meet the minimum 1 ha size for emergent marsh wetlands that are targeted by this protocol. Although only one survey with playback was conducted, the 434 deployment nights of acoustic recorders at eight locations is believed to more than compensate.

4.2.2.4 Incidental Observations

Observations of bird species were recorded opportunistically during other fieldwork in 2020 particularly for species that are difficult to detect with point counts or acoustic monitoring (e.g., raptors, waterfowl). Breeding evidence codes from the Ontario Breeding Bird Atlas (Cadman et al. 2007) were used. Particular attention was paid to potentially significant wildlife habitat as identified in OMNRF's (2017) draft criteria schedules for Ecoregion 3W such as migration stopover habitat (waterfowl, shorebirds), raptor nests, great blue heron nesting colonies, and colonial waterbird colonies (e.g., Bonaparte's gulls).

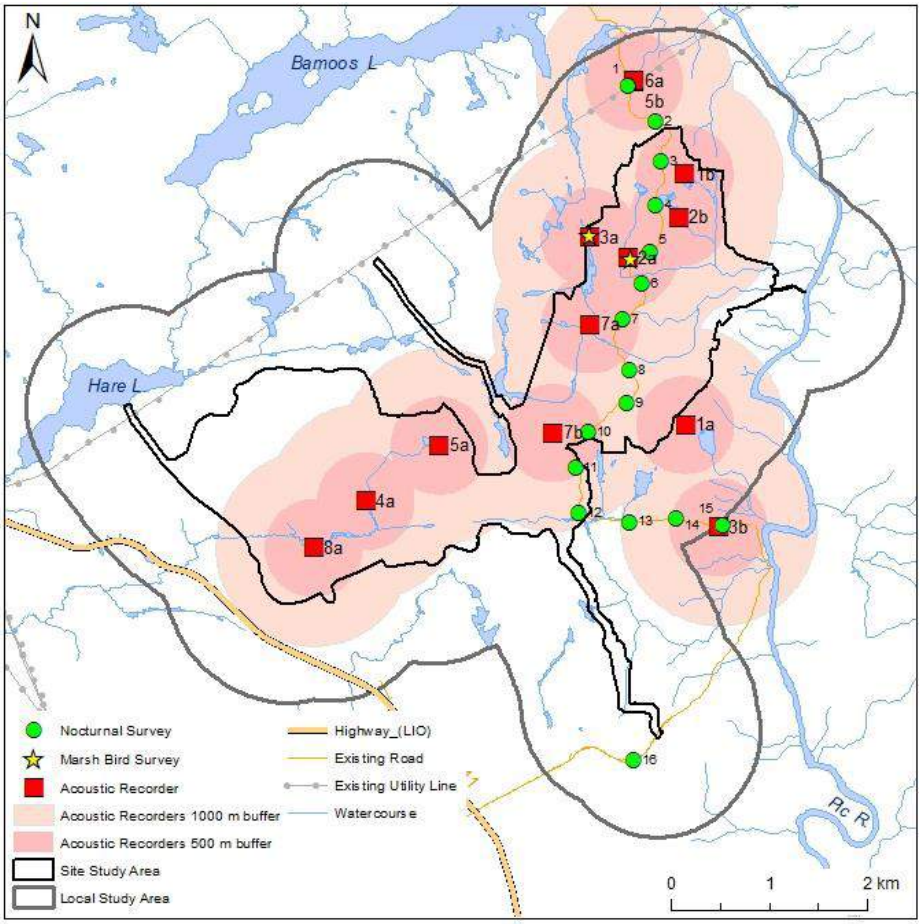

Figure 4. Location of 2020 nocturnal survey stops, acoustic recorder locations, and marsh bird surveys.

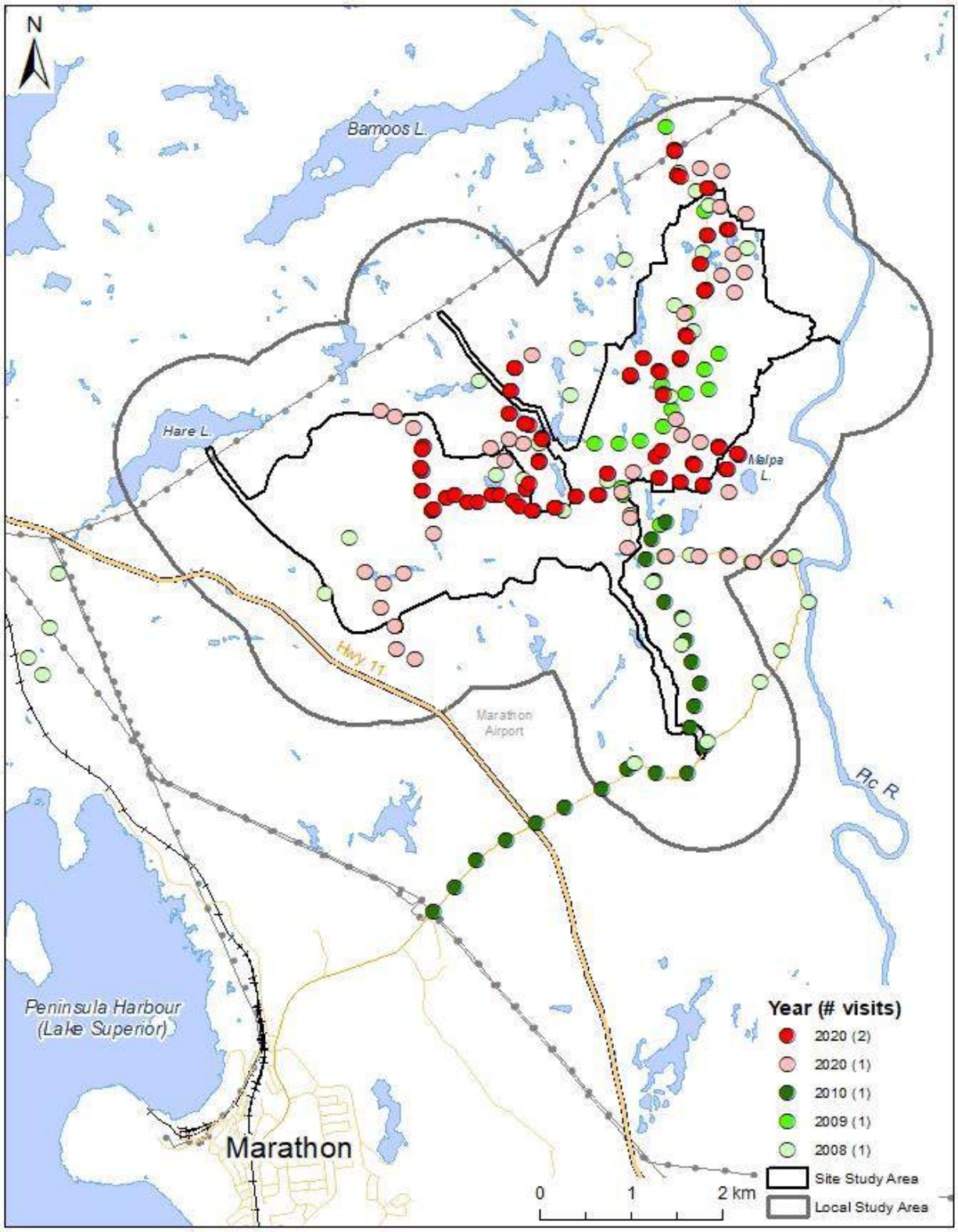

Figure 5. Location of 2008-2010 and 2020 morning point counts for the Marathon Palladium Project.

4.2.3 Mammals

4.2.3.1 Bats

Potential use of the study area by SAR bats was monitored with eight Wildlife Acoustics acoustic recorders equipped with SMM-U1 ultrasonic microphones deployed at 12 locations in the study areas (Figure 4, Table 2). Six recorders were initially deployed in early June; these and an additional two units were redeployed to new locations in early July and left in place until early August. Recorders were programmed to be active in the evening (22:00-24:00) and triggered by sounds greater than 16,000 Hz. Bats were identified using the Auto ID feature in Kaleidoscope Pro software (version 5.1.9g) and a subset was confirmed visually. Bats were also surveyed at 16 stations (Figure 4) during each of three nocturnal whip-poor-will surveys using a hand-held Wildlife Acoustics Echo MeterTouch acoustic bat detector. Potential bat maternal habitat (OMNR 2011) was assessed by surveys for cavity trees concurrent with other fieldwork. As discussed in IR 23.3, roosting habitat is likely not limited in the disturbance-driven boreal forest and intensive plot-based surveys for potential roost trees were considered unnecessary and impractical given the scale of disturbance in the boreal forest (e.g., wildfire, commercial forestry). Rather, visual surveys for potential roost trees i.e., large-diameter (25 cm+ diameter) trees with cavities or sloughing bark, were conducted along trails and survey tracks concurrently with other fieldwork in 2020. A total of 37 km of transect survey were conducted concurrent with other fieldwork in June-August 2020. Trees on either side of the trail or road or intact forest being walked down were searched for potentially suitable roost trees. Most of the 37 km of trail/road were surveyed multiple times by multiple observers during 2020.

4.2.3.2 Other Mammals

Monitoring of potential use of the study area by woodland caribou, alternate prey (moose, white-tailed deer), and their predators (grey wolf, black bear) were monitored using four Reconyx Hyperfire or Bushnell Trophy Cam trail cameras set along trails, rock barrens, river valleys, and lakeshores in the Project study area (Table 3, Figure 6, Figure 7). These units were set out on in early June 2020 and redeployed to new locations in July before being removed in August 2020. Trail cameras were programmed to take a burst of 3 photos, with Sensitivity set to “High” and a delay of 60 seconds between bursts. Field scan mode was set for one photo each day at midday to document seasonal changes in environmental conditions and ensure camera batteries (Li) were still operational for the duration of the deployment.

Table 3. Trail camera deployments in June-August, 2020 trail camera deployments at the Marathon Palladium Project study area.

Unit ID	Model	Deployment	Location	Easting*	Northing
3a	Bushnell	June 6 - July 8	junction of trail and stream west of proposed pit	549810	5404768
3b	Bushnell	July 8 - Aug 13	trail northwest of airport	546937	5402146
6a	Reconyx	June 6 - July 8	junction of trail and creek north of proposed PSMF	548313	5404241
6b	Reconyx	July 8 - Aug 13	road into Twin Duck Lake	550628	5405647
7a	Reconyx	June 5 - July 7	trail junction in proposed PSMF	547573	5403216
7b	Reconyx	July 7 - Aug 13	wetland in proposed PSMF	547506	5402808
8a	Reconyx	June 7 - July 7	trail west of bedrock overlooking Milpa Lake	550557	5403496
8b	Reconyx	July 7 - Aug 13	meadow and trail near bend in main access road	549665	5402680

*UTM Zone 16; NA83

Figure 6. Reconyx trail camera overlooking trail west of Malpa Lake (left) and along trail in the western part of the study area (right)

During 2020 fieldwork, georeferenced observations were recorded opportunistically for mammals and their habitat use such as:

- tracks and trails (all species)
- scat (all species)
- nests and dens (all species – considered significant wildlife habitat for some furbearers)
- bones and antlers (all species)
- scrapes and rubs (white-tailed deer)
- browsing (moose)
- cratering (woodland caribou)
- riparian/aquatic feeding platforms and slides (muskrat, otter)
- food caches (e.g. red squirrel)
- other evidence of foraging e.g., turned over rocks, ripped apart logs (black bear)
- dams, lodges, food piles, and felled trees (beaver)

A total of 37 km of forest, rock barren, wetland, trail, and road were surveyed on foot (Figure 7), most of it multiple times and by multiple observers during June-August 2020 fieldwork.

No aerial surveys were conducted in 2020 for the Marathon Palladium Project since data are available from aerial surveys for woodland caribou, moose, wolves, and white-tailed deer conducted for other projects that overlap the project (e.g., Foster 2014, 2020; Shuter et al. 2018).

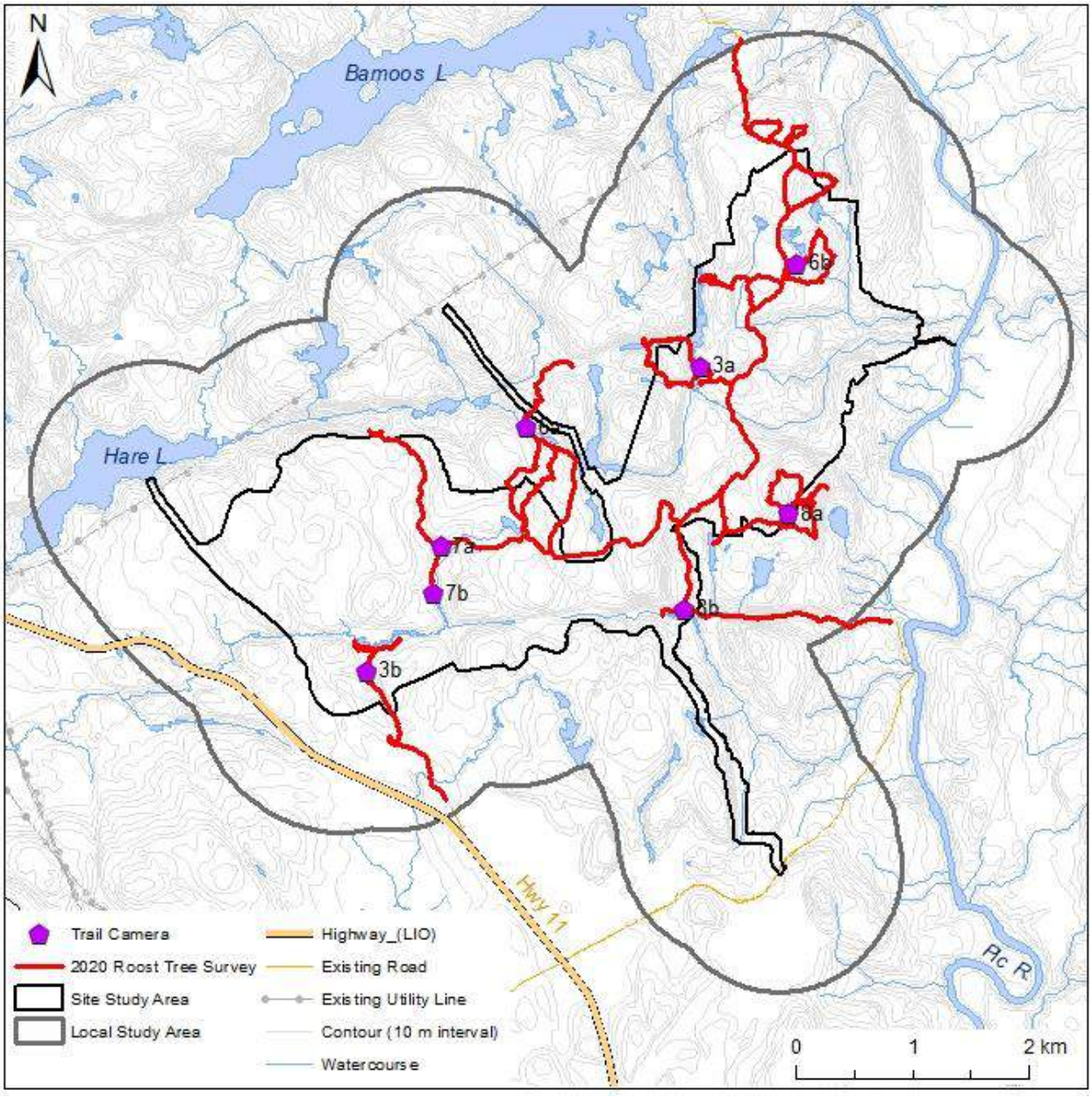

Figure 7. Location of trail cameras deployed and bat roost tree surveys at the Marathon Palladium Project, June-August 2020.

4.2.4 Reptiles and Amphibians

Reptiles and amphibians were surveyed in 2020 using a combination of methods, often concurrently with other fieldwork during June-August fieldwork. Anuran (frogs and toads) calls were recorded: a) during three nocturnal surveys for bats and nocturnal/crepuscular birds in June-July (Table 1), b) with eight acoustic recorder deployments during June-August (Table 2), and c) during two evening marsh bird surveys (Figure 4). Visual encounter surveys for reptiles and amphibians (e.g., Kendell 2002) were conducted while travelling along approximately 37 km of trail/road and intact habitat (Figure 7); most of these survey transects were repeated on multiple days by multiple observers. Searches were conducted for eggs, larvae, and adult reptiles and amphibians in suitable upland habitats, vernal pools, wetlands, and along the margins of permanent waterbodies and watercourses. Cover articles (logs, rocks) were flipped (and replaced) for salamanders and snakes. Particular attention was paid for potential significant wildlife habitat identified in the draft Ecoregion 3W criteria schedules (OMNRF 2017), such as snake hibernacula and multi-species vernal pools.

The project area is within the potential range of only two turtle species i.e., painted turtle (*Chrysemys picta*) and common snapping turtle (*Chelydra serpentina*), both of which lack standardized provincial survey protocols. Therefore, relevant elements of the Casper and Hecnar (2011) and OMNRF's (2015) survey protocol for Blanding's turtles were adapted for use to survey for the two potentially occurring species. Ponds and small lakes in the study area were surveyed from shoreline with 10 x 42 binoculars during June, July, and August fieldwork for basking and swimming turtles, multiple times for some waterbodies (Table 4). Shorelines, access trails, and roads in the study area were also searched for evidence of eggshells from predated nests as well as adult turtles.

Table 4. Summary of waterbodies surveyed for turtles in 2020 within the Project LSA 2020 for turtles. Standardized weather conditions recorded at from Marathon airport*

Survey Date	Waterbody Surveyed	Ambient Temperature (°C) (06:00-18:00)		Cloud Cover**
		Low	High	
2020-06-05	L26	14	29	passing or scattered clouds
2020-06-06	L5, L26, S63	15	24	passing or broken clouds
2020-06-07	L1, L15, L16, Two Duck Lake (L10, L11), Malva L.	11	21	passing or scattered clouds
2020-06-08	L8, L12, L15, L16	10	22	scattered or broken clouds
2020-07-07	L5, L8, L15, L26, S63	17	34	partly sunny or scattered clouds
2020-07-08	L8, L16, S15, S78 (headwater pond), Two Duck Lake (L10, L11), Terru L.	21	33	passing or scattered clouds
2020-07-09	L8, L16, S78 (headwater pond), Two Duck Lake (L10, L11), Terru L.	20	35	partly sunny or passing clouds
2020-07-10	L12	21	36	passing or scattered clouds
2020-08-12	L1, S15	16	30	passing clouds
2020-08-13	L9, L12, L13, L13a, L13b, L15, L16, L26, S63, Two Duck Lake (L10, L11)	18	31	passing or scattered clouds

*https://www.timeanddate.com/weather/; no precipitation on any 2020 survey dates

** scattered clouds = 3/8 to ½ of sky cloud-covered; broken clouds = 5/78 to 7/8 of sky cloud-covered

4.2.5 Insects and Other Taxa

Visual surveys were conducted for SAR insects such as Monarch (*Danaus plexippus*) and Yellow-banded Bumblebee (*Bombus terricola*), as well as searches for potential larval host plants and nectar sources. Suitable habitats with wildflowers were surveyed along trails and roads as well as clearings, lakeshores, wetlands.

During fieldwork for other VECs, surveys were conducted concurrently for significant wildlife habitat as defined by OMNRF (2000, 2017) and OMNR's Stand and Site Guide (OMNR 2009). Significant species that are not listed as SAR were also surveyed in 2020. Significant species and communities included those that are:

- tracked by NHIC or ranked S1-S3,
- regionally rare,
- locally or regionally features species by OMNR,
- species of special management concern,
- species near the limits of their range, and

4.3 Modelling

Additional habitat modelling has been conducted to take advantage of enhanced Forest Resource Inventory (eFRI) that was not fully available previously (Fraser 2012), and will be presented in the updated environmental impact statement.

5 UPDATED BASELINE VEGETATION VECS

5.1 Vegetation Communities

Vegetation communities (Figure 9 to Figure 19) have not changed significantly since field surveys in 2007-2010 due to the absence of major disturbance such as fire or insect outbreak, and given the relatively slow rate of forest and succession. For the initial baseline report (Harris and Foster 2009), vegetation mapping for the Project was primarily based upon Forest Resource Inventory (FRI) the northwestern Ontario ecosite classification (Racey et al. 1996), supported by field observations. This habitat assessment was updated and expanded upon for the 2012 bird impact analysis (Harris and Foster 2012). In 2013, newer FRI based on 2008 imagery and draft provincial boreal ecosites (Banton et al. 2009) became available and was used as the basis of an updated bird impact analysis (IR 23.4). Quantification of the extent of ecosite-based vegetation communities is updated here to reflect a refined Project footprint (Table 5, Figure 12). Where possible, fieldwork in 2020 confirmed the accuracy of these new ecosite designations and polygon boundaries within the study area. These ecosite-based vegetation communities will support revised habitat modelling in the updated impact assessment.

5.1.1 Forested Communities

Forested communities in the SSA remain largely unchanged from previous descriptions (Harris and Foster 2009, 2012, IR # 15.1, IR #23.4.1), although there have been relatively minor changes in areas of different boreal ecosites reflecting the refined Project footprint. Mixedwood forest (Figure 9) accounts for approximately 57% of the SSA and a slightly lower proportion (42%) of the LSA with conifer representing the bulk of the remaining vegetation classes by area ((Figure 8). Other vegetation classes represent approximately 5.3% of the SSA and 11.5 % of the LSA. Most of the mixedwood and conifer forests are dominated by varying proportions of balsam fir, white spruce, black spruce, and white in the overstory (Figure 12). Hardwood forests are relatively uncommon, with trembling aspen more abundant in deeper alluvial soils near the Pic River. The forests of the SSA exhibit an uneven age distribution, with 272 ha or 25% of the forest cover being overmature (150+ years), about 22% of the forest in the 121-130 year age group, and 29% aged 71-90 years of age (Figure 10, Figure 13). There is almost no area (< 4 ha) in young pre-closure forests (i.e., <40 years of age) due to a lack of recent natural (e.g., fire) or anthropogenic (i.e., harvesting) disturbance.

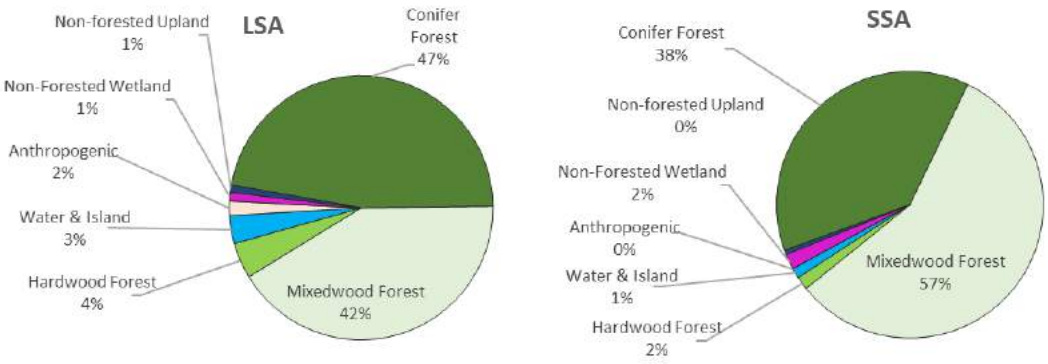

Figure 8. Relative proportion of vegetation classes in the Marathon Palladium Project local study area (LSA) and site study area (SSA) based on forest resource inventory (FRI) mapping.

Figure 9. Typical mixedwood forest in the Marathon Palladium Project study area.

Figure 10. Age-class structure of the forest in the GenPGM Project site study area (SSA) broken out by provincial boreal ecosites (Banton et al. 2009).

Table 5. Summary of vegetation communities in the GenPGM landscape based on boreal ecosites (ES) (Banton et al. 2009) delineated in the 2013 Forest Resource Inventory (FRI).

ES	Description	Vegetation Class	Area (ha)		% of Area	
			LSA	SSA	LSA	SSA
B007	Active Mineral Barren (gravel pit)	Anthropogenic	6.3	0.0	0.2	0.0
B012	Black Spruce-Jack Pine: Very Shallow Soil	Conifer Forest	121.6	41.8	2.9	3.7
B014	Very Shallow, Dry to Fresh: Conifer	Conifer Forest	264.6	110.8	6.4	9.9
B016	Very Shallow, Dry to Fresh: Aspen - Birch Hardwood	Hardwood Forest	180.6	18.1	4.4	1.6
B040	Hardwood-Fir-Spruce Mixedwood: Sandy Soil	Mixedwood Forest	7.4	0.0	0.2	0.0
B046	Fresh, Sandy or Dry to Fresh, Coarse Loamy. Non-treed	Non-forested Upland	0.4	0.0	0.0	0.0
B047	Fresh, Sandy or Dry to Fresh, Coarse Loamy. Non-treed	Non-forested Upland	17.3	3.0	0.4	0.3
B049	Spruce-Pine / Feathermoss: Fresh, Sandy-Coarse Loamy Soil	Conifer Forest	8.0	3.1	0.2	0.3
B050	Dry to Fresh, Coarse: Pine-Black Spruce Conifer	Conifer Forest	304.8	39.7	7.4	3.6
B052	Fir-Spruce Mixedwood: Fresh, Coarse Loamy Soil	Mixedwood Forest	1334.5	537.1	32.3	48.1
B053	Dry to Fresh, Coarse: Conifer. Tall treed	Conifer Forest	5.1	0.0	0.1	0.0
B055	Dry to Fresh, Coarse: Conifer. Low treed	Conifer Forest	1061.6	194.4	25.7	17.4
B062	Hardwood-Fir-Spruce Mixedwood: Fresh, Sandy-Coarse Loamy Soil	Mixedwood Forest	8.4	0.8	0.2	0.1
B063	Moist, Sandy to Coarse Loamy non-treed	Non-forested Upland	17.6	2.4	0.4	0.2
B065	Spruce-Pine / *Ledum* / Feathermoss: Moist, Sandy-Coarse Loamy Soil	Conifer Forest	91.2	26.3	2.2	2.4
B067	Hardwood-Fir-Spruce Mixedwood: Moist, Sandy-Coarse Loamy Soil	Mixedwood Forest	118.0	77.3	2.9	6.9
B070	Spruce-Pine / Feathermoss: Fresh, Fine Loamy-Clayey Soil	Conifer Forest	70.9	4.7	1.7	0.4
B098	Pine-Spruce / Feathermoss: Fresh, Silty Soil	Conifer Forest	8.0	0.0	0.2	0.0
B099	Fir-Spruce Mixedwood: Fresh, Fine Loamy Soil	Mixedwood Forest	31.3	0.8	0.8	0.1
B101	Hardwood-Fir-Spruce Mixedwood: Fresh, Silty Soil	Mixedwood Forest	42.1	2.5	1.0	0.2
B104	Hardwood-Fir-Spruce Mixedwood: Fresh, Silty Soil	Mixedwood Forest	170.8	18.4	4.1	1.6
B128	Intermediate Swamp: Black Spruce (Tamarack): Organic Soil	Conifer Forest	7.3	0.0	0.2	0.0
B135	Organic Thicket Swamp	Non-Forested Wetland	0.9	0.0	0.0	0.0
B136	Sparse Treed Fen: Tamarack-Black Spruce/ *Sphagnum*: Organic Soil	Non-Forested Wetland	14.4	4.3	0.3	0.4
B140	Open Moderately Rich Fen	Non-Forested Wetland	1.6	1.6	0.0	0.1
B142	Mineral Meadow Marsh	Non-Forested Wetland	24.6	14.7	0.6	1.3
B144	Organic Meadow Marsh	Non-Forested Wetland	1.0	0.0	0.0	0.0
B146	Shore Fen: Organic Soil	Non-Forested Wetland	1.7	0.0	0.0	0.0
B164	Organic Meadow Marsh	Non-Forested Wetland	0.9	0.0	0.0	0.0
B165	Open Rock Barren	Non-forested Upland	0.4	0.0	0.0	0.0
B168	Open Talus	Non-forested Upland	0.6	0.6	0.0	0.1
B190	Anthropogenic	Anthropogenic	7.0	0.0	0.2	0.0
B197	Anthropogenic	Anthropogenic	16.7	0.0	0.4	0.0
U997	Developed Area (airport)	Anthropogenic	18.7	0.0	0.5	0.0
U998	Existing Transmission Line	Anthropogenic	22.9	0.2	0.6	0.0
	Water & Island	Water & Island	142.0	13.8	3.4	1.2
	TOTAL		4131.4	1116.4	100.0	100.0

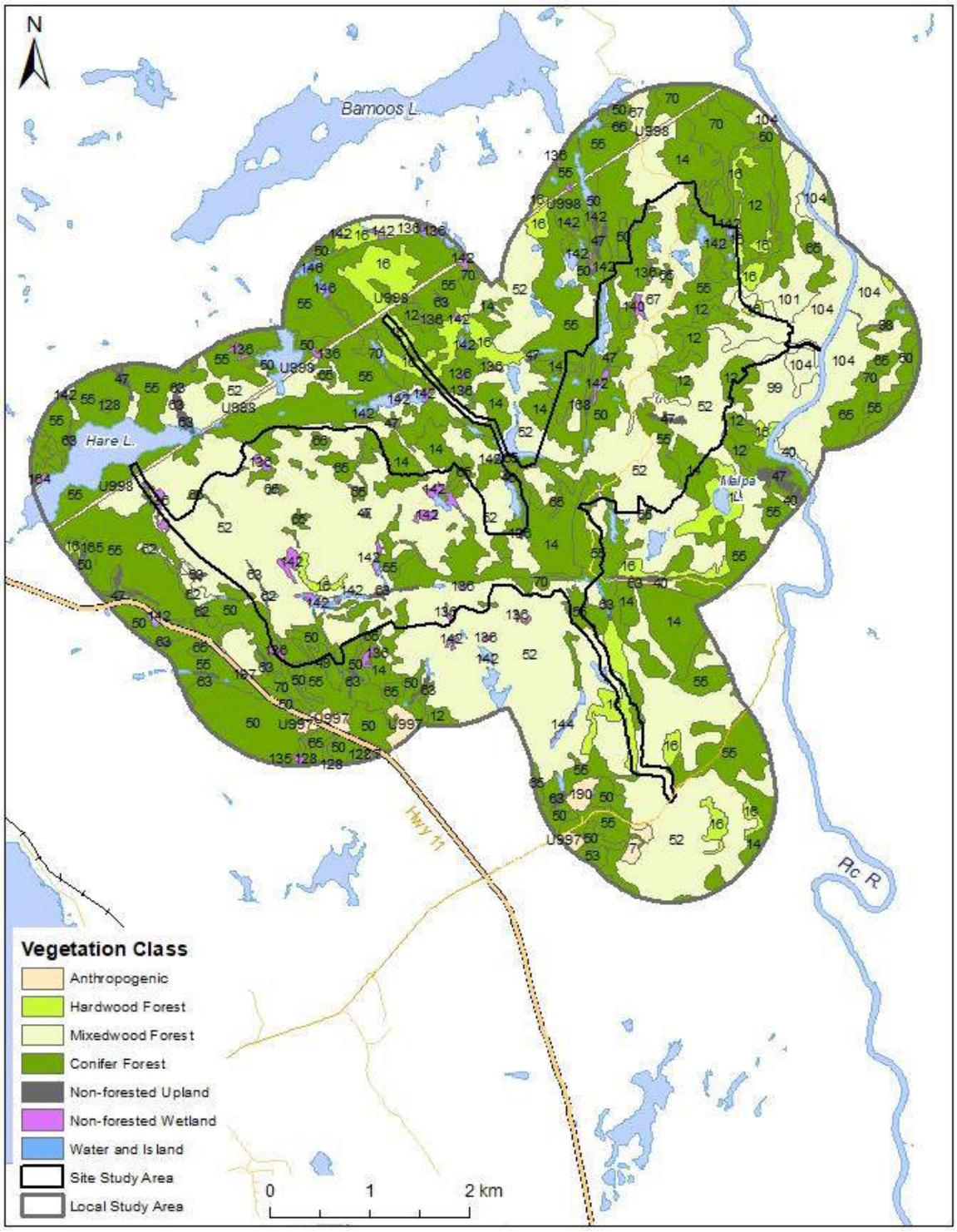

Figure 11. Vegetation communities of the Marathon Palladium Project study area (2008 Forest Resource Inventory). Polygon map labels refer to provincial ecosites (see Table 5 for ecosite descriptions).

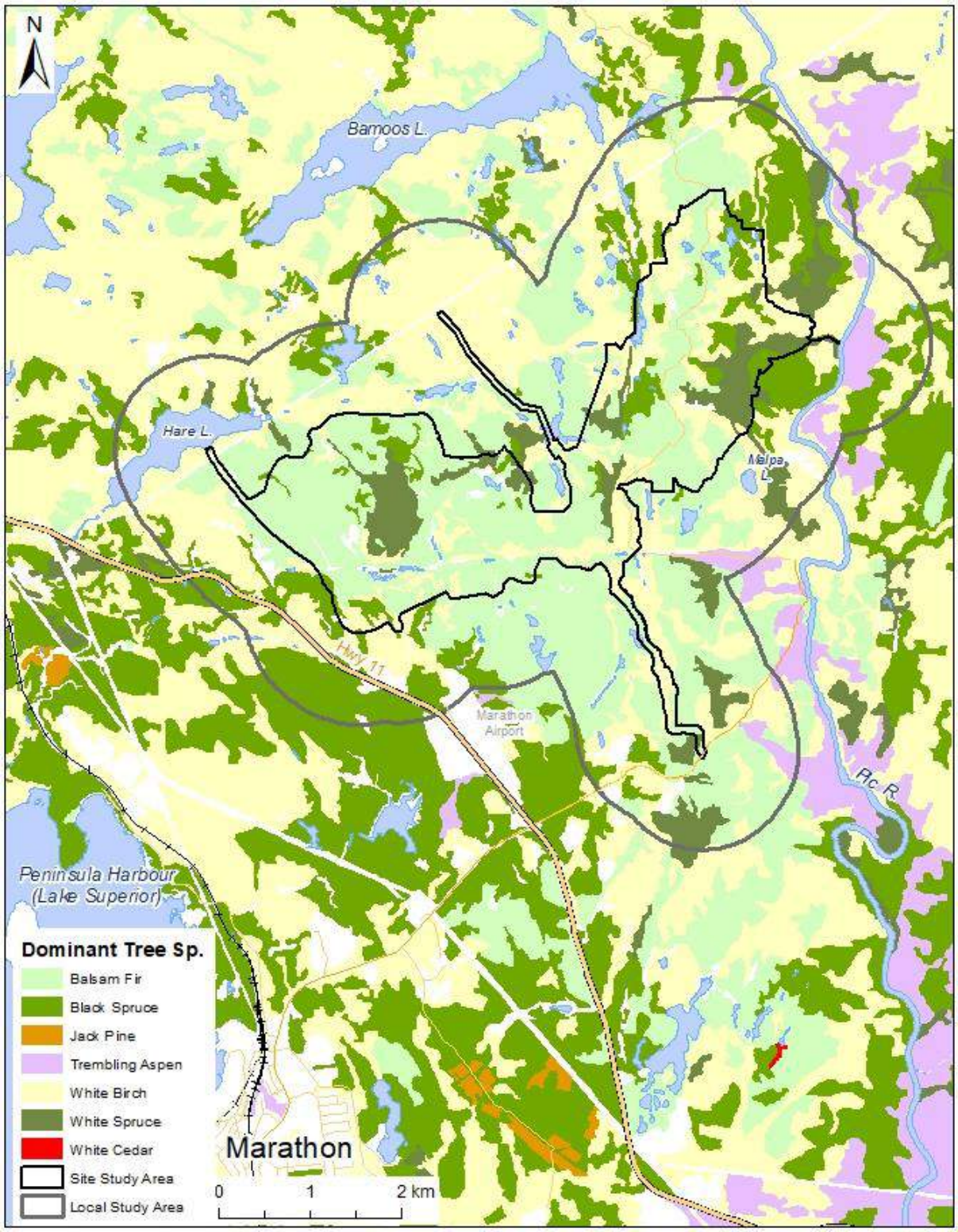

Figure 12. Forest communities (Banton et al. 2009) of the Marathon Palladium Project study area by dominant tree species (2008 Forest Resource Inventory).

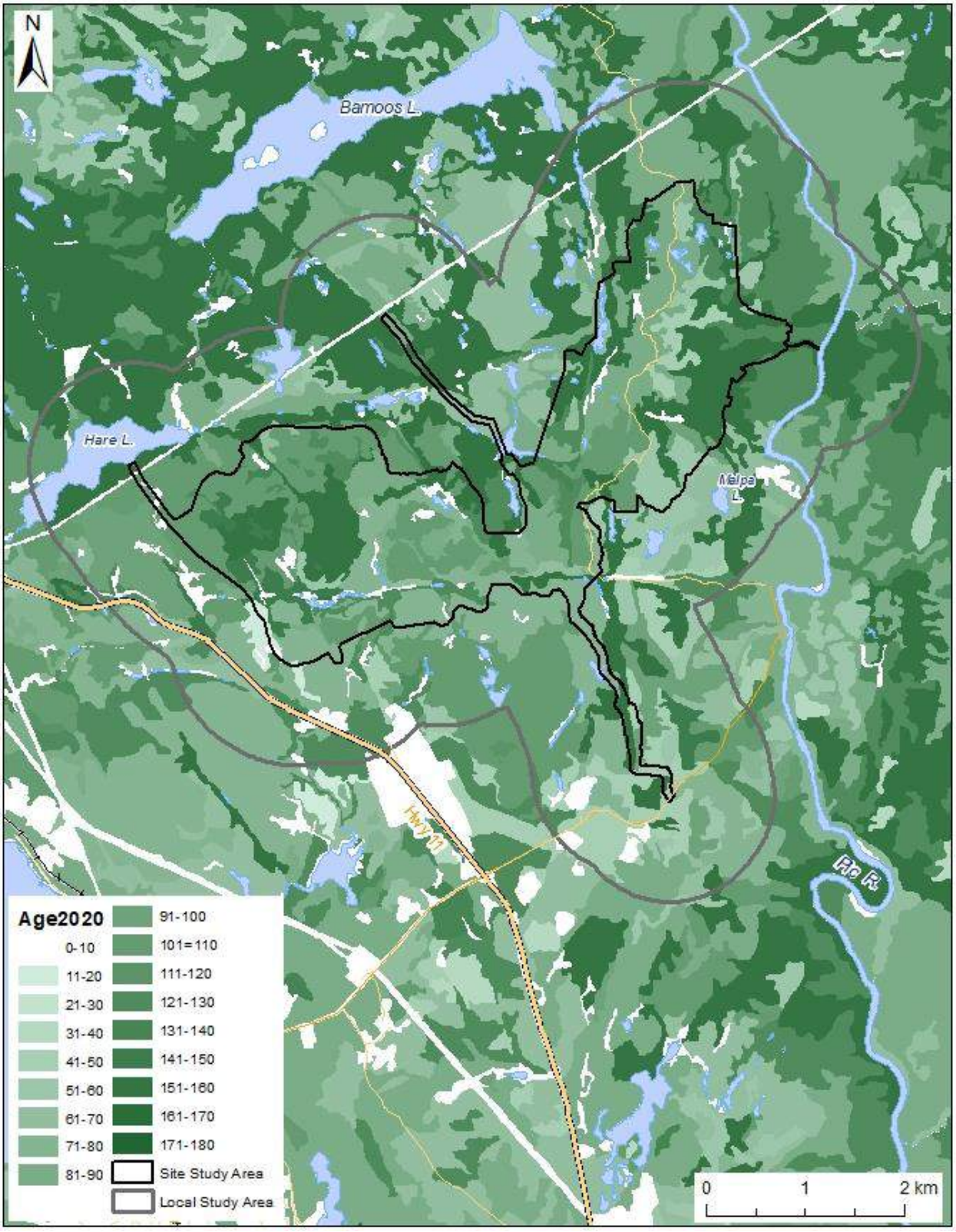

Figure 13. Forest age of the Marathon Palladium Project study area (2008 Forest Resource Inventory).

5.1.2 Wetlands

Open wetlands on small waterbodies were often not delineated in the Pic River FRI due to their lack of direct relevance to forest management and were left as “open water” (Figure 14). In addition, small patches of multiple wetland ecosites were often pooled in the FRI or incorrectly classified. Ecosite boundaries for open wetlands within the SSA were therefore revised based on 2020 field observations and previous information (e.g., Ecometrix 2012; Harris and Foster 2012). A summary of open wetlands is presented in Table 6; mapping and photographs for the larger of these are presented in Appendix 2 as they are considered VECs and also provide habitat for rare plants and other taxa. In general, wetlands are rather small and limited in development in the SSA, in part due to the small waterbodies, rugged topography, and thin soils. None of the wetlands in the SSA have been formally evaluated for provincial significance (OMNR 2014) but would not meet the criteria due to their very small size, low diversity, limited hydrological function, and paucity of special features.

Where submergent cover is less than 25% cover, these were typed as “open water”. This typically occurred if the waterbody where bathymetry (Ecometrix Inc. 2012) showed the water was too deep (e.g., >2 m) to support extensive submergent aquatic vegetation. The surrounding landscape and shores of these waterbodies were generally steeply sloping and bedrock-dominated. Smaller, recently flooded beaver ponds also lacked sufficient submergent vegetation to be considered wetland but may succeed over time depending on beaver activity. No moose aquatic feeding areas in the LSA have been identified during forest management planning for the Pic Forest – these are typically delineated at least in part by the abundance of preferred species of submergents and floating-leaved plants (e.g., Nuphar).

Open-water marshes on organic sediments (muck) i.e., B152 are found in quiet, shallow bays and margins of some of the waterbodies in the SSA. They are often dominated by pondweeds such as *Potamogeton richardsonii, P. natans,* and *P. vaseyi.* Provincially or regionally rare pondweeds (*P. oaksianus, P. confervoides*, and *P. pusillus)* may also be present (see *5.2 Flora)*. There are no large patches of open-water marshes in the SSA that are dominated by floating-leaved plants such as yellow or white pond lilies (*Nuphar, Nymphaea*) or water shield (*Brasenia schreberi*), although there are other waterbodies in the RSA with such wetland communities (Foster 2019).

Meadow marshes were the most abundant open wetland class in the SSA, comprising approximately 7.1 ha. Organic meadow marsh (B144) is actually more abundant than meadow marsh on mineral soil (B142) (much of the B142 was mistyped and was actually B144 or shore fen). Meadow marsh on mineral soil appears to be mainly restricted to the deeper soils in the southwest of the SSA along Stream S15. Elsewhere these, graminoid-dominated open wetlands are found on muck or organic soils (B144). Bluejoint grass (*Calamagrostis canadensis*) and robust sedges (e.g., *Carex stricta*, *C. aquatilis*, *C. lacustris*) are often dominant species in these vegetation communities. Meadow marshes were often formed on the exposed sediments in inactive beaver ponds where there had been a drawdow in water levels. Typically, these wetlands are only seasonally flooded during the spring, with little or little standing water later in the growing season.

Meadow marshes are often succeeded by and interspersed with thicket swamps i.e., B134 or B135 depending on the substrate (mineral vs. organic). Prolonged flooding from renewed beaver activity can kill off the shrubby vegetation and convert it back to meadow marsh or other open wetlands. Thicket swamps were typically dominated by speckled alder (*Alnus incana*), red osier dogwood (*Cornus sericea*), and/or willows (*Salix* spp.) and were most common along stream systems such as S15 and S63.

Marshes are those wetland communities that are permanently flooded and dominated by herbaceous vegetation such as cattails (*Typha* spp.), burreeds (*Sparganium* spp.), bulrushes (*Schoenoplectus* spp.), sweetflag (*Iris versicolor*), spikerushes (*Eleocharis* spp.), and other narrow or broad-leaved emergents (Harris et al. 1996; OMNR 2014b). No shallow marsh ecosites such B148 or B149 were typed in the FRI. Within the SSA, these ecosites are found in small (<1 ha) pockets interspersed with other wetland

communities, typically as a narrow strip or scattered patches along the margins of beaver ponds or other permanent waterbodies. Bulrushes are absent from the SSA and cattails are found only as small clumps in a larger wetland matrix. Wild rice (*Zizania palustris*) has not been observed in the LSA.

Shore fens are one of the most abundant wetland communities in the SSA, accounting for approximately 4.5 ha. These may either be *Sphagnum* and/or graminoid-dominated (B146) or shrub-dominated (B146) (i.e., >25% cover of shrubs). These communities form a floating mat[4], extending out over deeper water and often rising and falling with fluctuating water levels. Typical species in SSA shore fens include peat mosses (e.g. *Sphagnum squarrosum*), wire sedge (*Carex lasiocarpa*), few-seeded sedge (*Carex oligosperma*), and three-way sedge (*Dulichium arundinaceum*). Dominant shrubs often include leatherleaf (*Chamaedaphne calyculata*), sweet gale (*Myrica gale*), and bog birch (*Betula pumila*), and stunted speckled alder (*Alnus incana*). Shore fens may grade into grounded fen or directly abut the bedrock or other shoreline. Waterbody L16 is not actually moderately rich fen as typed in the FRI (see Appendix 2), but is meadow marsh that has recently been re-flooded by beaver activity. There is narrow band of moderately rich fen along the north shore of L12 that is dominated by a lawn of red beak-rush (*Rhyncospora fusca*), Kalm's lobelia (*Lobelia kalmia*), and other minerotrophic indicators.

There are also small (<1 ha) pockets of poor (B139) to moderately rich fens (B140) in depressions at several locations in the SSA (not adjacent to waterbodies) that are too small to be mapped. Nutrient-rich runoff from the surround slopes provides minerotrophic inputs and supports a more diverse peatland community than would otherwise be expected. There are also small, scattered pockets of sparse treed fen (B136) in low-lying areas in the SSA interspersed with forest types, but they account for less than 5 ha in total.

[4] They are sometimes erroneously referred to as a "floating bog", but are actually fens as they have contact with nutrient-rich water

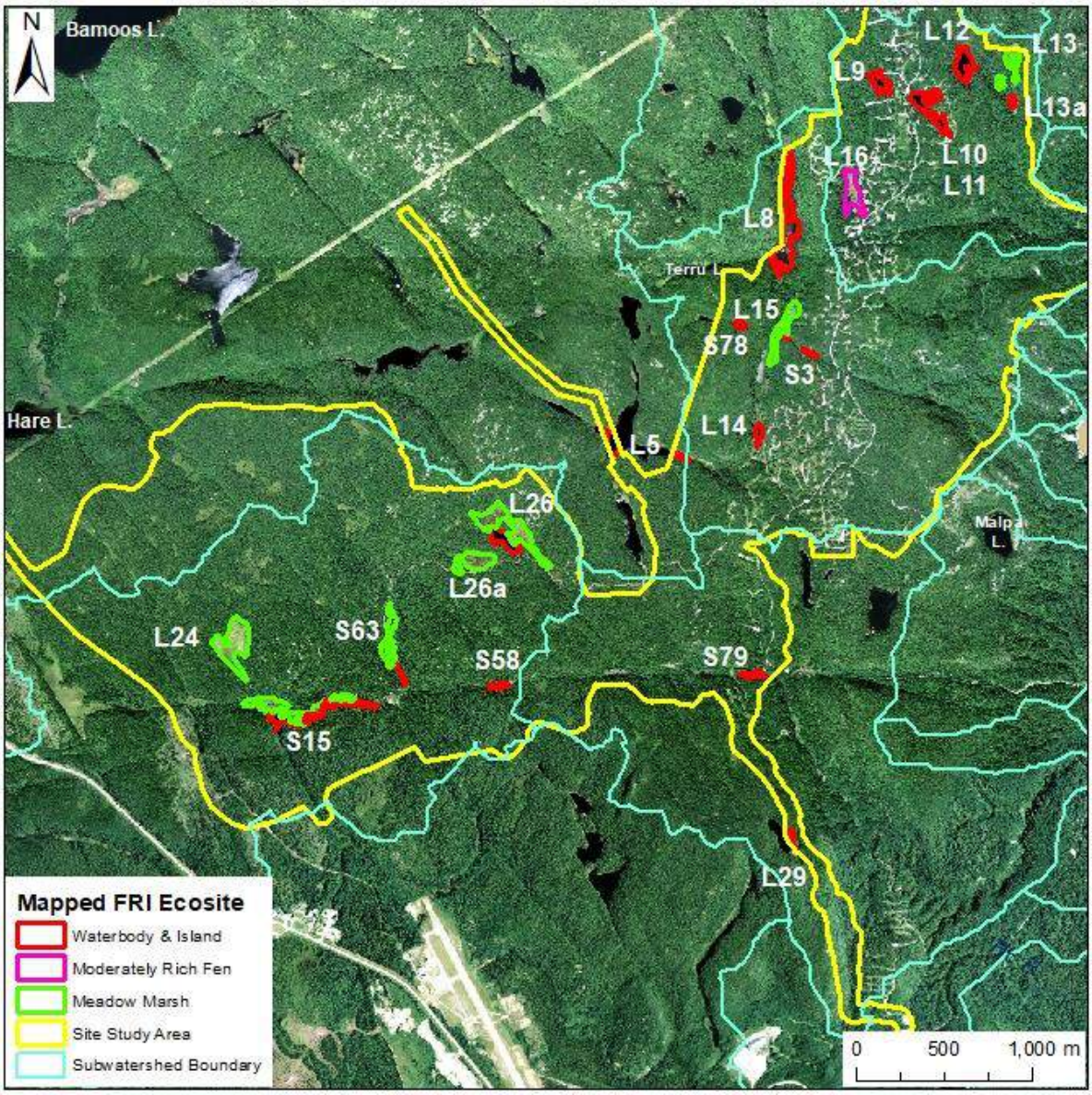

Figure 14. Mapped waterbodies and open wetlands within the GenPGM Project site study area (SSA) with original FRI ecosite designation. See Table 6 and Appendix 2 for updated ecosite typing.

Table 6. Summary of open wetlands within the GenPGM Project site study area (SSA).

Wetland Name	Boreal Ecosite Area (ha)											
	B134 Mineral Thicket Swamp	B135 Organic Thicket Swamp	B139 Poor Fen	B140 Open Moderately Rich Fen	B142 Mineral Meadow Marsh	B144 Organic Meadow Marsh	B146 Open Shore Fen	B147 Shrub Shore Fen	B151 Open Water Marsh: Mineral	B152 Open Water Marsh: Organic	Open Water (<25% submergents)	**Total Area (ha)**
L10/L11								0.14			1.74	1.88
L12				0.09			0.09	0.13			1.16	1.47
L13						0.16		0.54			0.17	0.87
L13a										0.18		0.18
L13b						0.25				0.02		0.27
L14											0.31	0.31
L15		1.32				0.26				0.16		1.75
L16						1.21				0.40		1.61
L24					3.36							3.36
L26							3.26			0.47	0.66	4.39
L26a			1.67									1.67
L29											0.27	0.27
L5							0.01				0.93	0.94
L8								0.35			3.29	3.64
L9											0.74	0.74
S15	2.59				0.89				1.80			5.28
S3										0.10		0.10
S58											0.22	0.22
S63	0.12				0.95				0.62			1.68
S78										0.22		0.22
S79											0.24	0.24
Total	2.71	1.32	1.67	0.09	1.84	5.24	3.36	1.17	2.42	1.55	9.74	31.09

Figure 15. Shore fen on waterbody L26, August 2020.

Figure 16. Small pockets of moderately rich and sparsely treed fen in the SSA, August 2020.

5.1.3 Non-forested Communities

Not including the open wetlands discussed above, the remaining non-forested communities include rock barrens, talus, cliff/rock face, and anthropogenic habitats such as hydro transmission lines and gravel pits. As per the provincial ecological land classification (ELC) system, these open communities typically have than 25% cover of trees[5]. Terrestrial non-forested communities account for approximately 6.1 ha or about 0.5 % of the Project SSA, and 0.9% of the LSA (Table 5, Figure 8).

Individual patches of rock barren (B164) are generally small (i.e., <100 m^2) and scattered throughout the study area, typically associated with shallow soils over bedrock and steep relief. Most are too small to be delineated individually in the FRI. Typical vascular plant species include common juniper (*Juniperus communis*), bearberry (*Arctostaphylos uva-ursi*), and three-toothed cinquefoil (*Sibbaldia tridentata*), with scattered pin cherry (*Prunus pensylvanica*), white spruce (*Picea glauca*), and balsam fir (*Abies balsamea*)(Figure 17). See Harris and Foster (2009, 2012) for further information on this community. No rare plant species or community types were observed in this ecosite, but it could potentially be suitable for winter habitat for woodland caribou due to the abundance of *Cladonia* (*Cladina*) ground lichens ("reindeer moss"). The active mineral barren (B007) in the southwest portion of the LSA is an existing gravel pit.

Talus slopes are generally too small to be typed individually in the FRI, which typically have a minimum polygon size of at least 5 ha. Talus slopes are found at the base of cliffs or very steep slopes such as along the west shore of L8 (Figure 17). Talus communities are typically dominated by lichens such as *Peltigera* and *Cladonia* in xeric, open conditions, but with more moss cover (e.g., *Pleurozium, Ptilium)* in moister shaded conditions*.* Vascular plants are less abundant and not diverse; rock polypody (*Polypodium virginianum*) and rusty woodsia (*Woodsia ilvensis*) are common species. No rare species or vegetation species were associated with this ecosite.

Cliffs and rock faces are fairly common in the SSA and LSA, although there are few large cliffs despite the topography due to the rounded nature of the bedrock domes. Most rock faces are fairly small (i.e., 3-5 m in height)(Figure 19) and are often forested to the upper rim and along the base. North-facing cliffs tend to have cooler and moister than average microclimates, and often support a dense carpet of mosses and often a rich herbaceous and shrub (e.g., mountain maple *Acer spicatum*) community at the base. Ferns such as fragrant cliff fern (*Dryopteris fragrans*), fragile fern (*Cystopteris fragilis*), *Woodsia* spp., and club mosses (Lycopodiaceae) are common in cracks and ledges on the bedrock faces, along with scattered sedges (e.g., *Carex canescens*), mosses, and lichens.

Approximately 70 ha of human-modified habitat is found in the LSA and includes the transmission line right-of-way (ROW)(Figure 19) passes through the northern part of the SSA. The ROW is dominated by grasses and other graminoids, and early successional weedy species, as well as remnant survivors of the original forest floor such as bunchberry. The vegetation is kept in an early successional, open state by active vegetation management (e.g., herbicide spraying and brush-saw) at regular intervals. There is less than 1 ha of mapped anthropogenic ecosites within the SSA, but there are extensive unmapped disturbed areas from mineral exploration such as trenches, trails and roads along the main north-south axis of the SSA (apparent on Figure 14).

[5] larger than 10 cm diameter at breast height and/or greater than 2 m tall

Figure 17. Rock barren overlooking Malpa L. (left) and talus community along shore of waterbody L8 (right).

Figure 18. Typical rock faces in the Project SSA, August 2010.

Figure 19. Anthropogenic ecosites in the LSA include existing transmission line right-of-way north of Project (left) and exploration roads and trails (right).

5.2 Flora

A total of 359 species of vascular plants have been documented in the Marathon Palladium Project study (Appendix 3). An additional 29 species were observed in 2020 in addition to the 340 species previously documented for the study area in 2007-2010[6]. No new occurrences of previously observed provincially or regionally rare plant species were found during 2020 field surveys. See *Species at Risk* for a discussion of black ash (*Fraxinus nigra*), the only federally or provincially listed vascular plant SAR whose range potentially overlaps the GenPGM Project study area. The presence of S3-listed of alga pondweed (*Potamogeton oaksianus*) in waterbody L26 was reconfirmed; other past occurrences of provincially or regionally rare plant species were not revisited and are assumed to be extant.

Since 2013, there have been a number of changes in the taxonomy or ranking of rare plant species documented from the GenPGM Project study area (Table 7). Marsh speedwell (*Veronica scutellata*) is no longer considered regionally rare in the Thunder Bay District as additional occurrences of this species have been observed. Occurrences of narrow-leaved cattail (*Typha angustifolia*) in the Thunder Bay District are now all considered non-native, and therefore this species is no longer considered regionally rare (TBFN 2015), as it was previously (TBFN 2003). Known locations of provincially and regionally rare plant species in the Project study area are shown in Figure 21 and summarized in Appendix 4.

Table 7. List of provincially rare (S1-S3 ranked) or regionally rare (RR TBD) vascular plant species known from the GenPGM Project study area.

Common Name	Scientific Name	S-Rank	RR TBD	Taxonomic/Status Notes
Alga Pondweed	*Potamogeton confervoides*	S2		NA
Alpine Woodsia	*Woodsia alpina*	S2		NA
American Shoreweed	*Littorella americana*	S3		formerly shore plantain
Braun's Holly Fern	*Polystichum braunii*	S3		NA
Broad-leaved Twayblade	*Neottia convallarioides*	S4	Y	formerly *Listera convallarioides*
Canada Ricegrass	*Piptatheropsis canadensis*	S4	Y	formerly Canada mountain rice (*Oryzopsis canadensis*)
Common Ragweed	*Ambrosia artemisiifolia*	S5	Y	NA
Hoary Draba	*Draba cana*	S3	Y	formerly S4 and known as Whitlowgrass
Mountain Firmoss	*Huperzia appressa*	S2?		taxon found at GenPGM was formerly known Appalachian firmoss (*Huperzia applachiana*) and S3
Northern St. John's-wort	*Hypericum boreale*	S4?	Y	since 2013, the subspecies of slender St. John's-wort that was found at the GenPGM site, *Hypericum mutilum* ssp. *boreale*, has been elevated to a full species i.e., *Hypericum boreale* (northern St. John's-Wort); this taxon is still considered regionally rare in the Thunder Bay District .
Oakes' Pondweed	*Potamogeton oakesianus*	S4	Y	NA
Small Pondweed	*Potamogeton pusillus*	S4?	Y	formerly slender pondweed

[6] 292 vascular plant species were listed in SID 24 (Harris and Foster 2009); subsequent fieldwork brought the total to 340 presented in the main EIS report (SCI 2012)

Common Name	Scientific Name	S-Rank	RR TBD	Taxonomic/Status Notes
Small-flowered Evening-primrose	*Oenothera parviflora*	S5	Y	NA
Tall Millet	*Milium effusum*	S4S5	Y	formerly wood millet grass

Several species of arctic-alpine disjunct plant species, including fragrant cliff fern (*Dryopteris fragrans*), glaucous blue grass (*Poa glauca*), alpine bistort (*Bistorta vivipara*), mountain cranberry (*Vaccinium vitis-idea*), northern woodsia (*Woodsia alpina*), and smooth woodsia (*W. glabella*) were discovered in 2009-2010 on cool, north-facing cliffs or bedrock faces. Although most of these species are not rare in Ontario, these species are significant because they are geographically separated from their main ranges in arctic and alpine regions in northern and western Canada. An additional western disjunct, thimbleberry (*Rubus parviflorus*) was documented during 2020 fieldwork.

A total of 40 non-native species have been observed in the GenPGM Project study area (SNA in). This represents approximately 11% of the species documented thus far in the Project study area; in comparison, approximately 38% of the known species in Ontario are considered non-native (NHIC unpublished data). Non-native species were most abundant along trails and road such as clovers (*Trifolium* spp.), oxeye daisy (*Leucanthemum vulgare*), common plantain (*Plantago major*), and little yellow rattle (*Rhinanthus minor*), many of which typically do not invade natural communities. However, several species that are potentially invasive were newly observed in the GenPGM Project study area in 2020. Tansy (*Tanacetum vulgare*) was observed at several locations along trails, and bull thistle (*Cirsium vulgare*) was observed roadside and along the shoreline of a small pond (where it must have spread via air-borne seeds). Purple loosestrife (*Lythrium salicaria*) was observed at one location and presumably arrived on site as seeds stuck to mud in tires. There are very few records of this invasive species along the north shore of Lake Superior, with the nearest documented location approximately 35 km to the west along Highway 11 at Black Fox Lake (iNaturalist 2020). Non-native common St. John's-wort (*Hypericum perforatum*) was very dense along some trails, crowding out other herbaceous species (Figure 20). Milkweed (*Asclepias* spp.) has not been observed in the LSA.

Figure 20. Purple loosestrife observed along trail at GenPGM study area, and trail with common St. John's-wort and other herbaceous species (right), August 2020.

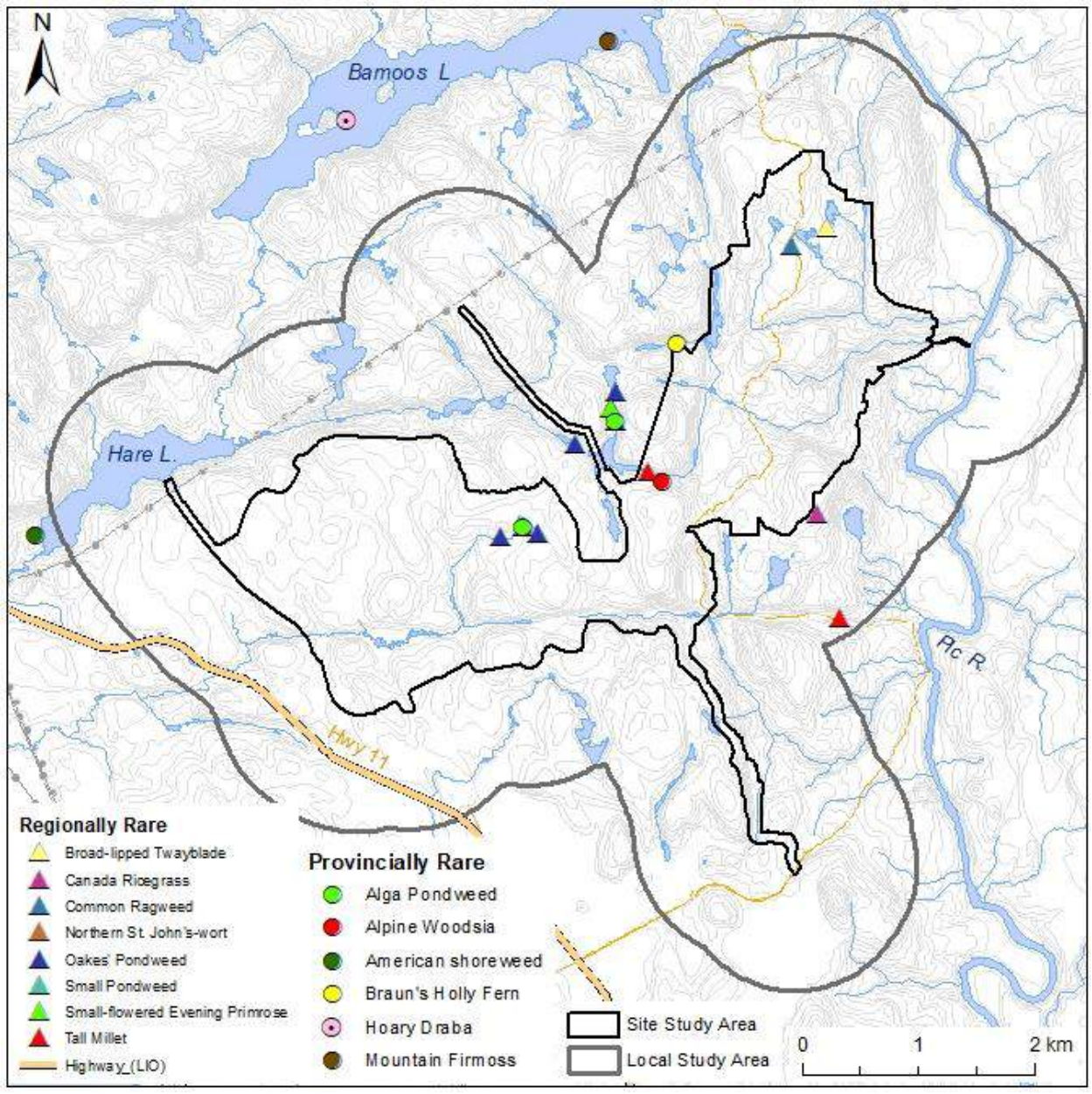

Figure 21. Location of provincially rare (S1-S3) and regionally rare (TBFN 2015) vascular plant species in the Marathon Palladium Project study area.

6 UPDATED WILDLIFE VECS

6.1 Insects

Field surveys in 2020 focused on insect groups of higher conservation concern (e.g., S1-S3 ranked), particularly odonates and butterflies. A total of 26 species of odonates are known from the MGPM study area, with 2020 field surveys confirming the presence of six new species of dragonflies and one species of damselfly (Appendix 5). Additional species are likely present given broad ranges (Paulson 2011; TBFN 2010) and habitat types present in the study area.

Of note was a single male ski-tipped emerald (formerly called ski-tailed emerald) observed flying along the margins of a small pond along the main access road on August 12, 2020 (549829E 5402631N). This dragonfly species is ranked as S3? by the NHIC (Oldham pers. Comm.). Ski-tipped emeralds are typically associated with slow-moving streams in bogs and swamps, forest streams, and small waterbodies at their outlets (Jones et al. 2020; Paulson 2011). Uncommon and local, the species is known from relatively few records in northern Ontario (iNat 2020; TBFN 2010) but is one of the more commonly encountered *Somatochlora* species in Algonquin Park and surrounding area (Jones et al. 2008). No other provincially rare odonates are known from the Project study area.

On the afternoon of August 12, 2020, at least 1000+ Compton tortoiseshells (*Nymphalis l-album*) and 50+ mourning cloaks (*Nymphalis antiopa*) were observed along the main access road puddling (i.e., drinking from puddles) or on carnivore scat. There had been a heavy rainfall the previous day, and the butterflies had also been even more abundant earlier in the week (C. Boucher pers. comm.)

Figure 22. Ski-tipped emerald (left) and Compton's tortoiseshells observed puddling along the main GenPGM access road (right), August 2020.

Eleven new species of butterflies were observed during 2020 field surveys (Appendix 6). A total of 23 species have been documented for the Project study area during 2007-2010 and 2020 field surveys or from other sources (e.g., eButterfly 2020; iNat 2020). Additional butterfly species are likely present given broad ranges (Hall et al. 2014; TBFN 2019) and habitat types present in the study area. Apart from the monarch, no butterfly species known from the study area is considered provincially rare (S1-S3) by OMNRF's Natural Heritage Information Centre (NHIC). Two rare butterflies identified by Golder Associates Ltd. (2009) as potentially occurring in the study area i.e., large marble (*Euchloe ausonides*) and taiga alpine (*Erebia mancinus*), were not confirmed in the present study. The preferred habitat for large marble is sandy, open pine forests (Hall et al. 2014), which are lacking the Project study area. Taiga alpines prefer wet, open forests around spruce and tamarack bogs (Hall et al. 2014), which are limited in the study area.

Two insect SAR insects i.e., yellow-banded bumblebee (*Bombus terricola*) and monarch (*Danaus plexippus*) were observed during 2020 fieldwork. See *Species at Risk* for a discussion of these species.

6.2 Reptiles and Amphibians

Ten species of amphibians (e.g., (Figure 23) have been confirmed as occurring in the Marathon Palladium Project study area, with several others potentially occurring based on their broad ranges and habitat within the study area (Appendix 7). No new amphibian species were observed during 2020 fieldwork. No abundance estimates were calculated, but anurans were generally widespread and relatively abundant, as in 2007-2010. Anurans were routinely heard during the three nocturnal surveys along the main access road (Appendix 8), as well as on acoustic recorders, particularly during deployments in June and early July.

A single eastern gartersnake (*Thamnophis sirtalis sirtalis*) was observed in 2020 near L8; this species had not previously been observed in the LSA although there are records for it near Marathon (iNaturalist 2020). Red-bellied snake is unlikely to occur within the study area – there is only one record (Sleeping Giant Provincial Park) of this species along the north shore of Lake Superior (iNaturalist 2020; Ontario Nature 2019). No snake hibernacula were observed. Common gartersnakes will use a variety of habitats for overwintering such as rock crevices, talus, and mammal burrows (Rowell 2012), all of which are present in the LSA.

No turtles were observed during 2020 or 2007-2010 field surveys. There are very few occurrences of painted turtle along the north shore of Lake Superior, with a record from Marathon and another from Pukaskwa National Park as the only two documented records between Black Bay and Wawa (iNaturalist 2020; Ontario Nature 2019). There appears to be potentially suitable habitat in the LSA but cooler temperatures near the north shore Lake Superior may be limiting for some species of reptiles, including turtles (McKenney et al. 1998). Painted turtles are more widespread farther inland from Lake Superior (e.g., White River, Beardmore) (iNaturalist 2020; Ontario Nature 2020). See *Species at Risk* for a discussion of snapping turtle.

Some of the waterbodies in the SSA may qualify as significant amphibian breeding habitat according to the draft Ecoregion 3W criterion schedules (OMNR 2017). The 3W threshold for significant wetland amphibian breeding habitat requires the presence of at least 20 breeding individuals of a salamander or newt species or at least four anuran (frog/toad) species including either northern leopard, mink, or green frog. Eastern newts were described as numerous in waterbody L13 and L13a during previous fisheries survey were also observed in L1, L2, L9, and L16, and Two Duck Lake (L10/L11) (Ecometrix Inc. 2012). No potentially significant vernal pool amphibian breeding habitat was observed in 2020.

Figure 23. Eastern red-backed salamander (left) and green frog (right) observed at the Marathon Palladium Project study area during 2020 fieldwork.

6.3 Birds

A total of 97 bird species has been documented at the Marathon Palladium Project, with an additional 35 species detected nearby in the RSA on past Breeding Bird Survey(BBS) or Ontario Bird Atlas (Appendix 9). Additional species are expected to occur in the RSA (eBird 2020; iNaturalist 2020) but may not be breeding. Six new species were detected in the LSA in 2020 including American goldfinch, turkey vulture, Cape May warbler, American woodcock, northern saw-whet owl, and sandhill crane. The latter three species had not been recorded in adjacent BBS or Bird Atlas data but have been reported for the Marathon area (eBird 2020). Level of breeding evidence, has also be updated for a several species (e.g., based on 2020 observations (Figure 24).

Morning point count data from 2020 (Appendix 10) suggests that the breeding bird community within the Project LSA is broadly comparable to the 2008-2010 data, with the most abundant species similar amongst years despite differences in survey effort. Pine siskin, however, were much more abundant on point counts in 2020 than in previous years, perhaps reflecting a locally abundant seed year.

Table 8. The 20 most common bird species (all years) recorded on point counts for the Marathon Palladium Project and annual proportion of those species.

Common Name	# in 2008	# in 2009	# in 2010	# in 2020	# in all years	% of 2008	% of 2009	% of 2010	% of 2020	% of all years
Pine Siskin	2	5	-	447	454	0.4	1.1	0.0	27.2	15.4
White-throated Sparrow	70	69	58	159	356	13.6	15.1	17.7	9.7	12.1
Swainson's Thrush	-	34	49	115	198	0.0	7.4	14.9	7.0	6.7
Black-throated Green Warbler	35	49	29	59	172	6.8	10.7	8.8	3.6	5.8
Winter Wren	33	42	23	71	169	6.4	9.2	7.0	4.3	5.7
Hermit Thrush	61	7	-	71	139	11.8	1.5	0.0	4.3	4.7
American Redstart	27	28	8	54	117	5.2	6.1	2.4	3.3	4.0
Red-eyed Vireo	5	25	14	57	101	1.0	5.5	4.3	3.5	3.4
Nashville Warbler	13	15	8	61	97	2.5	3.3	2.4	3.7	3.3
American Robin	20	22	23	30	95	3.9	4.8	7.0	1.8	3.2
Red-breasted Nuthatch	7	4	16	53	80	1.4	0.9	4.9	3.2	2.7
Yellow-rumped Warbler	15	8	4	39	66	2.9	1.8	1.2	2.4	2.2
Common Raven	9	6	8	41	64	1.7	1.3	2.4	2.5	2.2
Least Flycatcher	23	19	6	16	64	4.5	4.2	1.8	1.0	2.2
Ruby-crowned Kinglet	11	3	1	48	63	2.1	0.7	0.3	2.9	2.1
Magnolia Warbler	6	14	13	27	60	1.2	3.1	4.0	1.6	2.0
Bay-breasted Warbler	11	5	1	27	44	2.1	1.1	0.3	1.6	1.5
Mourning Warbler	9	16	7	9	41	1.7	3.5	2.1	0.5	1.4
Ovenbird	10	14	6	9	39	1.9	3.1	1.8	0.5	1.3
Ovenbird	6	8	3	16	33	1.2	1.8	0.9	1.0	1.1
Total of top 20 species	373	393	277	1409	2452	72.3	86.0	84.5	85.9	83.3
Total of all species	516	457	328	1641	2942	100.0	100.0	100.0	100.0	100.0

See *Species at Risk* for results of nocturnal/crepuscular surveys for eastern whip-poor-will and common nighthawk and SAR songbirds.


Figure 24. Swainson's thrush nest and eggs (left) and territorial male black-throated blue warbler observed June 2020 in the Marathon Palladium Project study area.

6.3.1 Waterfowl

As in previous years, very few waterfowl species or individuals were observed in the LSA. Based on field observations, the small waterbodies provide suitable breeding habitat for hooded merganser and common goldeneye (fledged young observed) and may for ring-necked duck, mallard, common merganser, and red-breasted merganser (pairs observed). To qualify as significant waterfowl nesting habit as per the draft Ecoregion 3W, three or more nesting pairs of waterfowl must nest within 120 m of a >0.5 ha wetland or a cluster of three or more small (<0.5 ha) wetlands. Based on field observations to date, it is unlikely this threshold is met in the SSA

The lack of open fields, wild rice (*Zizania palustris*), and large marshes limits the value of the LSA for migrating waterfowl. In Ecodistrict 3W, the significance threshold for significant aquatic waterfowl stopover and staging areas is 100+ waterfowl on 7+ days, or use by ruddy duck, canvasback, trumpeter swan, or tundra swan (OMNRF 2017). That use threshold is unlikely to be met on any of the LSA waterbodies due to their small size, and there is no evidence of use by the latter four species.

6.3.2 Marsh Birds

Marsh birds are relatively rare in the LSA. No marsh birds such as pied-billed grebe, American bittern, sora, or Virginia rail were heard during targeted surveys or 434 deployment-nights of acoustic recorders in 2020, despite the presence of calling anurans and songbirds that indicate suitable survey conditions. Wetlands in the LSA are limited in area and diversity (see Appendix 2), and available evidence suggests the LSA supports a low density of marsh birds that depend upon these habitats. A great blue heron was reported previously in the LSA, but none were observed in 2020.

To qualify as significant marsh breeding habitat in Ecoregion 3W (OMNRF 2017) there must be:

a) at breeding pair of trumpeter swan, yellow rail, or black tern

or

b) five or more breeding pairs of other marsh species i.e., green-winged teal, northern shoveler, pied-billed grebe, red-necked grebe, Virginia rail, sora, American bittern, sedge wren, marsh wren, ring-necked duck, common loon, spotted sandpiper, or sandhill crane.

None of the waterbodies or wetlands in the LSA are likely to meet this significance criterion, since only the last four species have been observed in the LSA during 2008-2010 and 2020 fieldwork, and not in sufficient numbers. The suitable marsh habitat is limited the LSA to small wetlands capable of supporting relatively few breeding pairs of any one these species.

6.3.3 Raptors

As in previous years, very few raptors and no raptor nests were observed in 2020. The LSA does potentially provide suitable nesting habitat at least for broad-winged hawk and red-tailed hawk, which were observed in 2020, as well as northern goshawk and sharp-shinned hawk, which have been reported nearby in the RSA. Habitat within 25m to 400 m (depending on species) of an occupied raptor nest is considered significant wildlife habitat (OMNRF 2017).

6.3.4 Colonial Nesting Birds

As in previous years, there was no evidence at the Project of colonial-nesting birds such as great blue heron, Bonaparte's gull, or terns. There is potentially suitable treed habitat, particularly along or near the margins of small lakes, but no evidence of use by great blue herons or Bonaparte's gulls. Low-lying islets suitable for nesting common terns are limited and there are no large hemi-marshes that would potentially support breeding black terns (see SAR). There are no banks suitable for colonial-nesting bank swallows or bridges for cliff swallows or barn swallows (see SAR).

6.3.5 Shorebirds

Shorebirds were uncommon in the LSA in 2020 and previously, with just a few common species observed. Suitable breeding habitat exists for a few shorebird species such as solitary sandpiper, spotted sandpiper, and killdeer.

There is no significant wildlife habitat for shorebird migratory stopover areas in the LSA. No seasonally flooded fields, open sandy shoreline habitat, or extensive mudflats or marshes are present. Shoreline habitat is limited and use is likely to be far less than criterion for significance of 1000 shorebird use-days during spring or fall migration (OMNRF 2017).

6.3.6 Game Birds

The LSA does provide suitable breeding habitat for upland game birds including ruffed grouse and spruce grouse, which may be of significance to Indigenous communities. Fledged young of both species were observed in 2020. Sharp-tailed grouse are not present in the LSA due to the lack of suitable habitat such as large open peatlands, cutovers, or fields.

6.4 Mammals

At least 24 species of mammals have been confirmed using the Marathon Palladium Project study area in, including 13 new species in 2020 that had not previously documented for the Project study area (Appendix 11). Seven species of mammals were observed on the trail cameras deployed in the Marathon Palladium Project study area (Table 9); the remaining mammal species were recorded on acoustic recorders or observed opportunistically during June-August fieldwork in 2020. Approximately 60 species of mammals are known to have occurred in the Thunder Bay District (TBFN 2018), and additional mammal species typical of the southern boreal forest (e.g., Eder 2012; Kurta 2017; Naughton 2012) likely use the study area but were not detected during past of 2020 fieldwork, in particular insectivores and rodents.

Little Brown Myotis and Northern Myotis were detected in the Project study area in 2020. No evidence of woodland caribou was observed in 2020. See *Species at Risk* for a discussion of these species. No additional mammal SAR are expected to be present based on available habitat, known ranges, and similar surveys conducted in the RSA (Foster 2019).

Details of individual wildlife sightings captured on trail cameras are presented in Appendix 12 with representative photos from individual trail cameras in Appendix 13. Of the 1208 photos taken by the trail cameras in 2020, wildlife were present in 214 photos (17% of total). Since trail cameras were set to take three photos per triggering event, these photos represented 82 triggering events[7], which captured photos of 78 animals passing by the cameras. Multiple wolves were sometimes caught during a single triggering event.

Grey wolf (*Canis lupus occidentalis*) were the most observed species on trail cameras, followed by black bear (*Ursus americanus*) and moose (*Alces alces*). Sign (scat, tracks) of wolf and moose were widespread across the study area along roads and trails, as that of bear and evidence of their foraging e.g., ripped-apart logs and flipped-over rocks. Single bears and moose were also observed at close quarters while conducting fieldwork. Based on location of sightings, as well as colour and size of observed individuals, the LSA overlaps the home range of at least one pack of wolves two or more adults and three pups in 2020. The study area is suitable moose habitat as it has abundant mountain maple (*Acer spicatum*) and other preferred moose browse, in addition to late winter thermal cover and small waterbodies that provide thermal relief in summer as well as submergents that are be an important seasonal source of dietary calcium for moose. No mineral licks in the LSA were observed during fieldwork or were identified by OMNRF during recent forest management planning for the Pic Forest, nor were any mammal dens.

Of note were three trail camera observations of white-tailed deer at two locations in the southern portion of the study area; no deer were observed in previous fieldwork (although trail cameras were not deployed in 2007-2010).

Table 9. Summary of wildlife observed on 1208 photos taken in 2020 at the Project site with trail cameras.

Species	Trail Camera							Total # Wildlife Individuals	Total # Wildlife Photos
	3a	3b	6a	7a	7b	8a	8b		
American marten	-	-	-	-	-	1	-	**1**	**1**
beaver	-	-	-	-	1	-	-	**1**	**3**
black bear	2	2	1		3	3	5	**16**	**44**
grey wolf	3	5	9	16	12	-	-	**45**	**111**
moose	8	-	4	1	-	1	-	**14**	**42**
sandhill crane	-	-	-	-	1	-	-	**1**	**3**
snowshoe hare	-	-	-	-	-	1	-	**1**	**3**
white-tailed deer	-	1	-	-	2	-	-	**3**	**7**
Total # Wildlife Individuals	**13**	**8**	**14**	**17**	**19**	**6**	**5**	**82**	**-**
Total # Wildlife Photos	**36**	**21**	**38**	**47**	**44**	**14**	**14**	**-**	**214**
Total # All Photos	**93**	**51**	**202**	**116**	**238**	**402**	**106**	**-**	**-**

[7] passes referred to a single triggering event when an animal(s) passed in front of trail camera or other disturbance (e.g., wind, human); 3 photos will have been taken and wildlife may be in 0-3 of them (depending on rate of travel)

6.4.1 Bats

A total of six bat species were recorded using acoustic recorders at 12 locations during 434 deployment-nights of survey effort in June-August on the GenPGM Project study area (Table 10, Appendix 15). Over 4400 passes were recorded, with the most bat activity along the shore of waterbody L8 (Table 10). Passes by hoary bat were by far the most numerous, followed by two other migratory species silver-haired bat and red bat. In comparison, the species that overwinter in northern Ontario, particularly the two SAR Myotis that are most affected by white-nose syndrome, were the least numerous. Caution must be used when interpreting this acoustic data, since each pass represents a vocalizing bat that passed within 30-50 m of the recorder, and are not absolute abundance data i.e., number of individuals using an area. The data do provide an index of relative abundance and temporal use in the LSA.

Very few bats were detected during the three nocturnal surveys along the main access road in 2020 (Appendix 8), with one small *Myotis* sp. Seen on the June 6 survey near the northern part of the LSA, and two hoary bats and one little brown myotis detected acoustically on the July 7 survey.

See *Species at Risk* for further discussion of Little Brown Myotis and Northern Myotis, both of which are listed as Endangered federally and provincially.

Table 10. Total number of passes by each bat species at acoustic recorders deployed in the GenPGM study area, June-August 2020.

Unit #	Location	Big Brown Bat	Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Northern Myotis	All Spp. Total
1a	in rock barren overlooking Malpa L.	22	21	61	35	10		149
1b	on shore of lake L12	3	19	156	38	21		237
2a	on shore of lake L16		39	4	59	2		104
2b	along shore of Two Duck Lake (L11)	9	228	141	69	48		495
3a	along shore of lake L8	16	30	1613	199	40		1898
3b	in valley along main access road	13	39	333	139	60		584
4a	in meadow marsh along stream S63	2	12	239	48	7		308
5a	along shore of lake L26		146		111	3		260
5b	along transmission line ROW		85	1	3			89
6a	along transmission line ROW		4					4
7a	along shore of lake L14	24	3	4	1	11		43
7b	in clearing at radio antenna			2				2
8a	in meadow marsh along stream S15		11	245	23	36	1	316
	Total	**89**	**637**	**2799**	**725**	**238**	**1**	**4489**

7 UPDATED SPECIES AT RISK VECS

At least 32 federal or provincial species at risk have ranges that broadly overlap the Project study area (Table 11). Of these, potentially suitable habitat occurs for about 15 species, and 10 species have been confirmed in the SSA or LSA. Several other species have been found in the RSA and may potentially have suitable habitat in the LSA or SSA, but whose presence has not been confirmed. Their absence may be the results of a) the habitat appearing suitable but is actually not suitable, b) the habitat is suitable but is unoccupied for other unknown reasons, c) or the species were present but not detected, or d) other undetermined reasons. SAR that have been confirmed from the SSA or LSA or are present in the LSA and have apparently suitable habitat in the LSA/SSA are discussed in detail below. Locations of SAR observed in the Project study area from 2007-2010 and 2020 are shown in Figure 25 and Figure 29. Details of 2007-2010 and 2020 species at risk observations are provided in Appendix 4.

Fish species at risk (e.g., lake sturgeon, native lampreys) are discussed separately in aquatic reports (Ecometrix 2012, 2020).

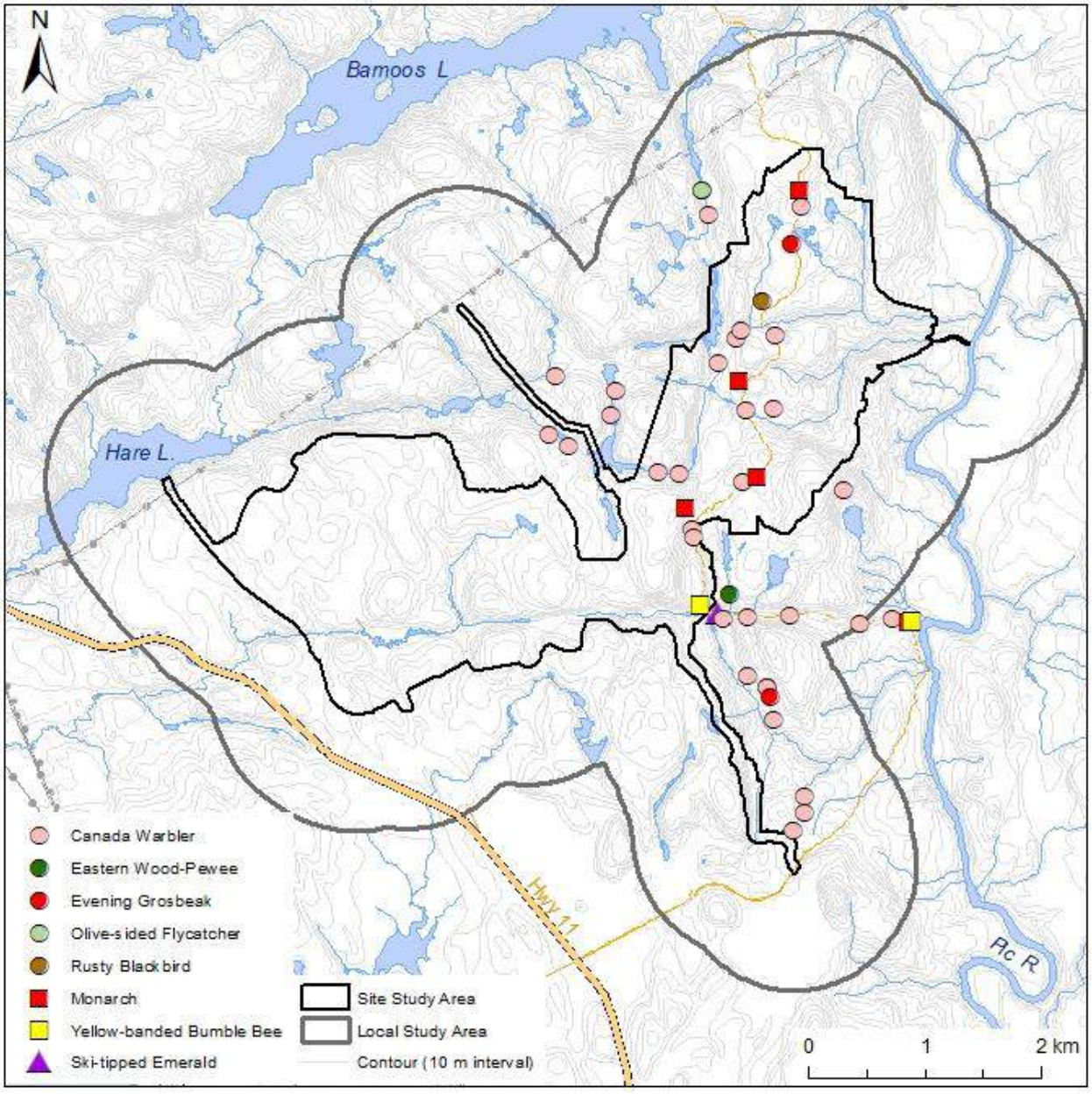

Figure 25. Location of ski-tailed emerald (S3) as well as bird and insect species at risk observed in the Marathon Palladium Project study area, 2007-2010 and 2020.

Table 11. Summary of confirmed, potential, and excluded species at risk at the Marathon Palladium study area.

Common Name	Scientific Name	SARO	COSEWIC	Within Range	Potential Habitat	Confirmed	Distribution/Habitat Notes
Mammals							
American Badger (Northwestern population)	*Taxidea taxus taxus*	END	SC	N	N	-	Project is 600+ km from nearest known populations in Ontario (Rainy River area)
Woodland Caribou (Boreal population)	*Rangifer tarandus pop. 14*	THR	THR	Y	Y	-	Within range and potential habitat at or near Project
Eastern cougar	*Puma concolor couguar*	END	DD	N	-	-	No confirmed extant populations in northwestern Ontario
Eastern Small-footed Myotis	*Myotis leibii*	END		N	-	-	Project is 200+ km from nearest known populations south of Wawa
Eastern Wolf	*Canis lupus lycaon*	THR	THR	N	-	-	nearest confirmed population is 400+ km east of Sault. St. Marie
Gray Fox	*Urocyon cinereoargenteus*	THR	THR	N	N	-	Project is 300+ km from nearest known populations at Thunder Bay
Little Brown Myotis	*Myotis lucifugus*	END	END	Y	Y	Y	Confirmed presence in Project study area
Northern Myotis	*Myotis septentrionalis*	END	END	Y	Y	Y	Confirmed presence at Project
Birds							
American White Pelican	*Pelecanus erythrorhynchos*	THR	NAR	Y	N	-	Within broad range but no suitable nesting habitat (i.e., remote islands) at or near Project
Bald Eagle	*Haliaeetus leucocephalus*	SC	NAR	Y	Y	Y	Observed once in the LSA but no evidence of nesting at or near Project
Bank Swallow	*Riparia riparia*	THR	THR	Y	N	-	Within range but no suitable nesting habitat (silty-sandy bluffs or banks) at or near Project
Barn Swallow	*Hirundo rustica*	THR	THR	Y	N	-	Within range but limited suitable nesting habitat at or near Project and no evidence of use
Black Tern	*Chlidonias niger*	SC	NAR	Y	N	-	Within range but no suitable nesting habitat (i.e., large emergent marshes) at or near Project
Bobolink	*Dolichonyx oryzivorus*	THR	THR	Y	N	-	Project is 200+ km from nearest known populations in Dorion - Thunder Bay; suitable grassland habitat lacking at or near Project
Buff-breasted Sandpiper	*Calidris subruficollis*	DD	SC*	Y(M)	N	-	Within potential range for migrants but not suitable nesting habitat at or near Project
Canada Warbler	*Cardellina canadensis*	SC	THR	Y	Y	Y	Confirmed current use of Project by nesting individuals
Chimney Swift	*Chaetura pelagica*	THR	THR	Y	N	-	Project is 200+ km from nearest known populations in Wawa or Thunder Bay; no anthropogenic structures or suitable nesting habitat (large-diameter snags) present at or near Project

Common Name	Scientific Name	SARO	COSEWIC	Within Range	Potential Habitat	Confirmed	Distribution/Habitat Notes
Common Nighthawk	*Chordeiles minor*	SC	SC	Y	Y	-	Within range and potential habitat at Project but no evidence of use
Eastern Meadowlark	*Sturnella magna*	THR	THR	N	N	-	Project is 400+ km from nearest known populations near Sault St. Marie; suitable grassland habitat lacking at or near Project
Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	Y	Y	-	Within range and potential habitat but no evidence of use
Eastern Wood-Pewee	*Contopus virens*	SC	SC	Y	Y	Y	Confirmed recent use of the Project
Evening Grosbeak	*Coccothraustes vespertinus*	SC	SC	Y	Y	Y	Confirmed use but no evidence of nesting at or near Project
Golden Eagle	*Aquila chrysaetos*	END	NAR	Y(M)	Y	-	Within potential range for migrants but historic or current evidence of use
Golden-winged Warbler	*Vermivora chrysoptera*	SC	THR	N	-	-	Project is 250+ km from nearest known populations in Ontario (Rainy River area) or Manitoba
Horned Grebe	*Podiceps auritus*	SC	SC	Y(M)	N	-	Within potential range for migrants but Project is 700+ km from nearest known breeding population near Rainy River
Hudsonian Godwit	*Limosa haemastica*		THR*	C	N	-	Within potential range for migrants but not suitable nesting habitat at or near Project
Least Bittern	*Ixobrychus exilis*	THR	THR	N	N	-	Project is 400+ km from nearest known populations near Sault St. Marie
Loggerhead Shrike	*Lanius ludovicianus*	END	END	N	N	-	Project is 700+ km from nearest known populations in Ontario (Rainy River area)
Olive-sided Flycatcher	*Contopus cooperi*	SC	THR	Y	Y	Y	Confirmed recent use of the Project
Peregrine Falcon	*Falco peregrinus*	SC	NAR	Y	Y	-	Within range and potentially suitable nesting habitat (i.e., cliffs) at Project but no evidence of use
Piping Plover	*Charadrius melodus*	END	END	Y	N	-	Project at northern edge of range but no suitable habitat (large beaches) at or near Project
Red Knot	*Calidris canutus*	END	END	Y(M)	N	-	Within potential range for migrants but not suitable nesting habitat at or near Project
Red-headed Woodpecker	*Melanerpes erythrocephalus*	SC	END	N	N	-	Project is 500+ km from nearest known breeding populations in Ontario (Rainy River area or Manitoulin I.)
Red-necked Phalarope	*Phalaropus lobatus*	SC	SC	Y(M)	N	-	Within potential range for migrants but not suitable nesting habitat at or near Project
Rusty Blackbird	*Euphagus carolinus*	NAR	SC	Y	Y	Y	Confirmed past use of Project
Short-eared Owl	*Asio flammeus*	SC	SC	Y(M)	N	-	Within potential range for migrants but no suitable nesting habitat, nor historic or current evidence of use at or near Project

Common Name	Scientific Name	SARO	COSEWIC	Within Range	Potential Habitat	Confirmed	Distribution/Habitat Notes
Yellow Rail	*Coturnicops noveboracensis*	SC	SC	Y	N	-	Within range but no suitable nesting habitat (i.e., large marshes or fens) at or near Project
Reptiles & Amphibians							
Common Snapping Turtle	*Chelydra serpentina*	SC	SC	Y	N	-	Project is at edge of range but limited potential habitat (productive marshes) and no evidence of use
Insects							
Aweme Borer Moth	*Papaipema aweme*	END	END	Y	N	-	Within broad range and but no suitable large rich fen habitat at or near Project
Gypsy Cuckoo Bumble Bee	*Bombus bohemicus*	END	END	N	-	-	No confirmed extant records in northwestern Ontario
Monarch	*Danaus plexippus*	SC	END	Y	N	Y	Project is 200+ km from nearest known populations in Ontario or Manitoba (vagrants may stray farther north) and outside known range of larval host plant (milkweed)
Rusty-patched Bumble Bee	*Bombus affinis*	END	END	N			No confirmed extant records in northwestern Ontario
Yellow-banded Bumble Bee	*Bombus terricola*	SC	SC	Y	Y	Y	Confirmed current use of the Project
Plants							
Black Ash	*Fraxinus nigra*		THR	Y	Y	-	Project is within broad range but none observed on site, and rich lowland habitat is limited at or near Project
Pitcher's Thistle	*Cirsium pitcheri*	THR	SC*	N	N	-	Project at northern edge of range but no suitable habitat (large beaches) at or near Project
Fungi							
Flooded Jellyskin	*Leptogium rivulare*	NAR	SC*	Y	N	-	Project is within broad range but lacks host ash trees

*assessed by COSEWIC but not added to Schedule 1 of SARA

7.1 Plant SAR

Black ash is the only federally or provincially assessed plant SAR[8] that has potential to occur in the SSA or LSA. Despite targeting suitable habitats, no black ash were observed in the Project study area in 2007-2010, and none were observed in 2020. No stands in the FRI for the Project area list black ash as a species component i.e., if present, it has less than 10% canopy cover. There are only a few black ash records along the north shore of Lake Superior between Nipigon and Sault Ste. Marie, and again, none in the Project area (COSEWIC 2018a, Figure 3). Throughout its range, including the RSA, the primary threat to black is the invasive emerald ash borer (*Agrilus planipennis*)(COSEWIC 2018a).

7.2 Insect SAR

7.2.1 Monarch

No monarchs were observed during 2007-2010 fieldwork. However, at least 15 monarchs were observed on July 7-8, 2020 along the main access road through the Project. These individuals likely represent the 2nd or 3rd generation of migrating adults (COSEWIC 2016b), including females that are in search of suitable milkweed plants upon which oviposit. Milkweeds (*Asclepias* spp.) are the obligate host plants of larval monarchs (COSEWIC 2016b), and no milkweeds have been observed at the Project during surveys in 2020 and previously in 2007-2010 (monarch were listed as Special Concern at the time).

Only two species of milkweed are found in the Thunder Bay District (TBFN 2015) that could potentially serve as food plants for monarch larvae. Common milkweed (*A. incarnata*) is the most common species in the Thunder Bay District, but existing occurrences appears to be largely of anthropogenic origin along roadsides, railways, gravel pits, and deliberate plantings such as gardens (Foster pers. obs.; iNaturalist 2020). Swamp milkweed (*A. incarnata*) is rare in the District and localized to a few locations southwest of Thunder Bay. Due to the lack of milkweed, the Project LSA is unsuitable habitat for this species to complete its life cycle, although adults may nectar on wildflowers, particularly along roadsides.

Figure 26. Yellow banded bumblebee (left) and monarch (right) observed roadside at the Marathon Palladium Project in July 2020.

[8] Black ash has been assessed as Threatened by COSEWIC but has not been added to Schedule 1 of the SARA; its status has not been assessed provincially

7.2.2 Yellow-banded Bumblebee

A least 5 yellow-banded bumblebees (Figure 26) were observed in June-August, 2020 foraging for nectar and/or pollen on wildflowers such as goldenroads (*Solidago* spp.) along the main access road through the Marathon Palladium Project SSA and LSA (Figure 25). Although listed as Special Concern due to apparent declines in abundance in parts of its range (COSEWIC 2015), recent targeted bumblebees surveys in northwestern Ontario (Harris et al. 2019), have indicated that the species is not uncommon along roadsides in much of northwestern Ontario.

7.3 Reptile and Amphibian SAR

7.3.1 Common Snapping Turtle

There is no evidence of use of the Project SSA by common snapping turtles. No snapping turtles were observed during 2020 field surveys nor in 2007-2010 field surveys that also searched numerous waterbodies in June-August. No turtles were observed either by fisheries survey crews either that sampled the waterbodies of the LSA during 2009-2011(Ecometrix Inc. 2012). No turtles were observed in 10 waterbodies to the north and west of Bamoos lake during SAR and fisheries surveys during June-August 2017 (Foster 2019). Although the Project area was barely sampled, no snapping turtles were observed during 64 person-days (June 30 to September 9) of targeted herpetofaunal surveys in 2005 along the north shore of Lake Superior from Schreiber to White Lake (Harris and Foster 2006)(Figure 28). There are only two documented records for this species along the north shore of Lake Superior between Nipigon and Wawa (Figure 27), and those two records are known or probable introductions outside the species' natural range (COSEWIC 2008).

Several other lines of evidence suggest that the LSA is not used by snapping turtles. Cooler temperatures and fewer growing degree-days (GDD)(Figure 28) near the northeast shore Lake Superior may be limiting for some species of reptiles, including turtles (McKenney et al. 1998). The low number of growing degree-days may limit snapping turtles by impairing the development of incubating embryos (COSEWIC 2008; Primeau 2001). The inability of hatchlings to overwinter successfully in the nest is probably a major factor limiting the northern distribution of the common snapping turtle (Obbard and Brooks 1981).

Although snapping turtles can tolerate a broad range of aquatic habitats, their preferred habitat is shallow lakes or slow-moving water with a soft mud bottom and dense aquatic vegetation (COSWIC 2008; Environment Climate Change Canada; Harding 2006). This habitat is generally lacking at the Project, as the wetlands in the LSA are predominantly small (<3 ha) seasonally-flooded meadow marshes or shore fens on small beaver-controlled waterbodies (see *5.1.2 Wetlands*). Although snapping turtles have been observed using rocky streams to move between waterbodies (COSEWIC 200), steep topography may limit potential access to the LSA by snapping turtles from potentially suitable habitat in the Pic River (where there are no documented records either

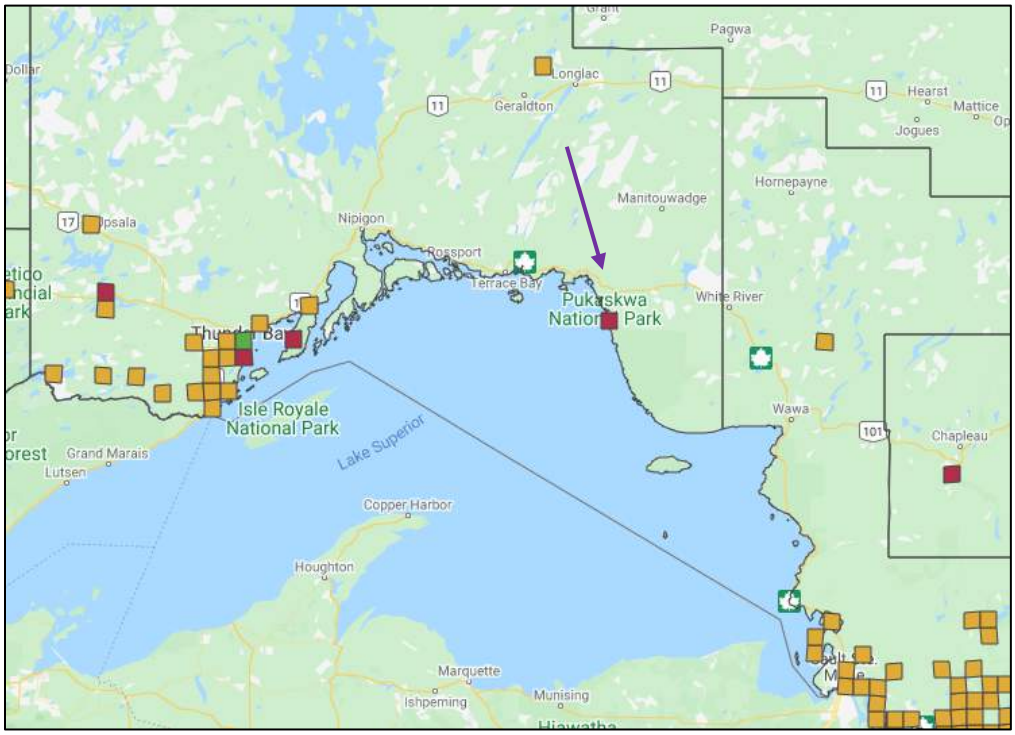

Figure 27. Snapping turtle records along the north shore of Lake Superior (Ontario Nature 2019). Purple arrow denotes general location of the Marathon Palladium Project.

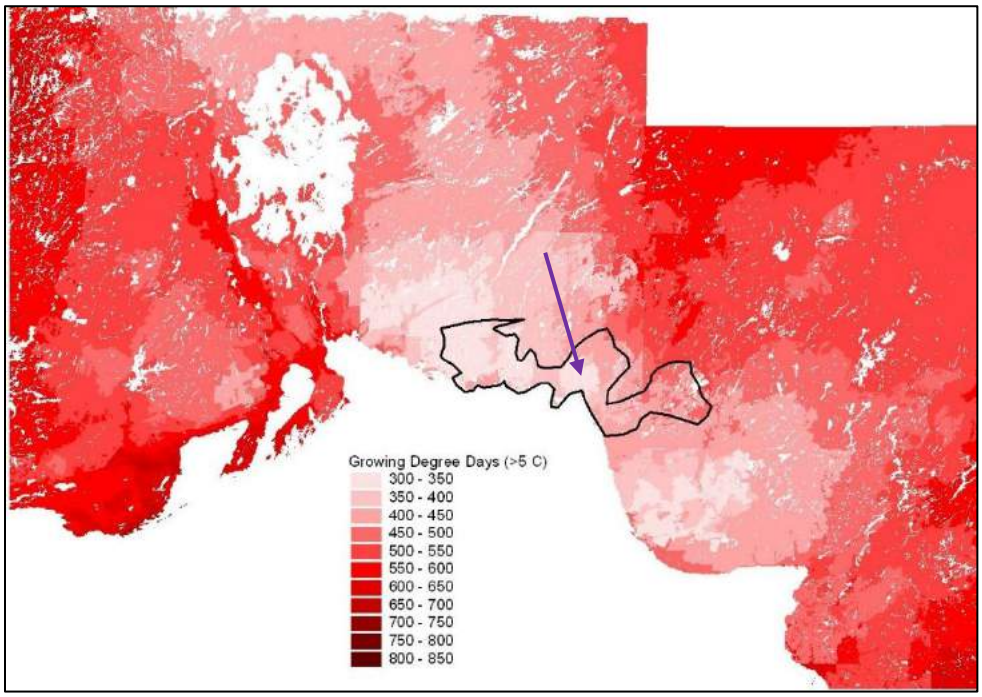

Figure 28. Growing degree days along the north shore of Lake Superior. Purple arrow denotes general location of the Marathon Palladium Project. Black outline denotes herpetofaunal survey area for Harris and Foster (2006b).

7.4 Bird SAR

7.4.1 Eastern Whip-poor-will

Despite relatively good survey conditions (Table 1) and calling activity from other nocturnal bird species and amphibians no eastern whip-poor-will were heard or seen during the three 2020 roadside surveys (Appendix 8). No whip-poor-will were any detected on 434 deployment-nights of acoustic recorders in 2020 (Table 2). Given that calling eastern whip-poor-will can be heard for up to 500 m under good conditions and as far as 1 km under ideal conditions (OMNRF 2013), there was good survey coverage of potentially suitable habitat in the Project SSA (Figure 4).

No eastern whip-poor-wills were found during a single June 14, 2011 survey by Ecometrix (IR 23.4.2) or during another roadside survey in 2013 and remote deployments of acoustic recorders at four remote sites in the LSA (Harris and Foster 2013). The Marathon airport and large gravel pit opposite were also surveyed on June 6, 2020 as a comparison – no eastern whip-poor-wills were heard. No eBird (2020) or iNaturalist (2020) records for this species have been documented for the Marathon area. Finally, no eastern whip-poor-will were detected on two acoustic recorders deployed during June-August, 2017 north and west of Bamoos Lake (Foster 2019). The nearest documented records for eastern whip-poor-will are approximately 80 km east of the Project from a regenerating cutover west of Dayohessarah Lake near White River (Foster 2018a,b).

It may be that the infrequency of ideal survey conditions at the Project area (Appendix 14) due to low ambient temperatures, wind, cloud cover, and lake-associated fog that may reduce whip-poor-will calling activity, may also be indicative of lower habitat suitability in the LSA for this species, both from an acoustic environment perspective but also prey availability. Based on available evidence it appears that eastern whip-poor-will do not use the Marathon Palladium Project LSA.

7.4.2 Common Nighthawk

As with eastern whip-poor-will, no common nighthawk were heard or seen during the three roadside 2020 surveys (Appendix 8), nor were any detected on 434 deployment-nights of acoustic recorders in 2020 (Table 2). Similarly, no common nighthawk were found during a single 2011 survey by Ecometrix (IR 23.4.2) or during another roadside survey in 2013 by Northern Bioscience, nor during the remote deployments of acoustic recorders at four remote sites in the LSA in 2013. The Marathon airport and large gravel pit opposite were also surveyed on June 6, 2020 as a comparison – no common nighthawks were heard.

Common nighthawk have been observed in the Marathon area however, including a 2011 observation within the RSA (just south of the LSA) near the gravel pit along the main access road 1.8 km north of Highway 17 (eBird 2020). Although no common nighthawks were observed in 2008 or 2009, this species was tallied once (1998) in the Breeding Bird Survey south of the study area. It may be an uncommon nesting species in the LSA, since it prefers open bedrock ridges, burns, and cutovers as nesting habitat (COSEWIC 2018b).

7.4.3 Canada Warbler

Canada warbler is a common nesting species in birch-dominated mixedwood forest in the study area and was observed at 16 locations (including 13 point counts) in the LSA in 2020. This species was often detected in previous fieldwork at the Project site as well, with 17 individuals observed during SAR encounter surveys and an additional five birds heard on four point counts (Harris and Foster 2012). During 2017 SAR surveys in the RSA to the north and west of the Project (Foster 2019), Canada warblers were observed at 33 locations and were the 11th most abundant bird species during point counts (Foster

2019). Canada warblers were also recorded every year of 23 years of Breeding Bird Survey south of the study area (1976 to 2004) with a maximum count of 15 in 1985 (Harris and Foster 2012).

7.4.4 Rusty Blackbird

No rusty blackbirds were detected in the Project LSA in 2020. However, a family group (adults with fledged young) was observed in 2009 along the shoreline of waterbody L16 in Project SSA (Harris and Foster 2009). Rusty blackbirds were observed in 2017 at five locations along lakeshores and streams in the RSA to the north and west of the Project LSA (Foster 2019). This species typically breeds in conifer swamps and other forested wetlands, often along streams and beaver ponds (Francis 2007). There is suitable breeding habitat in the Marathon Palladium Project LSA, although it may not be occupied, at least not in all years the surveys were completed.

7.4.5 Olive-sided Flycatcher

No olive-sided flycatchers were detected in the Project LSA in 2020. A single olive-sided flycatcher was seen in 2009 on the shore of a small lake southeast of Bamoos Lake outside the current SSA (Harris and Foster 2009). Olive-sided flycatchers were observed at several locations near open areas (wetlands, trails) in the RSA to the west and north of the Project in 2017 (Foster 2019). This species was reported on 2 years (1979 and 1980) of 23 years of Breeding Bird Surveys south of the study area (Harris and Foster 2012). Conifer forests with snags or other suitable perches adjacent to open areas for hawking insects is the preferred habitat for this species in Ontario (Cadman et al. 2007; Environment Canada 2016c). There is likely suitable breeding habitat in the Marathon Palladium Project LSA, although it may not be occupied, at least not in all years the surveys were completed.

7.4.6 Evening Grosbeak

The evening grosbeak was not considered a SAR during the initial baseline study and were only recently assessed as Special Concern by COSEWIC (2016), and thereafter by Ontario. No evening grosbeaks were observed during 2020 fieldwork, but single individuals were observed in the Project LSA during point counts in both 2008 and 2009 (Harris and Foster 2012). Neither individual was a singling male, so it is not known they were successful breeders. Evening grosbeaks are socially monogamous and not territorial during the breeding season (Cornell Lab of Ornithology 2019; COSEWIC 2016a).

In Ontario, this species breeds primarily in open, mature mixedwood forests with a high proportion of balsam fir and white spruce ((Cadman et al. 2007). Their distribution and abundance varies across their range, as this species moves large distances in response to the availability of food sources, particularly outbreaks of spruce budworm (*Choristoneura fumiferana*), its main food source during the breeding season (COSEWIC 2016a). They are also nomadic during the winter in response to cone, berry, and seed crops. No recent spruce budworm outbreaks are known from the Project area, and although the LSA may provide potentially suitable breeding habitat for evening grosbeaks, but it may not be occupied, at least not in all years the surveys were completed.

7.4.7 Eastern Wood-Pewee

No eastern wood-pewees were detected in the Project LSA in 2020. A single eastern wood-pewee was heard on a point count in the Project LSA in 2010 (Harris and Foster 2012), but the species had not yet been federally or provincially listed as a SAR. In 2017, two male eastern wood-pewee were heard singing along the edge of mixedwood forest in the RSA to the west of the Project.

This species prefers gaps and edges of deciduous and mixedwood forests (COSEWIC 2012; MacLaren 2007; Watt et al. 2018), which are abundant in Project LSA. Although this species is relatively uncommon along the north shore of Lake Superior (MacLaren 2017; eBird 2018), there is potentially suitable breeding habitat in the Marathon Palladium Project LSA. It may not always be occupied however, due to factors other than habitat suitability.

7.4.8 Bald Eagle

No bald eagles were observed during 2020 fieldwork. Bald eagles are not known to nest in the study area. No nests or birds were observed in 2009-2010 fieldwork (Harris and Foster 2009; IR # 23.4.4), although a single adult was observed near the Marathon Airport in 2008 (Golder Associates Ltd 2009). None were reported in 23 years of Breeding Bird Surveys along Highway 17 at the south edge of the study area (Harris and Foster 2012). OMNRF data show the nearest nest bald eagle nest at about 11 km north of the study area. This species is apparently an uncommon nesting species in the Marathon area, although it is observed fairly frequently in the Marathon area (eBird 2020). A single flying eagle was observed over Bamoos Lake during 2017 fieldwork, as well as a smaller unnamed lake to the west (Foster 2019). Based on the limited data available, modest but increasing numbers of Bald Eagles are present at Marathon and on the lower Pic River in the fall and early winter, which reflect Ontario's growing Bald Eagle population (IR# 23.4.4).

7.4.9 Peregrine Falcon

No peregrine falcons were observed in the study area in 2020 or previously. OMNR data shows the nearest nest location about 8 km west of the study area. An aerial survey in March 2009 found four potential nesting cliffs just outside the study area (Harris and Foster 2009), but a follow-up aerial survey in June found no evidence of nesting on the cliffs. Cliff habitat within the study area were classified as "marginal" habitat value (cliff faces less than 15 m high and less than 100 m long (B. Ratcliff pers. comm.).

7.5 Mammals SAR

7.5.1 Northern Myotis and Little Brown Myotis

No roosting bats, maternity colonies, or suitable large diameter trees with cavities were observed during 2020 fieldwork. Approximately 37 km of roost tree transect were surveyed in the RSA in 2020, of which 21.6 km was in the LSA. Assuming a survey transect width of approximately 6 m i.e., suitable roost trees 3 m on either side of the observer can be detected, then approximately 22 ha in total were surveyed. Of this, 13 ha were surveyed in the LSA, which represents approximately 1.2% of the LSA.

During the summer, nursing females of Little Brown Myotis and Northern Myotis aggregate in colonies dozens to thousands of individuals (depending on the species) in warm locations usually in or around buildings, but also tree cavities, exfoliating bark, cracks and crevices in cliffs. Northern Myotis, which typically have smaller colonies, switch maternity roosts every several days, carrying their non-volant young with them (Naughton 2012). During the summer, non-nursing bats roost singly or in groups during the day and at night when not foraging. Depending on the species, roost sites can include hidden amongst foliage in trees, under boulders, in tree cavities, caves, rock crevices, and buildings; some roosting habitat may be therefore present but undetected in the Project LSA.

Based on the results of the acoustic monitoring, the study area provides foraging habitat for little brown myotis, particularly near waterbodies and forest openings (e.g., trails). The continued presence of little brown myotis detected at recorders throughout much of the late spring and summer monitoring period at

multiple locations suggest that the LSA also provides roosting habitat for males or non-breeding females. However, it is not known any of these passes detected represent breeding female little brown myotis (sex cannot be determined from the acoustic recordings). No anthropogenic structures are present in the LSA that represent what is now typical maternity colony for this species, but the presence of natural maternity roost(s) cannot be ruled out. Northern myotis are more likely to use natural maternity roosts in suitable trees, but only one of the 4000+ recorded passes was tentatively[9] identified as northern myotis, on August 9 at Recorder 8a (Appendix 15). This lack of activity suggests that there is little if any use of the LSA by northern myotis.

Little brown myotis and northern myotis typically hibernate in abandoned mine shafts or caves (Naughton 2012). No mine adits or natural caves were observed during 2020 fieldwork, nor have any been observed during previous fieldwork nor are any indicated for the LSA in the Ministry of Northern Development and Mines' Abandoned Mine Information System (OMNDM 2020). Little brown myotis migrate up to 1000 km between summer ranges and winter hibernacula (Naughton 2012), so their presence during the summer does not necessarily indicate the presence of hibernacula at or near the Project site. Movement of approximately 50 km from summer range and hibernacula have also been documented for northern myotis (Naughton 2012). White-nose syndrome is the main reason for the decline in these two species, with the fungus responsible having been reported from locations near the study such as Terrace Bay, Wawa, and Thunder Bay (OMNRF 2015a).

[9] sonograms for this species can be difficult to differentiate from little brown myotis

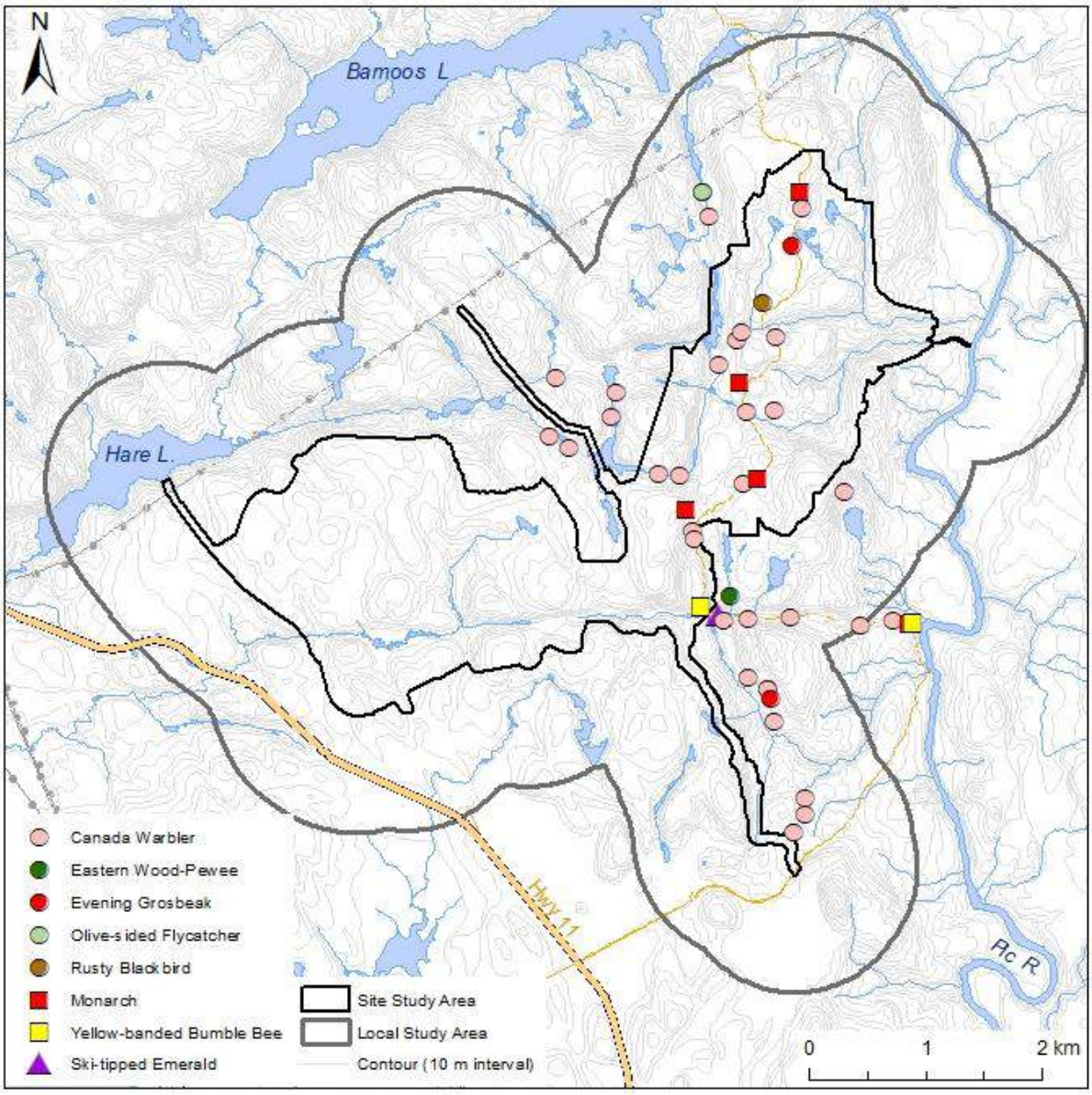

Figure 29. Number of passes of little brown myotis at each acoustic recorder deployment at the Marathon Palladium Project study area in 2020.

Woodland Caribou

Woodland caribou and their habitat were initially discussed in the 2009 baseline report (Harris and Foster 2009; SID #24) followed by a more in-depth analysis (Foster and Harris, SID #26). Caribou habitat models were subsequently updated in 2013 based on newly available forest resource inventory (FRI) in IR #23.1 Fragmentation and Woodland Caribou. There have been no changes to available caribou habitat models, as these are the same models currently used by OMNRF for forest management planning in the Coastal Range. However, the Project layout has been modified in the interim and therefore the shape of the SSA has changed, with concomitant changes in the amount of potential caribou habitat directly affected by the Project. In addition, MECP has recently updated caribou habitat categorization in the Lake Superior Coastal Range (including the Project area) based on the MRNF (2013) general habitat description (GHD) for woodland caribou.

No caribou or evidence of their presence (e.g., tracks, pellets, lichen cratering, bones) were observed during 2020 fieldwork. A review of available information provided by MECP/NHIC/MNRF indicates no observations of caribou in or near the Project SSA either.

Available evidence suggests that the current population in the LSA i.e., the mainland Coastal Range west of Pukaskwa National Park is lower that the estimate suggested in SID #24. Since 2013, there have been four aerial surveys in the mainly Lake Superior Coastal range and nearshore islands for woodland caribou as well as potential predators and alternate prey (i.e., wolves, moose, and white-tailed deer). These surveys, two by Northern Bioscience (Foster 20013, 2020), one by OMNRF (Shuter et al. 2018, and another by Michipicoten First Nation (no report available), all used generally similar methodologies with transects spaced 1 km apart and running perpendicular to the Lake Superior shoreline at least the width of the Coastal Range i.e., 10 km. Only one caribou total (on Detention Island in Neys Provincial Park), was observed on these four surveys in 2003, 2004, 2019, and 2020. On each survey, tracks of small groups (3-4 animals) of caribou were observed at several different locations. Based on modelling of detection distances caribou and moose tracks during their 2016 survey, Shuter et al. (2018) estimated there were 55 caribou (95% confidence intervals of 13-227) in the mainland Coastal Range and a minimum animal estimate (MAE) of 10 caribou. No other population estimate is available from OMNRF/MECP for the Lake Superior Coastal Range nor formal range assessment conducted, despite the provincial commitment in the 2008 Caribou Conservation Plan (OMNRF 2008) to conduct range assessments (including population estimates) for each range every five years.

Within the Project's caribou RSA, i.e., the Lake Superior Coastal Range, the overall caribou population has dramatically declined since 2013 due to wolves crossing over to both the Slate Islands and Michipicoten Island via ice bridges in 2014 (OMNRF 2018). As a result, the caribou populations on the Slate Island declined from approximately 100 in 2009 (Carr et al. 2012) to just several animals at most in 2017 (OMNRF 2018). An estimated 450 caribou in the fall of 2014 on Michipicoten Island in the fall declined to less than 116 animals by the fall of 2016, leading OMNRF to translocate six caribou (2 bulls, 4 cows) individuals to Caribou Island and nine caribou (1 bull; 8 cows) to the Slates Islands[10] during the early winter of 2018 (OMNRF 2018). No caribou are believed to now persist on Michipicoten Island. Apparently, some of the translocated caribou have given birth (G. Eason pers. comm.) but there are still less than 25-40 animals on offshore islands (Slate Is., Michipicoten I., Caribou I.) within the Lake Superior Coastal Range currently compared to approximately 500-600 caribou a decade ago.

[10] where they joined two surviving bulls

8 INDIGENOUS VECS

Generation PGM Inc. understands the importance of plants, fungi, and wildlife to Indigenous communities through information sharing during the consultation process. Project-specific Indigenous Traditional Knowledge (ITK) studies have been considered in Project planning including, baseline studies, alternatives assessment approach, mitigation, and monitoring, where appropriate. However, only non-confidential ITK is presented in the Final EIS/EA, where applicable to the Project, to respect the preferences of First Nations and Métis communities. I.R. #15.2 addresses specific plant species and use for traditional purposes by Indigenous communities.

Table 12 provides annotated list of plant and fungi species (e.g., Figure 30) identified as having traditional value or interest to First Nations and Métis communities, updated based on 2020 field observations. An updated annotated list of wildlife species of interest to Indigenous communities (e.g., Figure 31) is provided in Table 13. These annotated species lists have been compiled from Project-specific ITK studies and consultation input, current to 2013 and may need further review. Information on species of interest are often considered confidential and therefore detailed information is not provided in the table below.

Figure 30. Bunchberry (left) and bog cranberry (right) are plant species of interest to Indigenous communities.

Figure 31. Ruffed grouse (left) and moose (right) observed at the Project are wildlife species of interest to Indigenous communities.

Table 12. Plant species of interest to Indigenous communities.

Group	Common Name	*Scientific Name*	GenPGM Presence	Notes
Herbaceous	Agrimony	*Agrimonia striata*	?	found in Thunder Bay District in a variety of wooded and edge habitats
Herbaceous	Bear Root	*Ligusticum porteri*	N	not found in northern Ontario
Herbaceous	Bedstraw	*Galium spp.*	Y	several species at Project in a variety of forest and wetland habitats
Herbaceous	Bracken Fern	*Pteridium aquilinum*	Y	fairly widespread at Project in open habitats
Herbaceous	Bunch Berries	*Cornus canadensis*	Y	abundant
Herbaceous	Catalpa	*Catalpa spp.*	N	not found in northern Ontario
Herbaceous	Cattails	*Typha latifolia, T. angustifolia*	Y	present, but generally not very abundant in marshes and riparian areas at Project
Herbaceous	Chamomile	*Tripleurospermum inodorum*	?	non-native species observed along roadsides
Herbaceous	Chanterelles	*Cantharellus spp.*	?	mushroom found along north shore of Lake Superior; may be present at Project
Herbaceous	Cinnamon Fern	*Osmunda cinnamonea*	?	found along north shore of Lake Superior; may be present at Project
Herbaceous	Clover	*Trifolium spp.*	Y	several non-native species abundant along roads and trails
Herbaceous	Coltsfoot	*Petasites spp.*	?	found along north shore of Lake Superior; may be present at Project
Herbaceous	Dandelion	*Taraxacum officinale*	Y	non-native species widedly distributed in disturbed areas at Project
Herbaceous	Golden Rod	*Solidago spp.*	Y	widespread, most abundant along roads and trails, but some in wetlands
Herbaceous	Gooseberries	*Ribes spp.*	Y	present at Project in a variety of habitats depending on species
Herbaceous	Grasses	various	Y	present at Project in a variety of habitats depending on species
Herbaceous	Greater Celandine	*Chelidonium majus*	N	non-native species, not found in northern Ontario
Herbaceous	Horse Tail	*Equisetum* spp.	Y	several species; widespread at Project
Herbaceous	Horseradish	*Armoracia rusticana*	N	non-native species not found in northern Ontario
Herbaceous	Lamb's Quarters	*Chenopodium album*	Y	non-native species found in disturbed areas at Project

Group	Common Name	*Scientific Name*	GenPGM Presence	Notes
Herbaceous	Leeks	*Allium tricoccum*	N	not observed at Project and not known from Thunder Bay Judicial District
Herbaceous	Lichen	multiple species		widespread at Project
Herbaceous	Lung Wart [Lungwort]	*Pulmonaria officinalis*	N	not observed at Project and not known from Thunder Bay Judicial District
Herbaceous	Mallow	*Malva* spp.	N	non-native species not observed at Project
Herbaceous	Milkweed	*Asclepias* spp.	N	not found at Project; few records along north shore
Herbaceous	Mint	*Mentha arvensis*	Y	present at Project in wetlands
Herbaceous	Morels	*Morchella*	?	not observed but may be present at Project
Herbaceous	Moss	various	Y	present at Project in a variety of habitats depending on species
Herbaceous	Ostrich Fern / Fiddleheads	*Matteuccia struthiopteris*	Y	local at Project in moist depressions
Herbaceous	Peatland		Y	small occurences presnt at Project; see Vegetation Communities
Herbaceous	Plantain	*Plantago major*	Y	non-native species found in disturbed areas at Project
Herbaceous	Puffball	*various*	Y	not observed at Project but likely present
Herbaceous	Red-Rooted Pigweed	*Amaranthus retroflexus*	N	non-native species not observed at Project
Herbaceous	Rhubarb	*Rheum rhabarbarum*	N	non-native species not observed at Project; associated with habitation
Herbaceous	Royal Fern	*Osmunda regalis*	?	not observed at Project but may be present
Herbaceous	Sage	*Salvia officinalis*	N	non-native species not observed at Project
Herbaceous	Sedges	*Carex* spp.	Y	numerous species widespread at Project in a range of habitats
Herbaceous	Shaggy Mane	*Coprinus comatus*	?	not observed at Project but may be present
Herbaceous	Sheperds Purse	*Capsella bursa-pastoris*	?	non-native species not observed at Project but may be present in disturbed habitats
Herbaceous	Stinging Nettle	*Urtica dioica*	?	present at project in on rich, moist soils such as wetlands and beaver dams
Herbaceous	Strawberries	*Fragaria virginiana*	Y	widespread at Project particularly in open areas
Herbaceous	Sweetgrass	*Anthoxanthum hirtum*	?	not observed at Project but may be present

Group	Common Name	*Scientific Name*	GenPGM Presence	Notes
Non-Woody	Wild Mushrooms	various	Y	various in forested habitats mainly
Non-Woody	Wild Onions	*Allium* spp.	N	not found at Project
Non-Woody	Wild Potatoes	*Solanum* spp.	N	not found at Project or along northern shore of Lake Superior
Non-Woody	Wild Strawberries	*Fragaria virginiana*	Y	present at Project, partcularly along trails and forest openings
Non-Woody	Wild Thyme	*Thymus* sp.	N	non-native species not observed at Project
Non-Woody	Wood Sorrell	*Oxalis montana*	Y	present at Project in mixedwoods
Non-Woody	Yarrow	*Achillea millefolium*	Y	non-native species widespread at Project in disturbed habitats
Shrub	Comfrey	*Symphytum officinale*	N	non-native species not observed at Project
Shrubs	Alder	*Alnus incana, A. crispa*	Y	both species present; speckled alder is fairly widespread along riparian areas; green alder is patchier in upland habitats
Shrubs	Bare Berry	*Arctostaphylos uva-ursi*	Y	found in rock barrens and other dry open habitats at Project
Shrubs	Beaked Hazel	*Corylus cornuta*	Y	fairly widespread in understory on well-drained sites
Shrubs	Bilberry	*Vaccinium uligonosum*	?	found on north shore of Lake Superior; may be present at Project
Shrubs	Blackberries	*Rubus sp.*	N	not found on north shore of Lake Superior, although other raspberries (*Rubus spp.*) are known from the Project
Shrubs	Blueberries	*Vaccinium angustifolium, V. myrtilloides*	Y	two species found at Project; most abundant in rock barrens
Shrubs	Bog Cranberry	*Vaccinium oxycoccos*	Y	local in nutrient-poor peatlands at Project, particularly around waterbodies
Shrubs	Choke Cherry	*Prunus virginiana*	?	found along north shore of Lake Superior; may be present at Project
Shrubs	Elderberry	*Sambucus racemosa*	Y	fairly widespread at project
Shrubs	Gray Birch	*Betula populifolia*	N	not found in northern Ontario
Shrubs	Hazelnut	*Corydalus cornuta*	Y	present at site in upland habitats
Shrubs	Highbush Cranberries	*Viburnum trilobum*	Y	present at site in a variety of habitats
Shrubs	Labrador Tea	*Rhododendron groenlandicum*	Y	wetspread at Project, particularly in swamps and other wetlands
Shrubs	Mountain Ash	*Sorbus* spp.	Y	fairly widespread at Project

Group	Common Name	*Scientific Name*	GenPGM Presence	Notes
Shrubs	Raspberries	*Rubus idaeaus*	Y	widespread at Project, particularly in open areas such as roadsides
Shrubs	Red Osier Dogwood	*Cornus sericea*	Y	widespread at Project, particularly on rich, moist soils
Shrubs	Red Willow	*?*	?	see Willow
Shrubs	Rosehip	*Rosa acicularis*	Y	present at Project, mainly in upland habitats
Shrubs	Saskatoon Berries	*Amerlanchier* spp.	Y	present at Project, mainly in upland habitats
Shrubs	Speckled Alder	*Alnus incana*	Y	widespread at Project in wetland and riparian habitats
Shrubs	Sumac	*Rhus glabra*	N	not present at Project, and no records between Nipigon and White River
Shrubs	Swamp Birch	*Betula pumila*	Y	present at the Project in peatlands
Shrubs	Wild Choke Berries	*Prunus virginiana*	Y	present at Project, mainly in upland habitats
Shrubs	Willow	*Salix* spp.	Y	multiple species found in a range of habitats from wetlands to forest
Trees	American Chestnut	*Castanea dentata*	N	not found in northern Ontario
Trees	Amur Maple	*Acer*	N	non-native species; not found in natural habitats in northern Ontario
Trees	Apple Tree	*Malus sp.*	N	non-native species; not found in natural habitats in northern Ontario
Trees	Balsam fir seeds	*Abies balsamea*	Y	widespread at Project
Trees	Basswood	*Tilia americana*	N	not found on north shore of Lake Superior
Trees	Birch	*Betula spp.*	Y	several species abundant at Project in a variety of forest and wetland habitats
Trees	Black Ash	*Fraxinus nigra*	N	none observed at Project site; does exist in northern Ontario
Trees	Black Cherry	*Prunus serotina*	N	not found in northern Ontario
Trees	Black Maple	*Acer nigrum*	N	not found in northern Ontario
Trees	Black Spruce	*Picea mariana*	Y	found in wetland and upland habitats at Project
Trees	Black Walnut	*Juglans nigra*	N	not found in northern Ontario
Trees	Butternut	*Juglans cinerea*	N	not found in northern Ontario
Trees	Cedar	*Thuja occidentalis*	Y	widespread but not abundant at Project; in swamps and wet to moist fine-textured soils near Pic R.
Trees	Hickory	*Carya* spp.	N	not found in northern Ontario
Trees	Horse Chestnut	*Aesculus glabra*	N	not found in northern Ontario

Group	Common Name	*Scientific Name*	GenPGM Presence	Notes
Trees	Jack Pine	*Pinus banksiana*	N	not found at Project although occurs near Marathon
Trees	Manitoba Maple	*Acer negundo*	N	no natural occurrences along north shore of Lake Superior
Trees	Mountain Maple	*Acer spicatum*	Y	widespread at the Project, particularly in rich, moist soils
Trees	Norway Maple	*Acer platanoides*	N	no natural occurrences along north shore of Lake Superior
Trees	Paper Birch	*Betula papyrifera*		
Trees	Pine	*Pinus*	N	none observed at Project, although present along north shore of Lake Supeior
Trees	Poplar [Trembling Aspen, Balsam Poplar]	*Populus tremuloides, P. balsamea*	Y	widespread at project in upland areas, and localized at Project in lowland areas respectively
Trees	Prehistoric Woods?	*?*	?	unknown
Trees	Red Maple	*Acer rubrum*	N	not present at Project although scattered occurrences along north shore of Lake Superior
Trees	Red Oak	*Quercus rubra*	N	not found in along the north shore of Lake Superior
Trees	Red Pine	*Pinus resinosa*	N	not present at Project; uncommon along the north shore of Lake Superior between Nipigon and White River
Trees	Silver Maple	*Acer saccharinum*		not found in northern Ontario
Trees	Striped Maple	*Acer pensylvanicum*	N	not found in northern Ontario
Trees	Sugar Maple	*Acer saccharum*	N	not found in along the north shore of Lake Superior between Thunder Bay and White River
Trees	Sycamore	*Platanus* spp.	N	not found in northern Ontario
Trees	Tamarack	*Larix laricina*	Y	found at project in peatlands
Trees	White Ash	*Fraxinus*	N	not found in northern Ontario
Trees	White Pine	*Pinus strubus*	N	not present at Project; uncommon along the north shore of Lake Superior between Nipigon and White River
Trees	White Spruce	*Picea glauca*	Y	widespread at Project
Trees	Yellow Birch	*Betula alleghaniensis*	N	not found in along the north shore of Lake Superior between Thunder Bay and White River

Table 13. Wildlife species of interest to Indigenous communities.

Group	Common Name	Scientific Name	GenPGM Presence	Notes
Bird	Bald Eagle	*Haliaeetus leucocephalus*	N	not observed at Project but known from adjacent areas
Bird	Black Duck	*Anas rubripes*	N	not observed at Project but known from adjacent areas
Bird	Black Tern	*Chlidonias niger*	N	not observed at Project and no suitable breeding habitat
Bird	Blackbird	*Euphagus carolinus*	Y	observed at Project along shore of small lake
Bird	Black-chinned Hummingbird	*Archilochus alexandri*	N	not found in Ontario
Bird	Blue Jay	*Cyanocitta cristata*	Y	observed at Project in forested habitats
Bird	Broad-billed Hummingbird	*Cynanthus latirostris*	N	not found in Ontario
Bird	Broad-winged Hawk	*Buteo platypterus*	Y	observed at Project
Bird	Canada Goose / Goose	*Branta canadensis*	Y	observed at Project on waterbodies
Bird	Canada Warbler	*Cardellina canadensis*	Y	observed at Project in shrubby mixedwoods
Bird	Common Loon	*Gavia immer*	Y	observed at Project
Bird	Common Nighthawk	*Chordeiles minor*	N	no evidence of use at Project despite targeted surveys
Bird	Crow	*Corvus brachyrhynchos*	Y	widespread at Project
Bird	Duck		Y	a few species present on waterbodies
Bird	Ferruginous Hawk	*Buteo regalis*	N	not found in Ontario
Bird	Golden Eagle	*Aquila chrysaetos*	Y	might pass through only in migration
Bird	Gulls [Herring, Ring-billed]	*Larus spp.*	Y	observed at Project flying overhead
Bird	Killdeer	*Charadrius vociferus*	Y	observed at Project in open areas
Bird	Mallard Duck	*Anas platyrhynchos*	Y	observed at Project on waterbodies
Bird	Mourning Dove	*Zenaida macroura*	N	not observed at project, but known from open areas near Marathon
Bird	Olive-sided Flycatcher	*Contopus cooperi*	Y	observed in forested habitat at Project
Bird	Papasay (woodpecker)	*various*	Y	widespread at Project
Bird	Partridge / Ruffed Grouse	*Bonasa umbellus*	Y	observed at Project in mixedwood habitats and along trails/roads

Group	Common Name	Scientific Name	GenPGM Presence	Notes
Bird	Peregrine Falcon	*Falco peregrinus*	N	not observed; no evidence of nesting
Bird	Pheasants	*Phasianus colchicus*	N	non-native species not found in northern Ontario
Bird	Piping Plover	*Charadrius melodus*	N	not observed and no suitable habitat
Bird	Raven	*Corvus corax*	Y	widespread at Project
Bird	Red-shouldered Hawk	*Buteo lineatus*	N	not found on north shore of Lake Superior north of Wawa
Bird	Red-tailed Hawk	*Buteo jamaicensis*	Y	observed at Project
Bird	Rough-legged Hawk	*Buteo lagopus*	N	might pass through only in migration
Bird	Ruby-throated Hummingbird	*Archilochus colubris*	Y	observed at Project
Bird	Rufous Hummingbird	*Selasphorus rufus*	N	not found in Ontario
Bird	Sandpiper [Spotted]	*Actitis macularius*	Y	observed at Project along lakeshores
Bird	Short-eared Owl	*Asio flammeus*	N	might pass through only in migration; no suitable breeding habitat
Bird	Songbirds		Y	various
Bird	Srpuce Grouse	*Falcipennis canadensis*	Y	observed at Project in conifer-dominated habitats
Bird	Swainson's Hawk	*Buteo swainsoni*	N	not found in Ontario
Bird	Turkey Vultures	*Cathartes aura*	Y	observed at Project
Bird	Whip-poor-will	*Caprimulgus vociferus*	N	no evidence of use at Project despite targeted surveys
Bird	Whiskey Jack [Canada Jay]	*Perisoreus canadensis*	Y	observed at Project
Bird	Wild Turkey	*Meleagris gallopavo*	N	not found in northern Ontario
Mammal	Beaver	*Castor canadensis*	Y	widespread on waterbodies at Project
Mammal	Black Bear	*Ursus americanus*	Y	widespread at Project
Mammal	Bobcat	*Lynx rufus*	N	few confirmed records along north shore of Lake Superior
Mammal	Chipmunk [Easter, Least]	*Neotamias minimus, Tamias striatus*	Y	both species observed at Project
Mammal	Coyote	*Canis latrans*	unknown	not observed at Project, but may occur
Mammal	Elk	*Cervus elaphus*	N	not found on north shore of Lake Superior
Mammal	Ermine / Weasel	*Mustela erminea*	?	not observed at Project, but likely occurs

Group	Common Name	Scientific Name	GenPGM Presence	Notes
Mammal	Fisher	*Pekania pennanti*	?	not observed at Project, but likely occurs
Mammal	Fox / Red Fox	*Vulpes vulpes*	Y	observed at Project
Mammal	Hare / Rabbit [Snowshoe Hare]	*Lepus americanus*	Y	widespread at Project
Mammal	Lynx	*Lynx canadensis*	Y	observed at Project
Mammal	Marten	*Martes americana*	Y	observed at Project
Mammal	Mink	*Neovison vison*	Y	observed at Project
Mammal	Moose	*Alces americanus*	Y	widespread at Project
Mammal	Mountain Lion [Cougar]	*Puma concolor*	N	no confirmed records along north shore of Lake Superior
Mammal	Muskrat	*Ondatra zibethicus*	?	not observed at Project, but may occur
Mammal	Northern Brown Bat [Northern Myotis]	*Myotis septentrionalis*	?	one tentative recording; may occur at Project
Mammal	Otter	*Lontra canadensis*	N	observed at Project in waterbody
Mammal	Porcupine	*Erethizon dorsatum*	Y	observed at Project
Mammal	Racoon	*Procyon lotor*	N	few confirmed records along north shore of Lake Superior
Mammal	Skunk	*Mephitis mephitis*	?	not observed at Project, but may occur
Mammal	Small Footed Brown Bat	*Myotis leibii*	N	outside Ontario range
Mammal	Squirrel [Red Squirrel]	*Tamiasciurus hudsonicus*	Y	widespread at Project
Mammal	White-tailed Deer	*Odocoileus virginianus*	Y	observed at Project
Mammal	Wolf	*Canis lupus*	Y	widespread at Project
Mammal	Wolverine	*Gulo gulo*	N	no confirmed records along north shore of Lake Superior
Mammal	Woodland Caribou	*Rangifer tarandus*	N	no evidence of current use of Project
Other	Crayfish	*Orchonectes virilis*	?	observed at Project
Other	Honey Bee	*Apis mellifera*	?	non-native species; not observed at Project, but may occur
Reptile or Amphibian	American Toad	*Anaxyrus americanus*	Y	widespread at Project
Reptile or Amphibian	Blue-spotted Salamander	*Ambystoma laterale*	?	not observed at Project, but may occur
Reptile or Amphibian	Boreal Chorus Frog	*Pseudacris maculata*	Y	observed at Project

Group	Common Name	Scientific Name	GenPGM Presence	Notes
Reptile or Amphibian	Eastern Gartersnake / Snakes	*Thamnophis sirtalis*	Y	observed at Project
Reptile or Amphibian	Eastern Red Striped Salamander	*?*	-	perhaps red-backed salamander?
Reptile or Amphibian	Eastern Red-backed Salamander	*Plethodon cinereus*	Y	observed at Project
Reptile or Amphibian	Four Toed Salamander	*Hemidactylium scutatum*	N	outside Ontario range
Reptile or Amphibian	Green Frog	*Lithobates clamitans*	Y	widespread at Project
Reptile or Amphibian	Mink Frog	*Lithobates septentrionalis*	Y	widespread at Project
Reptile or Amphibian	Northern Leopard Frog	*Lithobates pipiens*	?	observed at Project
Reptile or Amphibian	Spotted Salamander	*Ambystoma maculatum*	?	not observed at Project, but may occur
Reptile or Amphibian	Spring Peeper	*Pseudacris crucifer*	Y	widespread at Project
Reptile or Amphibian	Tortoise	*?*	N	not found in Ontario
Reptile or Amphibian	Turtle [Painted, Snapping]	*Chrysemys picta, Chelydra serpentina*	N	not observed at Project
Reptile or Amphibian	Wood Frog	*Lithobates sylvaticus*	Y	widespread at Project

9 SUMMARY AND CONCLUSIONS

The original characterization of vegetation, wildlife, and species at risk in the Project study area included a desk top review of published and grey literature, databases, and other information sources. Fieldwork was conducted initially by Golder in 2007-2008, and by Northern Bioscience in 2009-2011. Generally, this information continues to be relevant and sufficient to support the updated effects assessment. Additional fieldwork and information review conducted in 2020 support the following refinements to our understanding of the distribution and abundance of these VECs at the project site:

- In the absence of significant natural disturbance, the vegetation communities have remained largely unchanged since 2013.
- No new rare plants species were detected during 2020 botanical surveys, although the list of known vascular plant species in the study area has been expanded, including some potentially invasive species.
- The presence of several significant insect species has been confirmed at the Project site, including SAR monarchs and yellow-banded bumble bees, and a provincially rare (S3) dragonfly.
- There have been no significant changes in the bird community, which is generally typical of mixedwood forest.
- No new bird SAR have been detected on the LSA or SSA, although a couple of species (eastern wood-pewee and evening grosbeak) previously detected at the Project present before have since been upgraded to SAR. The two other avian SAR (olive-sided flycatcher, rusty blackbird) previously found at the Project were not observed in 2020 despite increased survey effort. Habitat in the LSA remains potentially suitable for these four species but may be unoccupied for other reasons that habitat suitability.
- Canada warbler, a SAR, remains relatively common in the SSA and LSA in mixedwood forest with a dense understory of shrubs.
- The presence of little brown myotis and possibly northern myotis, both Endangered Bats, were confirmed in the Project study area. No suitable roost trees were observed, but the Project study area likely provides habitat for at least non-breeding individuals during the summer months. No hibernacula are present.
- Although trail cameras and field observation documented regular use of the Project study area by black bear, grey wolf, moose, and white-tailed deer, there was no evidence of use by woodland caribou. This SAR has declined significantly elsewhere in the coastal range since potential impacts of the Project were assessed for woodland caribou.

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Appendix 1. Location of morning point counts for the Marathon Palladium Project, 2008-2010 and 2020.

Point Count Code	Date	Observer[11]	Easting	Northing	# Visits in Different Years	# Visits in Same Year	Visit #	Main Tree Sp.[12]	Boreal Ecosite
PC-001-2020a	2020-06-05	RFF	549342	5403277	1	2	1	Bf	B014
PC-001-2020b	2020-07-07	BDR	549346	5403282	1	2	2	Bf	B014
PC-002-2020a	2020-06-05	RFF	548873	5403142	1	2	1	Bw	B055
PC-002-2020b	2020-07-07	BDR	548878	5403139	1	2	2	Bw	B055
PC-003-2020a	2020-06-05	RFF	548408	5403221	1	2	1	Bf	B052
PC-003-2020b	2020-07-07	RFF	548478	5403160	1	2	2	Sb	B065
PC-004-2020a	2020-06-05	RFF	547908	5403204	1	2	1	Bf	B052
PC-004-2020b	2020-07-07	RFF	548019	5403207	1	2	2	Bf	B052
PC-005-2020a	2020-06-05	RFF	547415	5403331	1	2	1	Bf	B052
PC-005-2020b	2020-07-07	RFF	547417	5403322	1	2	2		B047
PC-006-2020a	2020-06-05	RFF	547419	5403783	1	2	1	Bf	B052
PC-006-2020b	2020-07-07	BDR	547422	5403807	1	2	2	Bw	B055
PC-007-2020x	2020-06-05	RFF	547113	5404138	1	1	1	Bf	B052
PC-008-2020a	2020-06-06	RFF	548585	5403403	1	2	1	Sw	B052
PC-008-2020b	2020-07-07	BDR	548551	5403347	1	2	2	Sw	B052
PC-009-2020a	2020-06-06	RFF	548723	5403891	1	2	1	Sw	B052
PC-009-2020b	2020-07-07	BDR	548728	5403899	1	2	2	Sw	B052
PC-010-2020a	2020-06-06	RFF	548368	5404171	1	2	1	Bw	B055
PC-010-2020b	2020-07-07	BDR	548365	5404177	1	2	2	Bw	B055
PC-011-2020a	2020-06-06	RFF	548429	5404671	1	2	1	Bw	B055
PC-011-2020b	2020-07-07	BDR	548434	5404664	1	2	2	Bw	B055
PC-012-2020x	2020-06-06	RFF	548519	5403834	1	1	1	Sw	B052
PC-013-2020x	2020-06-06	RFF	548324	5403661	1	1	1	Sb	B065
PC-014-2020x	2020-06-06	RFF	547529	5402860	1	1	1		B142
PC-015-2020a	2020-06-07	RFF	550002	5403461	1	2	1	Bf	B052
PC-015-2020b	2020-07-10	RFF	550008	5403459	1	2	2	Bf	B052
PC-016-2020a	2020-06-07	RFF	550486	5403376	1	2	1	Bf	B052
PC-016-2020b	2020-07-10	RFF	550487	5403380	1	2	2	Bf	B052
PC-017-2020x	2020-06-07	RFF	550777	5403302	1	1	1	Bw	B016
PC-018-2020a	2020-06-07	RFF	550746	5403560	1	2	1	Bf	B014
PC-018-2020b	2020-07-10	RFF	550753	5403566	1	2	2	Bf	B014
PC-019-2020a	2020-06-07	RFF	550878	5403718	1	2	1	Bf	B014
PC-019-2020b	2020-07-10	RFF	550872	5403730	1	2	2	Bf	B014
PC-020-2020a	2020-06-08	RFF	549836	5404785	1	2	1		B047
PC-020-2020b	2020-07-10	RFF	549837	5404782	1	2	2		B047
PC-021-2020x	2020-06-08	RFF	550686	5406442	1	1	1	Bf	B014
PC-022-2009x	2009-06-20	RFF	549617	5403283	2	1	1	Bw	B055
PC-022-2020x	2020-06-08	RFF	550959	5406361	2	1	1	Sb	B012
PC-023-2020a	2020-06-08	RFF	550767	5406195	1	2	1		
PC-023-2020b	2020-07-10	BDR	550763	5406194	1	2	2		

[11] RFF=R.F. Foster; BDR=B.D. Ratcliff
[12] Bf=balsam fir; Bw=white birch; Pj=jack pine; Pt=trembling aspen; Sb=black spruce; Sw=white spruce

Point Count Code	Date	Observer[11]	Easting	Northing	# Visits in Different Years	# Visits in Same Year	Visit #	Main Tree Sp.[12]	Boreal Ecosite
PC-024-2009x	2009-06-20	BDR	550546	5406125	2	1	1	Bf	B067
PC-024-2020a	2020-06-08	RFF	550546	5406130	2	2	1	Bf	B067
PC-024-2020b	2020-07-09	RFF	550543	5406121	2	2	2	Bf	B067
PC-025-2020x	2020-06-08	RFF	550699	5406835	1	1	1	Bf	B014
PC-026-2009x	2009-06-20	RFF	550559	5406634	2	1	1	Bf	B067
PC-026-2020a	2020-06-08	RFF	550543	5406647	2	2	1	Bf	B067
PC-026-2020b	2020-07-09	BDR	550553	5406635	2	2	2	Bf	B067
PC-027-2009x	2009-06-20	BDR	550319	5405024	2	1	1	Bf	B067
PC-027-2020a	2020-06-08	RFF	550315	5405018	2	2	1	Bf	B067
PC-027-2020b	2020-07-09	BDR	550310	5405026	2	2	2	Bf	B067
PC-028-2020b	2020-07-09	RFF	550061	5404371	1	2	2	Sb	B050
PC-028-2020x	2020-06-08	RFF	550056	5404382	1	1	1	Bf	B067
PC-029-2020a	2020-06-05	BDR	549441	5403516	1	2	1	Sw	B014
PC-029-2020b	2020-07-07	RFF	549438	5403519	1	2	2	Sw	B014
PC-030-2020a	2020-06-05	BDR	549103	5403259	1	2	1	Bf	B014
PC-030-2020b	2020-07-07	RFF	549104	5403263	1	2	2	Bf	B014
PC-031-2020a	2020-06-05	BDR	548630	5403099	1	2	1	Bf	B052
PC-031-2020b	2020-07-07	RFF	548620	5403108	1	2	2	Bf	B052
PC-032-2020a	2020-06-05	BDR	548176	5403277	1	2	1	Bf	B052
PC-032-2020b	2020-07-07	BDR	548263	5403280	1	2	2	Bf	B052
PC-033-2020a	2020-06-05	BDR	547681	5403247	1	2	1	Bf	B052
PC-033-2020b	2020-07-07	BDR	547766	5403274	1	2	2	Bf	B052
PC-034-2020a	2020-06-05	BDR	547404	5403536	1	2	1	Sb	B065
PC-034-2020b	2020-07-07	RFF	547389	5403580	1	2	2	Sb	B065
PC-035-2020x	2020-06-05	BDR	547322	5404006	1	1	1	Bf	B052
PC-036-2020x	2020-06-05	BDR	546951	5404204	1	1	1	Bf	B052
PC-037-2020a	2020-06-06	BDR	548694	5403646	1	2	1	Bw	B055
PC-037-2020b	2020-07-07	RFF	548691	5403636	1	2	2	Bw	B055
PC-038-2020a	2020-06-06	BDR	548589	5404050	1	2	1	Bw	B055
PC-038-2020b	2020-07-07	RFF	548542	5404065	1	2	2	Bw	B055
PC-039-2020a	2020-06-06	BDR	548381	5404419	1	2	1	Bf	B052
PC-039-2020b	2020-07-07	RFF	548382	5404421	1	2	2	Bf	B052
PC-040-2020x	2020-06-06	BDR	548617	5404809	1	1	1	Bw	B055
PC-041-2020x	2020-06-06	BDR	548369	5403892	1	1	1	Bf	B052
PC-042-2020x	2020-06-06	BDR	548165	5403801	1	1	1	Bf	B014
PC-043-2020a	2020-06-06	BDR	547524	5403103	1	2	1	Bf	B052
PC-043-2020b	2020-07-07	BDR	547531	5403120	1	2	2	Bf	B052
PC-044-2009x	2009-06-20	BDR	550039	5403767	2	1	1	Bf	B052
PC-044-2020a	2020-06-07	BDR	549983	5403696	2	2	1	Bf	B052
PC-044-2020b	2020-07-09	RFF	550037	5403759	2	2	2	Bf	B052
PC-045-2020a	2020-06-07	BDR	550243	5403423	1	2	1	Bf	B052
PC-045-2020b	2020-07-10	BDR	550240	5403421	1	2	2	Bf	B052
PC-046-2020a	2020-06-07	BDR	550386	5403623	1	2	1	Bf	B052
PC-046-2020b	2020-07-10	BDR	550394	5403613	1	2	2	Bf	B052
PC-047-2020x	2020-06-07	BDR	550466	5403856	1	1	1	Bf	B014

Point Count Code	Date	Observer[11]	Easting	Northing	# Visits in Different Years	# Visits in Same Year	Visit #	Main Tree Sp.[12]	Boreal Ecosite
PC-048-2020a	2020-06-07	BDR	550657	5403805	1	2	1	Bf	B014
PC-048-2020b	2020-07-10	BDR	550665	5403800	1	2	2	Bf	B014
PC-049-2020a	2020-06-08	BDR	550013	5404633	1	2	1	Bf	B067
PC-049-2020b	2020-07-09	BDR	550030	5404626	1	2	2	Bf	B067
PC-050-2020a	2020-06-08	BDR	549697	5404581	1	2	1	Bw	B055
PC-050-2020b	2020-07-10	BDR	549698	5404589	1	2	2	Bw	B055
PC-051-2009x	2009-06-20	RFF	550703	5405686	2	1	1	Bf	B067
PC-051-2020x	2020-06-08	BDR	550702	5405688	2	1	1	Bf	B067
PC-052-2020x	2020-06-08	BDR	550817	5405926	1	1	1	Sb	B012
PC-053-2020x	2020-06-08	BDR	550943	5405712	1	1	1	Sb	B012
PC-054-2020x	2020-06-08	BDR	550840	5405492	1	1	1	Bw	B055
PC-055-2009x	2009-06-20	RFF	550516	5405519	2	1	1	Bf	B067
PC-055-2020a	2020-06-08	BDR	550517	5405523	2	2	1	Bf	B067
PC-055-2020b	2020-07-09	RFF	550516	5405520	2	2	2	Bf	B067
PC-056-2020x	2020-06-08	BDR	550459	5406865	1	1	1	Bf	B014
PC-057-2009x	2009-06-20	BDR	550218	5406784	3	1	1	Bf	B067
PC-057-2009x	2008-06-01	Golder	550220	5406811	3	1	1	Bf	B067
PC-057-2020a	2020-06-08	BDR	550219	5406786	3	2	1	Bf	B067
PC-057-2020b	2020-07-09	RFF	550237	5406772	3	2	2	Bf	B067
PC-058-2009x	2009-06-20	BDR	550176	5407055	2	1	1		
PC-058-2020a	2020-06-08	BDR	550176	5407056	2	2	1		
PC-058-2020b	2020-07-09	BDR	550174	5407048	2	2	2		
PC-059-2009x	2009-06-20	BDR	550466	5405811	2	1	1	Bf	B067
PC-059-2020a	2020-06-08	BDR	550458	5405812	2	2	1	Bf	B067
PC-059-2020b	2020-07-09	BDR	550461	5405814	2	2	2	Bf	B067
PC-060-2009x	2009-06-20	BDR	550245	5404767	2	1	1	Bf	B067
PC-060-2020a	2020-06-08	BDR	550240	5404776	2	2	1	Bf	B067
PC-060-2020b	2020-07-09	RFF	550238	5404774	2	2	2	Bf	B067
PC-061-2020x	2020-07-08	BDR	547328	5401473	1	1	1	Bw	B055
PC-062-2020x	2020-07-08	RFF	547125	5401585	1	1	1	Bw	B049
PC-063-2020x	2020-07-08	BDR	547115	5401840	1	1	1	Bw	B055
PC-064-2020x	2020-07-08	RFF	546955	5402046	1	1	1	Sb	B050
PC-065-2020x	2020-07-08	BDR	546988	5402301	1	1	1	Bw	B055
PC-066-2020x	2020-07-08	RFF	546790	5402429	1	1	1	Bf	B052
PC-067-2020x	2020-07-08	BDR	547208	5402416	1	1	1	Bf	B052
PC-068-2009x	2009-06-20	RFF	550319	5405276	2	1	1	Bf	B067
PC-068-2020x	2020-07-09	RFF	550282	5405257	2	1	1	Bf	B067
PC-069-2020x	2020-07-09	BDR	549730	5403525	1	1	1	Bw	B055
PC-070-2020x	2020-07-09	RFF	549603	5403311	1	1	1	Bw	B055
PC-071-2009x	2009-06-20	BDR	549693	5403025	2	1	1	Bw	B055
PC-071-2020x	2020-07-09	BDR	549693	5403023	2	1	1	Bw	B055
PC-072-2020x	2020-07-09	RFF	549670	5402695	1	1	1	Bw	B055
PC-073-2009x	2009-06-20	BDR	550069	5402613	2	1	1		B063
PC-073-2020x	2020-07-09	BDR	550084	5402605	2	1	1	Bf	B052
PC-074-2009x	2009-06-20	RFF	550446	5402602	2	1	1	Pt	B040

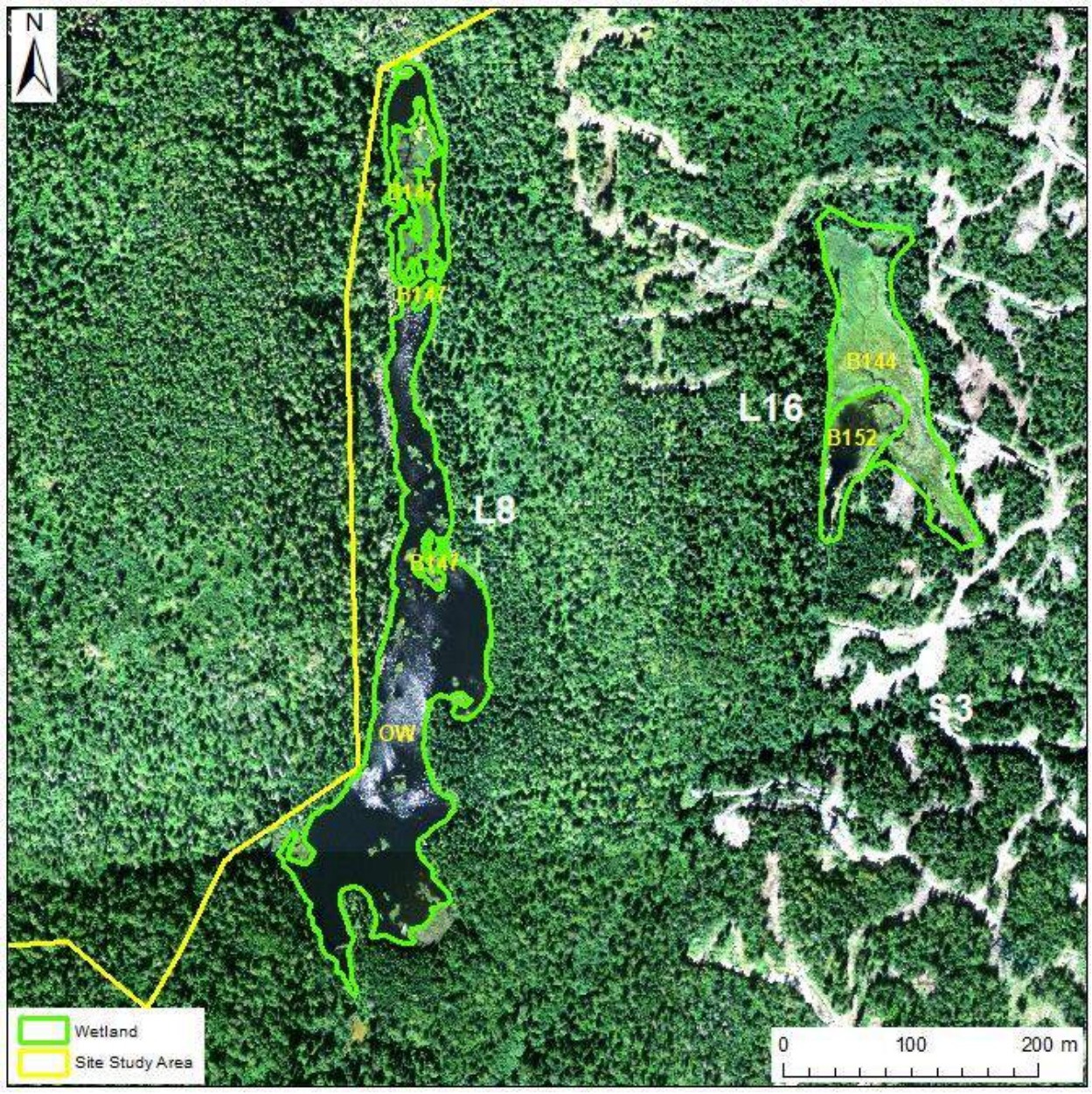
Point Count Code	Date	Observer[11]	Easting	Northing	# Visits in Different Years	# Visits in Same Year	Visit #	Main Tree Sp.[12]	Boreal Ecosite
PC-074-2020x	2020-07-09	RFF	550448	5402608	2	1	1	Pt	B040
PC-075-2009x	2009-06-20	BDR	550762	5402618	2	1	1	Pt	B055
PC-075-2020x	2020-07-09	BDR	550767	5402606	2	1	1	Pt	B055
PC-076-2008x	2008-06-01	Golder	551034	5402541	3	1	1	Pt	B055
PC-076-2009x	2009-06-21	BDR	551029	5402547	3	1	1	Pt	B055
PC-076-2020x	2020-07-09	RFF	551041	5402545	3	1	1	Pt	B055
PC-077-2009x	2009-06-21	BDR	551317	5402580	2	1	1	Pt	B055
PC-077-2020x	2020-07-09	BDR	551330	5402586	2	1	1	Pt	B055
PC-078-2020x	2020-07-09	BDR	550203	5404109	1	1	1	Bf	B052
PC-079-2020x	2020-07-09	BDR	550257	5403930	1	1	1	Bf	B052
PC-080-2009x	2009-06-20	RFF	550031	5402942	1	1	1	Bw	B055
PC-081-2009x	2009-06-20	RFF	549600	5403353	1	1	1	Bw	B055
PC-082-2009x	2009-06-20	RFF	550153	5404213	1	1	1	Bf	B052
PC-083-2009x	2009-06-20	RFF	550037	5404475	1	1	1	Bf	B067
PC-084-2009x	2009-06-20	RFF	550515	5406388	1	1	1	Bf	B067
PC-085-2009x	2009-06-20	RFF	550085	5407319	1	1	1	Bf	B067
PC-086-2009x	2009-06-20	RFF	550299	5404395	1	1	1	Bw	B055
PC-087-2009x	2009-06-20	RFF	550548	5404443	1	1	1	Bf	B067
PC-088-2009x	2009-06-20	RFF	550511	5404654	1	1	1	Sb	B012
PC-089-2009x	2009-06-20	RFF	550661	5404822	1	1	1	Bw	B055
PC-090-2009x	2009-06-20	BDR	550262	5403934	1	1	1	Bf	B052
PC-091-2009x	2009-06-21	BDR	550048	5404028	1	1	1	Bf	B052
PC-092-2009x	2009-06-21	BDR	549812	5403880	1	1	1	Bf	B052
PC-093-2009x	2009-06-21	BDR	549563	5403835	1	1	1	Bw	B050
PC-094-2009x	2009-06-21	BDR	549305	5403838	1	1	1	Bf	B052
PC-095-2010x	2010-06-01	RFF	550354	5400722	1	1	1	Bf	B052
PC-096-2010x	2010-06-01	RFF	550400	5400967	1	1	1	Bf	B052
PC-097-2010x	2010-06-01	RFF	550464	5401211	1	1	1	Bf	B052
PC-098-2010x	2010-06-01	RFF	550375	5401448	1	1	1	Bf	B052
PC-099-2010x	2010-06-01	RFF	550298	5401686	1	1	1	Bw	B055
PC-100-2010x	2010-06-01	RFF	550255	5401934	1	1	1	Bf	B052
PC-101-2010x	2010-06-01	RFF	550076	5402112	1	1	1	Bf	B052
PC-102-2010x	2010-06-01	RFF	549964	5402344	1	1	1	Bw	B055
PC-103-2010x	2010-06-01	RFF	549868	5402578	1	1	1	Bw	B055
PC-104-2010x	2010-06-01	RFF	549926	5402795	1	1	1	Bw	B055
PC-105-2010x	2010-06-01	RFF	550085	5402980	1	1	1	Bw	B055
PC-106-2010x	2010-06-01	BDR	550511	5400525	1	1	1	Bf	B052
PC-107-2010x	2010-06-01	BDR	550325	5400227	1	1	1	Bf	B052
PC-108-2010x	2010-06-01	BDR	549970	5400231	1	1	1	Bw	B055
PC-109-2010x	2010-06-01	BDR	547533	5398707	1	1	1		B197
PC-110-2010x	2010-06-01	BDR	547765	5398979	1	1	1		B197
PC-111-2010x	2010-06-01	BDR	548002	5399268	1	1	1		B197
PC-112-2010x	2010-06-01	BDR	548332	5399495	1	1	1		B197
PC-113-2010x	2010-06-01	BDR	548662	5399677	1	1	1		B197
PC-114-2010x	2010-06-01	BDR	548980	5399852	1	1	1	Sb	B050

Point Count Code	Date	Observer[11]	Easting	Northing	# Visits in Different Years	# Visits in Same Year	Visit #	Main Tree Sp.[12]	Boreal Ecosite
PC-115-2010x	2010-06-01	BDR	549377	5400057	1	1	1		
PC-116-2010x	2010-06-01	BDR	549659	5400267	1	1	1	Bw	B055
PC-117-2008x	2008-06-01	Golder	546620	5402809	1	1	1		B142
PC-118-2008x	2008-06-01	Golder	548230	5403503	1	1	1	Sb	B065
PC-119-2008x	2008-06-01	Golder	548035	5404536	1	1	1		B142
PC-120-2008x	2008-06-01	Golder	549040	5404375	1	1	1	Bf	B014
PC-121-2008x	2008-06-01	Golder	549112	5404882	1	1	1		B047
PC-122-2008x	2008-06-01	Golder	548700	5403834	1	1	1	Bw	B055
PC-123-2008x	2008-06-01	Golder	546347	5402202	1	1	1	Sb	B050
PC-124-2008x	2008-06-01	Golder	550982	5405985	1	1	1		B142
PC-125-2008x	2008-06-01	Golder	549630	5405853	1	1	1		B142
PC-126-2008x	2008-06-01	Golder	548527	5403456	1	1	1	Sw	B052
PC-127-2008x	2008-06-01	Golder	551498	5402613	1	1	1	Bw	B055
PC-128-2008x	2008-06-01	Golder	550353	5402622	1	1	1		B063
PC-129-2008x	2008-06-01	Golder	549698	5403053	1	1	1	Bw	B055
PC-130-2008x	2008-06-01	Golder	550260	5403930	1	1	1	Bf	B052
PC-131-2008x	2008-06-01	Golder	550129	5404351	1	1	1	Bf	B067
PC-132-2008x	2008-06-01	Golder	550391	5405082	1	1	1	Bf	B067
PC-133-2008x	2008-06-01	Golder	550175	5405356	1	1	1		B140
PC-134-2008x	2008-06-01	Golder	550499	5405931	1	1	1		
PC-135-2008x	2008-06-01	Golder	550563	5406450	1	1	1	Bf	B067
PC-136-2008x	2008-06-01	Golder	550421	5406614	1	1	1	Bf	B067
PC-137-2008x	2008-06-01	Golder	549450	5403442	1	1	1	Sw	B014
PC-138-2008x	2008-06-01	Golder	548964	5403110	1	1	1		B136
PC-139-2008x	2008-06-01	Golder	543250	5401311	1	1	1		B063
PC-140-2008x	2008-06-01	Golder	543099	5401487	1	1	1	Pj	B034
PC-141-2008x	2008-06-01	Golder	543330	5401822	1	1	1		
PC-142-2008x	2008-06-01	Golder	543426	5402412	1	1	1	Sw	B014
PC-143-2008x	2008-06-01	Golder	549738	5400330	1	1	1	Bw	B055
PC-144-2008x	2008-06-01	Golder	550544	5400572	1	1	1	Bw	B055
PC-145-2008x	2008-06-01	Golder	551123	5401233	1	1	1	Bw	B055
PC-146-2008x	2008-06-01	Golder	551357	5401574	1	1	1	Pt	B055
PC-147-2008x	2008-06-01	Golder	551656	5402112	1	1	1	Bf	B052
PC-148-2008x	2008-06-01	Golder	549940	5402317	1	1	1	Bw	B055
PC-149-2008x	2008-06-01	Golder	550277	5401910	1	1	1	Bf	B052
PC-150-2008x	2008-06-01	Golder	550265	5401629	1	1	1	Bf	B052

Appendix 2. Selected open wetlands of the Marathon Palladium Project Site Study Area (SSA).

Lake (L) and Stream (S) codes refer to those used in the baseline aquatics reports (Ecometrix Inc. 2012, 2020). Boreal ecosites (Banton et al. 2009) revised based on field observations and 2008 Forest Resource Inventory (FRI) for the Pic Forest.

L8 / L16



Notes:

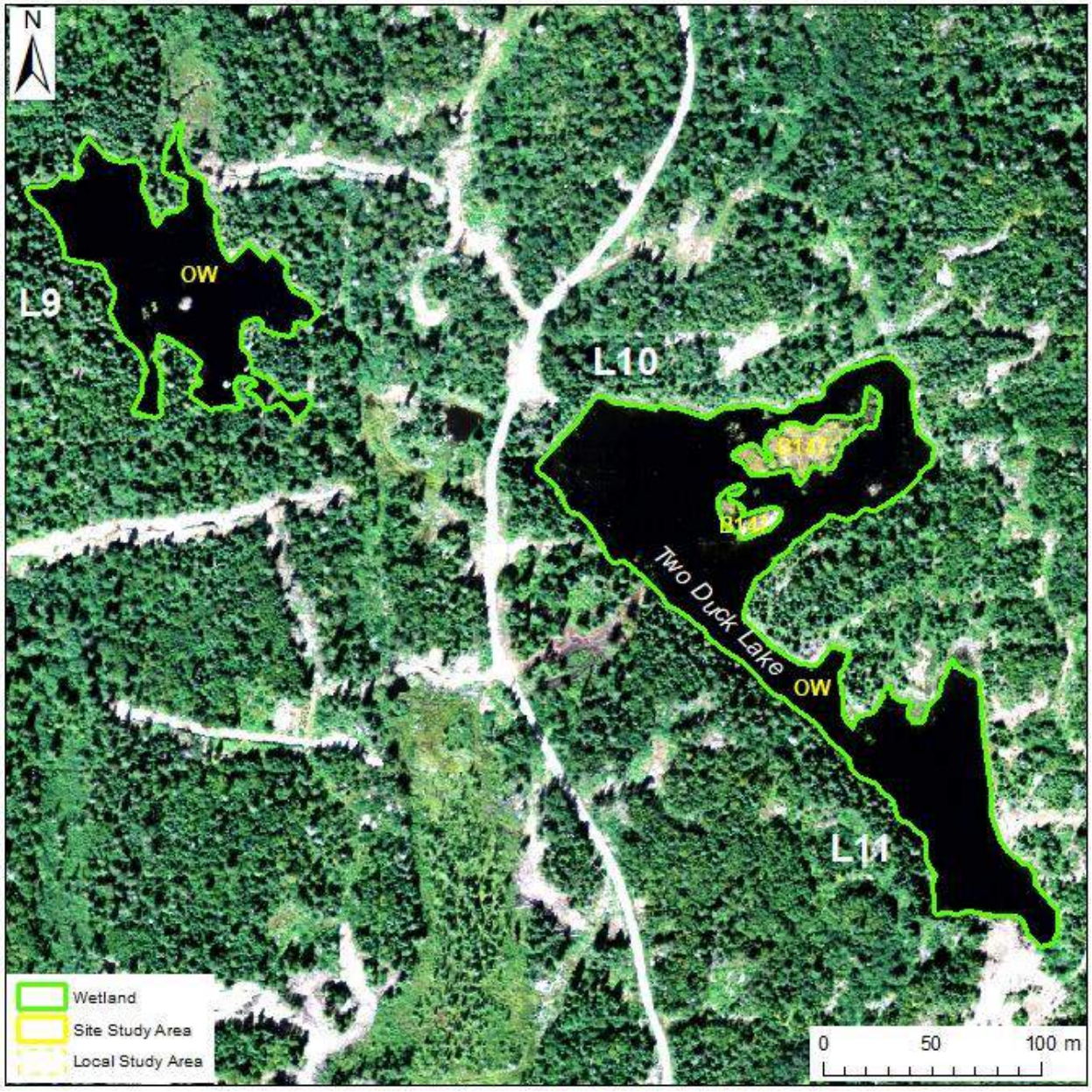
- L8 is narrow waterbody in a steep, bedrock-controlled valley; max depth 2.3 m
- Small islands of shrub-dominated shore fen particularly at north end of lake
- Stream 2 (#102) subwatershed; see Ecometrix Inc. (2012, Figures 3.7, 3.14) for more information

- 1.66 ha L16 was mapped as moderately rich fen (B140) but based on 2008 imagery was actually meadow marsh on organic substrate (B144)
- Has been recently flooded by beaver activity – active lodge in centre of waterbody
- Now is transitioning to open water marsh, with fringes of grounded meadow marsh along the margins in shallower water and some pockets (too small to map) that could be considered floating marsh (B145); max depth is 2.2. m
- L16 is in Stream 3 (#103) subwatershed; see Ecometrix Inc. (2012, Figures 3.16, 3.21) for more information

Low shrub shore fen (B146) at north end of L8, July 2020 (looking south).

Recently flooded meadow marsh and beaver lodge on L6, July 2020.

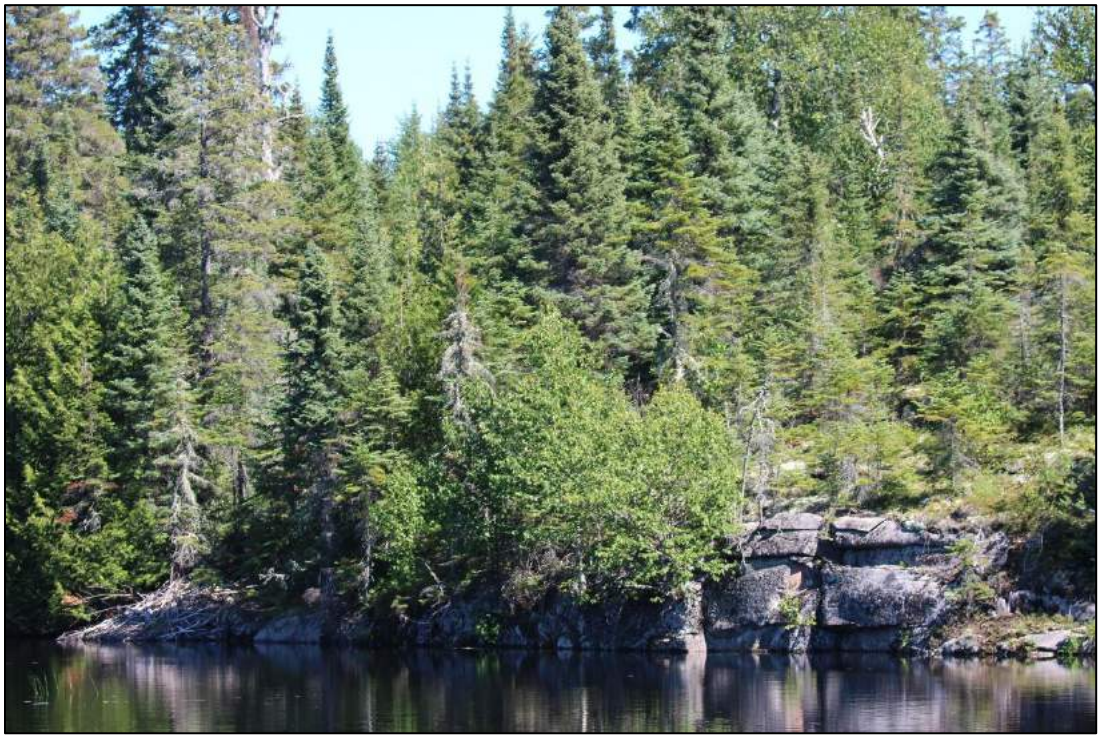
L9 / L10 / L11 (Two Duck Lake)



Notes:

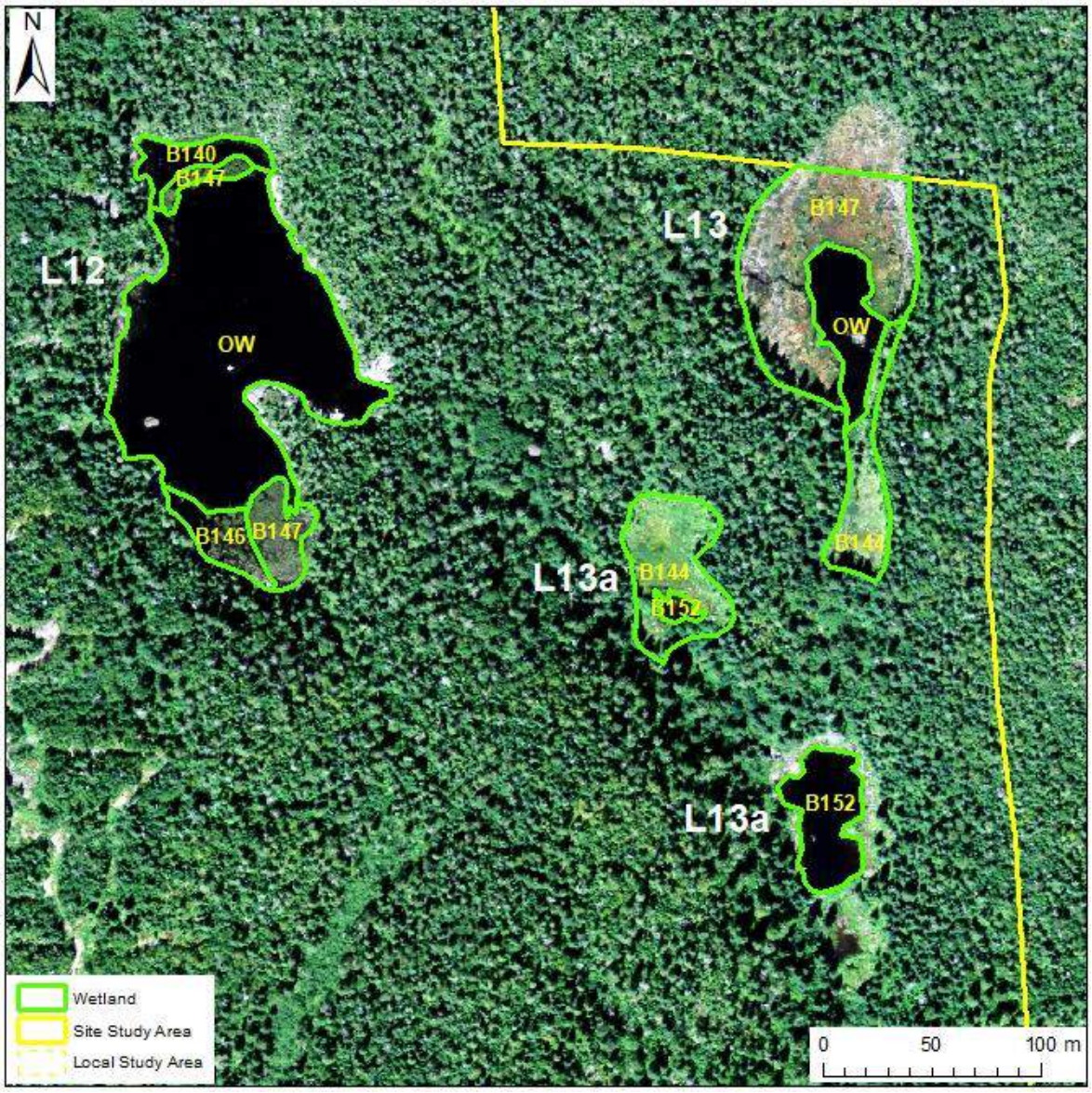
- Two Duck Lake (L10, L11) is a 1.66 ha waterbody, bedrock-controlled valley
- Maximum water depth is 3.1 m; outlet is controlled by beaver dam in southeast
- Small islands of shrub-dominated shore fen at north end of Two Duck Lake (L10)
- L9 is 0.37 ha with open water, open water marsh, or meadow marsh or open water marsh depending on water levels due to beaver activity; max depth is 2.3 m
- Stream 3 (#103) subwatershed; see Ecometrix Inc. (2012, Figures 3.16, 3.17, 3.18) for more information

Low shrub shore fen (B146) at north end of L10 (Two Duck Lake), August 2020.



Rocky shoreline on L11 (Two Duck Lake), August 2020.

L12 / L13 / L13a / L13b



Notes:

- L12 is a relatively shallow (1.8 m max depth) 1.5 ha lake with a beaver dam at its eastern outlet.
- Low shrub shore fen encompassed much of L13 except the southeastern portion which is open water on peaty substrate with a water depth of >2 m
- The outlet from L13 is controlled by a series of beaver dams, the lowermost which created the meadow marsh at the southern end of the wetland (B144)
- L13a and L13b are also small beaver-controlled wetlands, with max depth of 1.5 m and 1 m.
- L13a was primarily open water in 2008 imagery but has been recently re-flooded based on recently dead and dying riparian vegetation along its margins.
- L13a was meadow marsh with a small pocket of open water in 2018 but has been recently reflooded due to renewed beaver activity.

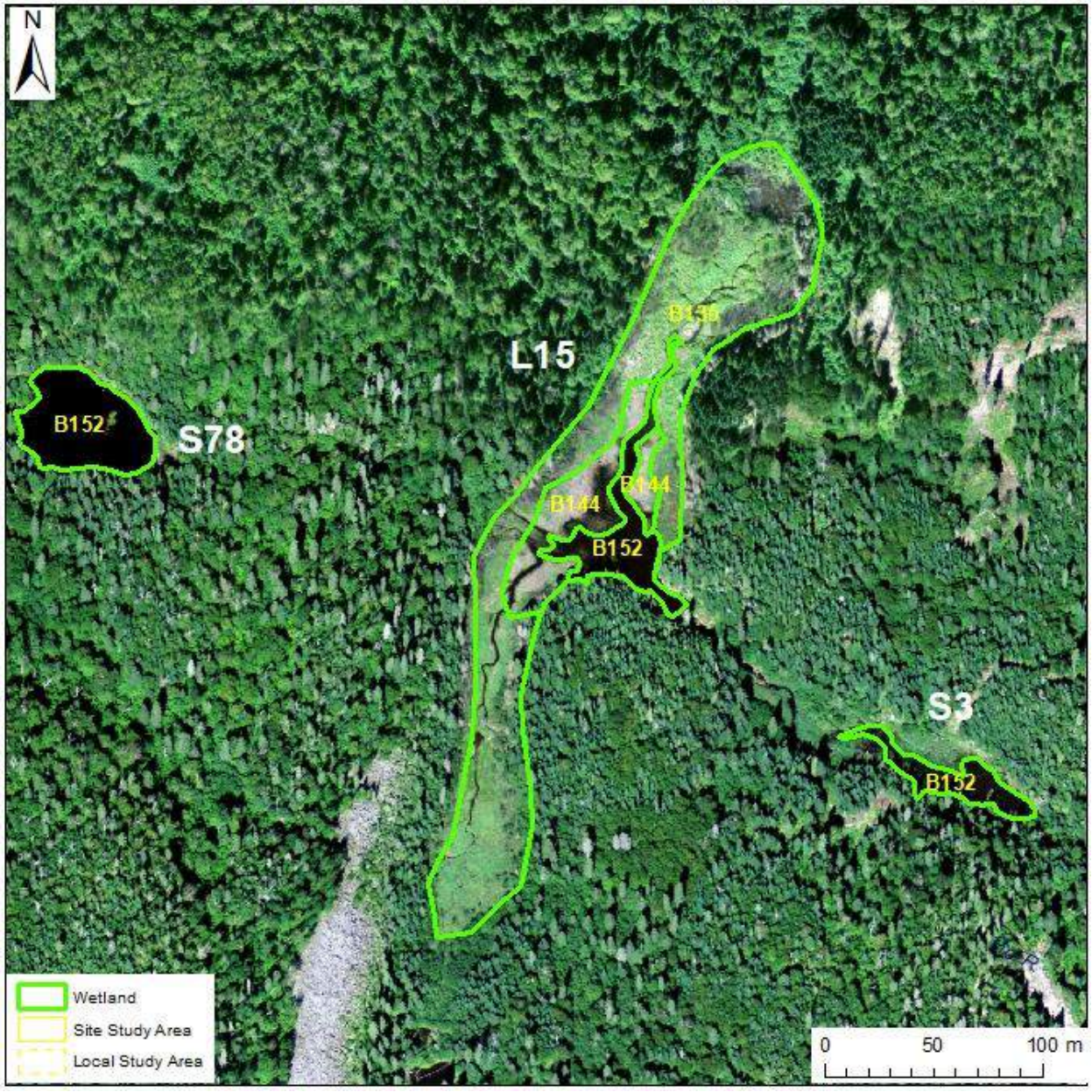
- Stream 3 (#103) subwatershed; see Ecometrix Inc. (2012, Figures 3.16, 3.19, 3.20) for more information

Band of moderately rich fen (B140) and low shrub shore fen (B147 on north end of L12, July 2020.

Shore fen on north end of L13, August 2020 (standing on floating mat).

Recently flooded meadow marsh at L13a (upper) and L16b (lower), August 2020.

L15 / S3 / S78



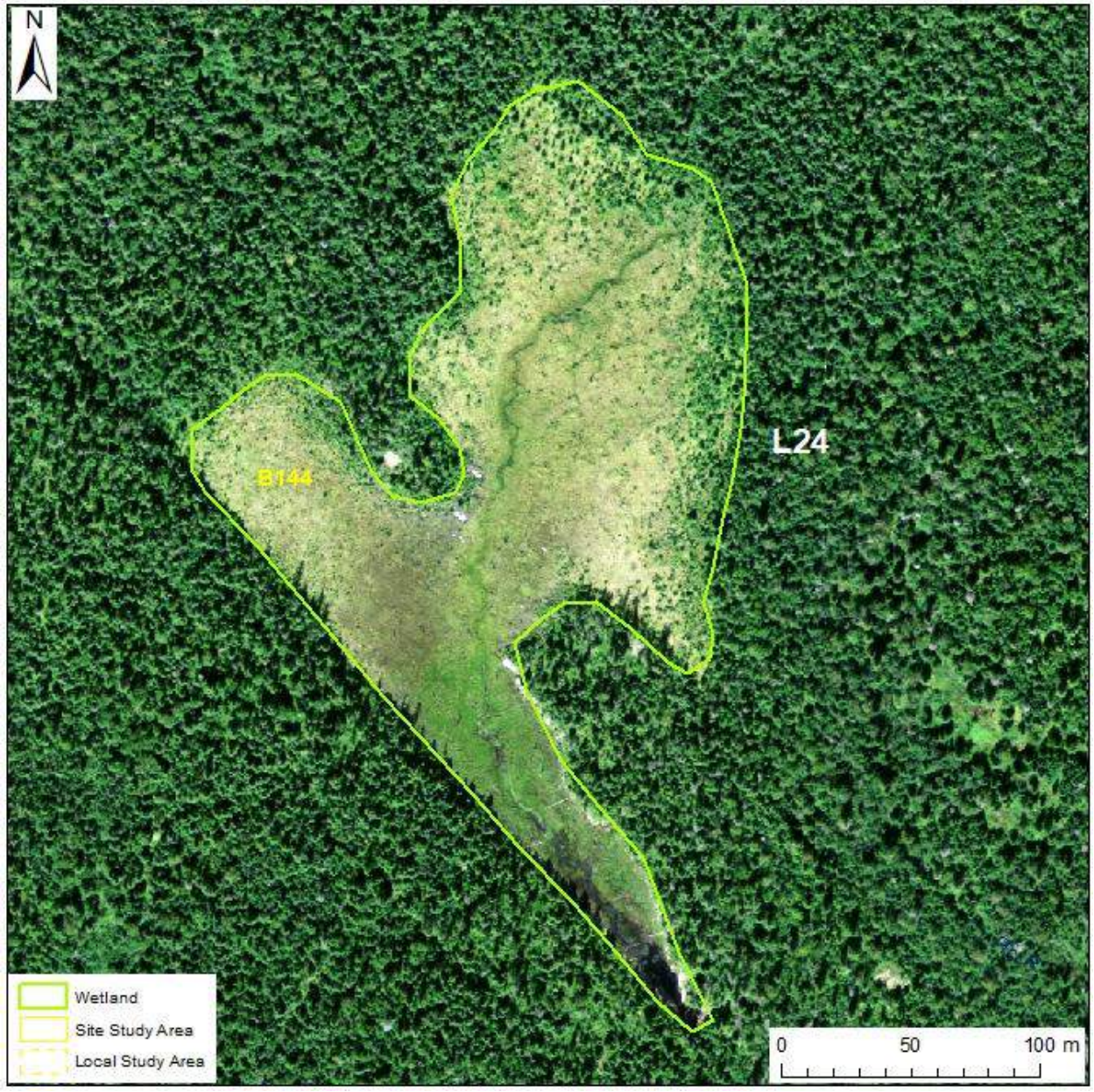
Notes:

- L15 is a shallow waterbody - maximum water depth is 1.7 m
- Connected by stream systems to the north, south, east and west.
- S78 flows down very steep slope from 0.22 ha pond that has a thin strip of meadow marsh on west shore
- Dynamic beaver activity – former meadow marsh and thicket swamp at L 15 has recently be re-flooded.
- Stream 2 (#102) subwatershed; see Ecometrix Inc. (2012, Figures 3.7, 3.15) for more information

Recently flooded meadow marsh at L15, August 2020.

Narrow strip of unmapped meadow marsh along west shore of unnamed ha pond in headwaters of S78.

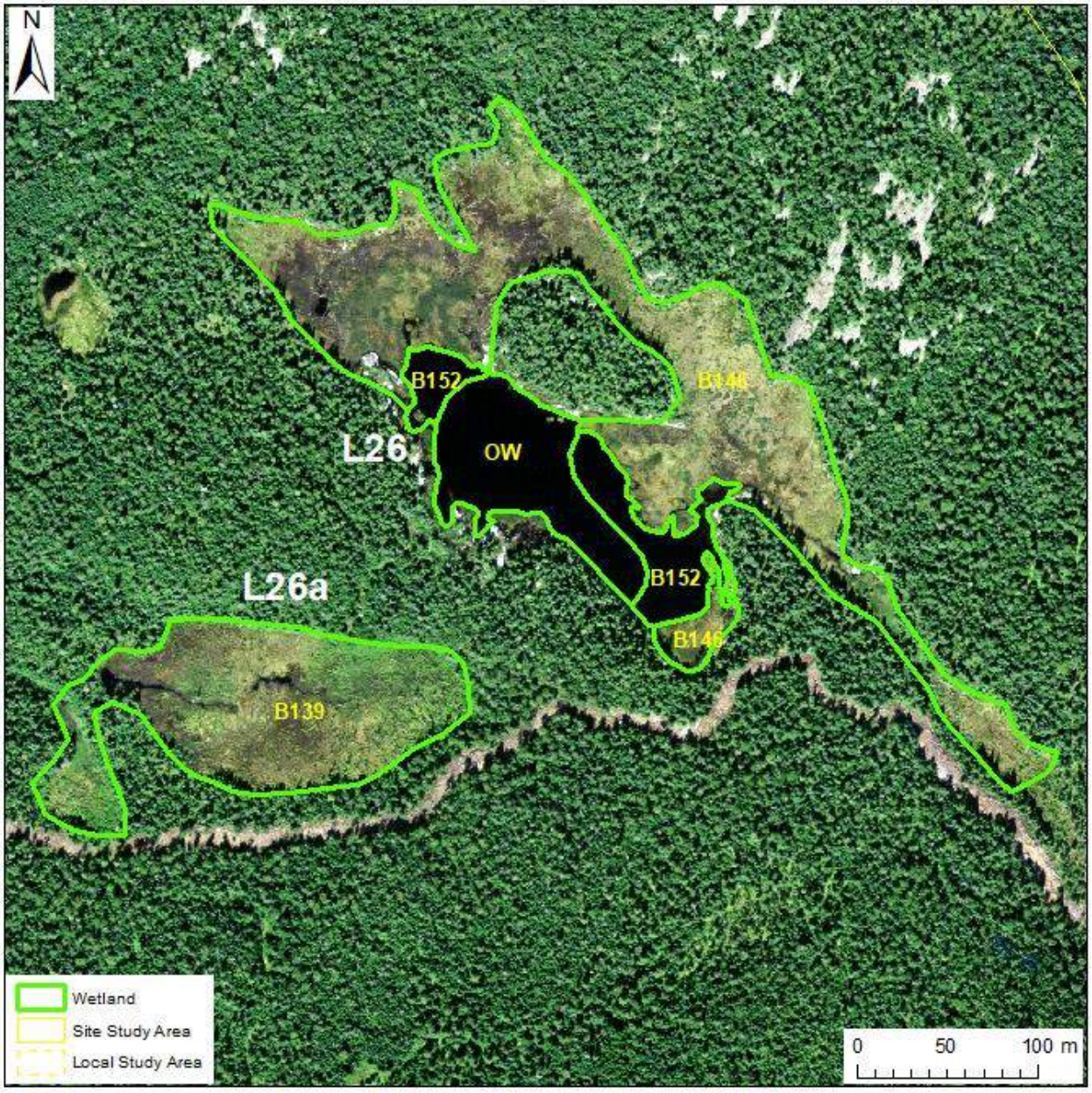
L24



Notes:

- L24 is a 3.4 m wetland that is predominately meadow marsh (B144) with patches of invading thicket swamp along the margins (too small to map)
- May be open water or open water marsh near the dam at is southern outlet depending on beaver activity
- Not surveyed on the ground in 2020.
- Stream 6 subwater (#106); see Ecometrix Inc. (2012, Figures 3.35, 3.37) for more information

L26 / L26a



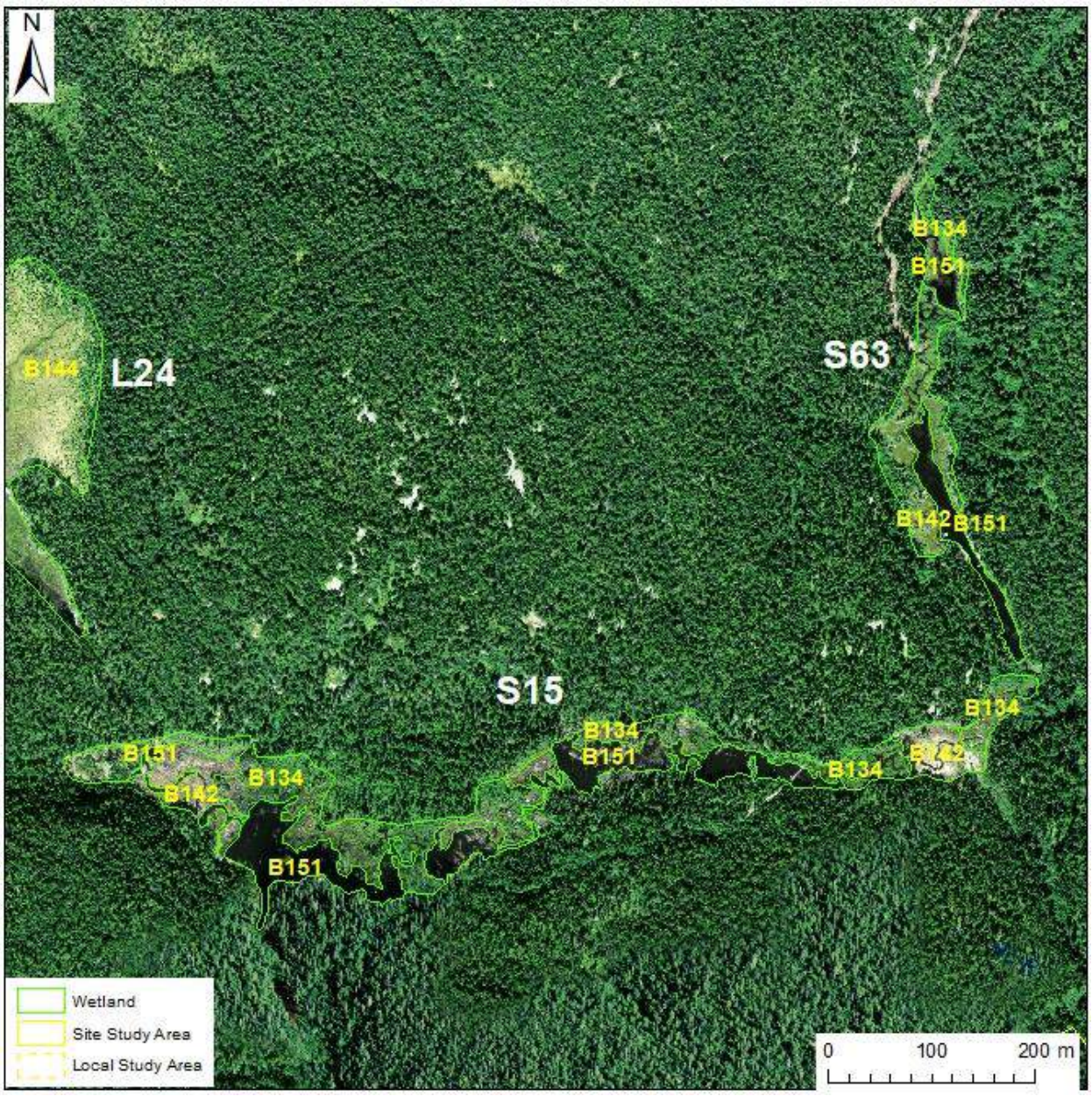
Notes:

- L26 is a relatively deep (max depth 5 m) waterbody in bedrock-controlled valley
- Graminoid shore fend predominates, with patches of low shrub shore fen – may grade to grounded poor fen along margins.
- L26 is poor fen that is connected hydrologically by stream (possibly intermittent) – succeeding to tall shrub fen community
- Stream 6 subwater (#106); see Ecometrix Inc. (2012, Figures 3.35, 3.36) for more information

Graminoid shore fen (B146) with hummocks of low shrub shore fen (B147) at L26, August 2020.

Poor fen (B139) in depression at L26a, June 2020.

S15/ S63



Notes:

- palustrine system of beaver ponds (B151), meadow marshes (B142), , and thicket swamps (B134) along meandering streams S15 and SS63.
- very dynamic due to beaver activity, with ecosite boundaries changing in response to water levels
- overall wetland system constrained to relatively flat river valley by relative steep slopes of adjacent landscape
- Stream 6 subwater (#106); see Ecometrix Inc. (2012, Figure 3.35) for more information

Meadow marsh (upper) and thicket swamp (lower) along S63, August 2020.

Meadow marsh (B142) and thicket swamp (B134) along S15 in July (upper image) and August (lower image) 2020.

Appendix 3. Vascular Plant Species of the Marathon Palladium study area.

The following species were observed in the GenPGM study area in 2009-2010 and 2020. Nomenclature and subnational ranks (S-ranks) are by NHIC (2020). Regionally rare species (RR TBD) are those known from five or less records in the Thunder Bay Judicial District (TBFN 2015).

List is phylogenetically by class, then alphabetically by family and scientific name.

Family	Common Name	Scientific Name	S-Rank	RR TBD
Equisetaceae	Field Horsetail	*Equisetum arvense L.*	S5	
Equisetaceae	Common Scouring-rush	*Equisetum hyemale L.*	S5	
Equisetaceae	Meadow Horsetail	*Equisetum pratense Ehrh.*	S5	
Equisetaceae	Woodland Horsetail	*Equisetum sylvaticum L.*	S5	
Equisetaceae	Variegated Horsetail	*Equisetum variegatum Schleich. ex F. Weber & D.M.H. Mohr*	S5	
Aspleniaceae	Maidenhair Spleenwort	*Asplenium trichomanes L.*	S4	
Dennstaedtiaceae	Bracken Fern	*Pteridium aquilinum (L.) Kuhn*	S5	
Dryopteridaceae	Common Lady Fern	*Athyrium filix-femina (L.) Roth*	S5	
Dryopteridaceae	Fragile Fern	*Cystopteris fragilis (L.) Bernh.*	S4	
Dryopteridaceae	Spinulose Wood Fern	*Dryopteris carthusiana (Vill.) H.P. Fuchs*	S5	
Dryopteridaceae	Spreading Wood Fern	*Dryopteris expansa (K. Presl) Fraser-Jenkins & Jermy*	S4	
Dryopteridaceae	Fragrant Wood Fern	*Dryopteris fragrans (L.) Schott*	S4	
Dryopteridaceae	Common Oak Fern	*Gymnocarpium dryopteris (L.) Newman*	S5	
Dryopteridaceae	Ostrich Fern	*Matteuccia struthiopteris (L.) Todaro*	S5	
Dryopteridaceae	Sensitive Fern	*Onoclea sensibilis L.*	S5	
Dryopteridaceae	Braun's Holly Fern	*Polystichum braunii (Spenner) Fee*	S3	
Dryopteridaceae	Alpine Woodsia	*Woodsia alpina (Bolton) S.F. Gray*	S2	
Dryopteridaceae	Smooth Woodsia	*Woodsia glabella R. Br. ex Richards.*	S4	
Dryopteridaceae	Rusty Woodsia	*Woodsia ilvensis (L.) R. Br.*	S5	
Dryopteridaceae	Oregon Woodsia	*Woodsia oregana D.C. Eat.*	S4	
Osmundaceae	Interrupted Fern	*Claytosmunda claytoniana (L.) Metzgar & Rouhan*	S5	
Polypodiaceae	Rock Polypody	*Polypodium virginianum L.*	S5	
Pteridaceae	Steller's Rockbrake	*Cryptogramma stelleri (Gmel.) Prantl*	S4	
Thelypteridaceae	Northern Beech Fern	*Phegopteris connectilis (Michx.) Watt*	S5	
Thelypteridaceae	Marsh Fern	*Thelypteris palustris Schott*	S5	
Isoetaceae	Spiny-spored Quillwort	*Isoetes echinospora Durieu*	S5	
Lycopodiaceae	Flat-branched Tree-clubmoss	*Dendrolycopodium obscurum (L.) A. Haines*	S4	
Lycopodiaceae	Mountain Firmoss	*Huperzia appressa (Desv.) A. Löve & D. Löve*	S2?	
Lycopodiaceae	Shining Firmoss	*Huperzia lucidula (Michx.) Trevisan*	S5	
Lycopodiaceae	Northern Bog Clubmoss	*Lycopodiella inundata (L.) Holub*	S5	
Lycopodiaceae	Running Clubmoss	*Lycopodium clavatum L.*	S5	
Lycopodiaceae	Stiff Clubmoss	*Spinulum annotinum (Linnaeus) A. Haines*	S5	
Cupressaceae	Common Juniper	*Juniperus communis L.*	S5	
Cupressaceae	Eastern White Cedar	*Thuja occidentalis L.*	S5	
Pinaceae	Balsam Fir	*Abies balsamea (L.) P. Mill.*	S5	

Family	Common Name	Scientific Name	S-Rank	RR TBD
Pinaceae	Tamarack	*Larix laricina (Du Roi) K. Koch*	S5	
Pinaceae	White Spruce	*Picea glauca (Moench) Voss*	S5	
Pinaceae	Black Spruce	*Picea mariana (P. Mill.) B.S.P.*	S5	
Taxaceae	Canada Yew	*Taxus canadensis Marsh.*	S4	
Acoraceae	American Sweetflag	*Acorus americanus (Raf.) Raf.*	S4	
Alismataceae	Northern Arrowhead	*Sagittaria cuneata Sheldon*	S5	
Alismataceae	Broad-leaved Arrowhead	*Sagittaria latifolia Willd.*	S5	
Cyperaceae	Lesser Brown Sedge	*Carex adusta Boott*	S4	
Cyperaceae	Water Sedge	*Carex aquatilis Wahlenb.*	S5	
Cyperaceae	Golden Sedge	*Carex aurea Nutt.*	S5	
Cyperaceae	Bebb's Sedge	*Carex bebbii Olney ex Fern.*	S5	
Cyperaceae	Brownish Sedge	*Carex brunnescens (Pers.) Poir.*	S5	
Cyperaceae	Buxbaum's Sedge	*Carex buxbaumii Wahlenb.*	S5	
Cyperaceae	Hoary Sedge	*Carex canescens L.*	S5	
Cyperaceae	Creeping Sedge	*Carex chordorrhiza Ehrh. ex L. f.*	S5	
Cyperaceae	Fringed Sedge	*Carex crinita Lam.*	S5	
Cyperaceae	Northeastern Sedge	*Carex cryptolepis Mackenzie*	S4	
Cyperaceae	Bent Northern Sedge	*Carex deflexa Hornem.*	S5	
Cyperaceae	Dewey's Sedge	*Carex deweyana Schwein.*	S5	
Cyperaceae	Star Sedge	*Carex echinata Murr.*	S5	
Cyperaceae	Nodding Sedge	*Carex gynandra Schwein.*	S5	
Cyperaceae	Houghton's Sedge	*Carex houghtoniana Torr. ex Dewey*	S5	
Cyperaceae	Inland Sedge	*Carex interior Bailey*	S5	
Cyperaceae	Bladder Sedge	*Carex intumescens Rudge*	S5	
Cyperaceae	Lake Sedge	*Carex lacustris Willd.*	S5	
Cyperaceae	Woolly-fruited Sedge	*Carex lasiocarpa Ehrh.*	S5	
Cyperaceae	Lenticular Sedge	*Carex lenticularis Michx.*	S5	
Cyperaceae	Bristle-stalked Sedge	*Carex leptalea Wahlenb.*	S5	
Cyperaceae	Finely-nerved Sedge	*Carex leptonervia (Fern.) Fern.*	S5	
Cyperaceae	Mud Sedge	*Carex limosa L.*	S5	
Cyperaceae	Boreal Bog Sedge	*Carex magellanica Lam.*	S5	
Cyperaceae	Michaux's Sedge	*Carex michauxiana Boeckl.*	S4	
Cyperaceae	Few-seeded Sedge	*Carex oligosperma Michx.*	S5	
Cyperaceae	Few-flowered Sedge	*Carex pauciflora Lightf.*	S5	
Cyperaceae	Peck's Sedge	*Carex peckii Howe*	S5	
Cyperaceae	Retrorse Sedge	*Carex retrorsa Schwein.*	S5	
Cyperaceae	Awl-fruited Sedge	*Carex stipata Muhl. ex Willd.*	S5	
Cyperaceae	Sparse-flowered Sedge	*Carex tenuiflora Wahlenb.*	S5	
Cyperaceae	Three-seeded Sedge	*Carex trisperma Dewey*	S5	
Cyperaceae	Northern Beaked Sedge	*Carex utriculata Boott*	S5	
Cyperaceae	Greenish Sedge	*Carex viridula Michx.*	S5	
Cyperaceae	Fox Sedge	*Carex vulpinoidea Michx.*	S5	
Cyperaceae	Three-way Sedge	*Dulichium arundinaceum (L.) Britt.*	S5	

Family	Common Name	Scientific Name	S-Rank	RR TBD
Cyperaceae	Needle Spikerush	*Eleocharis acicularis (L.) Roemer & J.A. Schultes*	S5	
Cyperaceae	Ovate Spikerush	*Eleocharis ovata (Roth) Roemer & J.A. Schultes*	S4S5	
Cyperaceae	Creeping Spikerush	*Eleocharis palustris (L.) Roemer & J.A. Schultes*	S5	
Cyperaceae	Tussock Cottongrass	*Eriophorum vaginatum L.*	S5	
Cyperaceae	White Beakrush	*Rhynchospora alba (L.) Vahl*	S5	
Cyperaceae	Brown Beakrush	*Rhynchospora fusca (L.) Ait. f.*	S4	
Cyperaceae	Dark-green Bulrush	*Scirpus atrovirens Willd.*	S5	
Cyperaceae	Cottongrass Bulrush	*Scirpus cyperinus (L.) Kunth*	S5	
Cyperaceae	Red-tinged Bulrush	*Scirpus microcarpus J.& K. Presl*	S5	
Cyperaceae	Tufted Clubrush	*Trichophorum cespitosum (L.) Hartman*	S5	
Eriocaulaceae	Seven-angled Pipewort	*Eriocaulon aquaticum (Hill) Druce*	S5	
Iridaceae	Harlequin Blue Flag	*Iris versicolor L.*	S5	
Iridaceae	Strict Blue-eyed-grass	*Sisyrinchium montanum Greene*	S5	
Juncaceae	Canada Rush	*Juncus canadensis J. Gay ex Laharpe*	S5	
Juncaceae	Soft Rush	*Juncus effusus L.*	S5	
Juncaceae	Thread Rush	*Juncus filiformis L.*	S5?	
Juncaceae	Knotted Rush	*Juncus nodosus L.*	S5	
Juncaceae	Path Rush	*Juncus tenuis Willd.*	S5	
Juncaceae	Small-flowered Woodrush	*Luzula parviflora (Ehrh.) Desv.*	S5	
Liliaceae	Blue Bead-lily	*Clintonia borealis (Ait.) Raf.*	S5	
Liliaceae	Wood Lily	*Lilium philadelphicum L.*	S5	
Liliaceae	Wild Lily-of-the-valley	*Maianthemum canadense Desf.*	S5	
Liliaceae	Large False Solomon's Seal	*Maianthemum racemosum (L.) Link*	S5	
Liliaceae	Star-flowered False Solomon's Seal	*Maianthemum stellatum (L.) Link*	S5	
Liliaceae	Three-leaved False Solomon's Seal	*Maianthemum trifolium (L.) Sloboda*	S5	
Liliaceae	Clasping-leaved Twisted-stalk	*Streptopus amplexifolius (L.) DC.*	S5	
Liliaceae	Rose Twisted-stalk	*Streptopus lanceolatus (Aiton) Reveal*	S5	
Liliaceae	Nodding Trillium	*Trillium cernuum L.*	S5	
Najadaceae	Slender Naiad	*Najas flexilis (Willd.) Rostk. & Schmidt*	S4S5	
Orchidaceae	Pink Lady's-slipper	*Cypripedium acaule Ait.*	S5	
Orchidaceae	Dwarf Rattlesnake-plantain	*Goodyera repens (L.) R. Br. ex Ait. f.*	S5	
Orchidaceae	Broad-leaved Twayblade	*Neottia convallarioides (Swartz) Richard*	S4	Y
Orchidaceae	Lake Huron Green Orchid	*Platanthera huronensis (Nutt.) Lindl.*	SU	
Poaceae	Redtop	*Agrostis gigantea Roth*	SNA	
Poaceae	Rough Bentgrass	*Agrostis scabra Willd.*	S5	
Poaceae	Creeping Bentgrass	*Agrostis stolonifera L.*	SNA	
Poaceae	Wavy Hairgrass	*Avenella flexuosa (L.) Drej.*	S5	
Poaceae	Fringed Brome	*Bromus ciliatus L.*	S5	
Poaceae	Smooth Brome	*Bromus inermis Leyss.*	SNA	
Poaceae	Bluejoint Reedgrass	*Calamagrostis canadensis (Michx.) Beauv.*	S5	

Family	Common Name	Scientific Name	S-Rank	RR TBD
Poaceae	Drooping Woodreed	*Cinna latifolia (Trev. ex Goepp.) Griseb.*	S5	
Poaceae	Poverty Oatgrass	*Danthonia spicata (L.) Beauv. ex Roemer & J.A. Schultes*	S5	
Poaceae	Woolly Panicgrass	*Dichanthelium lanuginosum (Elliott) Gould*	S5	
Poaceae	Slender Wildrye	*Elymus trachycaulus (Link) Gould ex Shinners*	S5	
Poaceae	Boreal Mannagrass	*Glyceria borealis (Nash) Batchelder*	S5	
Poaceae	Canada Mannagrass	*Glyceria canadensis (Michx.) Trin.*	S5	
Poaceae	Tall Mannagrass	*Glyceria grandis S. Wats.*	S5	
Poaceae	Fowl Mannagrass	*Glyceria striata (Lam.) A.S. Hitchc.*	S5	
Poaceae	Persian Ryegrass	*Lolium persicum Boiss. & Hohen. ex Boiss.*	SNA	
Poaceae	Tall Millet	*Milium effusum L.*	S4S5	Y
Poaceae	Common Timothy	*Phleum pratense L.*	SNA	
Poaceae	Canada Ricegrass	*Piptatheropsis canadensis (Poir.) Romasch., P.M. Peterson & Soreng*	S4	Y
Poaceae	Annual Bluegrass	*Poa annua L.*	SNA	
Poaceae	Glaucous Bluegrass	*Poa glauca Vahl*	S4	
Poaceae	Fowl Bluegrass	*Poa palustris L.*	S5	
Poaceae	Purple False Melic	*Schizachne purpurascens (Torr.) Swallen*	S5	
Poaceae	Pale False Mannagrass	*Torreyochloa pallida (Torr.) Church*	S4	
Potamogetonaceae	Large-leaved Pondweed	*Potamogeton amplifolius Tuckerman*	S5	
Potamogetonaceae	Alga Pondweed	*Potamogeton confervoides Reichenb.*	S2	
Potamogetonaceae	Ribbon-leaved Pondweed	*Potamogeton epihydrus Raf.*	S5	
Potamogetonaceae	Floating Pondweed	*Potamogeton natans L.*	S5	
Potamogetonaceae	Oakes' Pondweed	*Potamogeton oakesianus J.W. Robbins*	S4	Y
Potamogetonaceae	White-stemmed Pondweed	*Potamogeton praelongus Wulfen*	S4	
Potamogetonaceae	Small Pondweed	*Potamogeton pusillus L.*	S4?	Y
Potamogetonaceae	Richardson's Pondweed	*Potamogeton richardsonii (Benn.) Rydb.*	S5	
Potamogetonaceae	Spiral Pondweed	*Potamogeton spirillus Tuckerman*	S5	
Potamogetonaceae	Vasey's Pondweed	*Potamogeton vaseyi J.W. Robbins*	S4	
Scheuchzeriaceae	Marsh Scheuchzeria	*Scheuchzeria palustris L.*	S5	
Sparganiaceae	Narrow-leaved Burreed	*Sparganium angustifolium Michx.*	S4?	
Sparganiaceae	Green-fruited Burreed	*Sparganium emersum Rehmann*	SU	
Sparganiaceae	Floating Burreed	*Sparganium fluctuans (Morong) B.L. Robins.*	S5?	
Typhaceae	Narrow-leaved Cattail	*Typha angustifolia L.*	SNA	
Typhaceae	Broad-leaved Cattail	*Typha latifolia L.*	S5	
Aceraceae	Mountain Maple	*Acer spicatum Lam.*	S5	
Apiaceae	American Cow Parsnip	*Heracleum maximum Bartr.*	S5	
Apiaceae	Hairy Sweet Cicely	*Osmorhiza claytonii (Michx.) C.B. Clarke*	S5	
Apiaceae	Hemlock Water-parsnip	*Sium suave Walt.*	S5	
Apocynaceae	Spreading Dogbane	*Apocynum androsaemifolium L.*	S5	
Araliaceae	Bristly Sarsaparilla	*Aralia hispida Vent.*	S5	
Araliaceae	Wild Sarsaparilla	*Aralia nudicaulis L.*	S5	
Aristolochiaceae	Canada Wild-ginger	*Asarum canadense L.*	S5	

Family	Common Name	Scientific Name	S-Rank	RR TBD
Asteraceae	Common Yarrow	*Achillea millefolium L.*	SNA	
Asteraceae	Common Ragweed	*Ambrosia artemisiifolia L.*	S5	Y
Asteraceae	Pearly Everlasting	*Anaphalis margaritacea (L.) Benth. & Hook. f.*	S5	
Asteraceae	Field Pussytoes	*Antennaria neglecta Greene*	S5	
Asteraceae	Water Beggarticks	*Bidens beckii Torr. ex Spreng.*	S5	
Asteraceae	Nodding Beggarticks	*Bidens cernua L.*	S5	
Asteraceae	Spotted Knapweed	*Centaurea stoebe L.*	SNA	
Asteraceae	Creeping Thistle	*Cirsium arvense (L.) Scop.*	SNA	
Asteraceae	Bull Thistle	*Cirsium vulgare (Savi) Ten.*	SNA	
Asteraceae	Narrow-leaved Hawksbeard	*Crepis tectorum L.*	SNA	
Asteraceae	Flat-top White Aster	*Doellingeria umbellata (P. Mill.) Nees*	S5	
Asteraceae	Canada Horseweed	*Erigeron canadensis L.*	S5	
Asteraceae	Philadelphia Fleabane	*Erigeron philadelphicus L.*	S5	
Asteraceae	Large-leaved Aster	*Eurybia macrophylla (L.) Cass.*	S5	
Asteraceae	Grass-leaved Goldenrod	*Euthamia graminifolia (L.) Nutt.*	S5	
Asteraceae	Spotted Joe Pye Weed	*Eutrochium maculatum (L.) E.E. Lamont*	S5	
Asteraceae	Umbellate Hawkweed	*Hieracium umbellatum L.*	S5	
Asteraceae	Tall Blue Lettuce	*Lactuca biennis (Moench) Fern.*	S5	
Asteraceae	Oxeye Daisy	*Leucanthemum vulgare Lam.*	SNA	
Asteraceae	White Rattlesnakeroot	*Nabalus albus (L.) Hook.*	S5	
Asteraceae	Golden Ragwort	*Packera aurea (L.) A.& D. Löve*	S5	
Asteraceae	Orange Hawkweed	*Pilosella aurantiaca (Linnaeus) F.W. Schultz & Schultz-Bipontinus*	SNA	
Asteraceae	Tall Hawkweed	*Pilosella piloselloides (Villars) Soják*	SNA	
Asteraceae	Canada Goldenrod	*Solidago canadensis L.*	S5	
Asteraceae	Giant Goldenrod	*Solidago gigantea Ait.*	S5	
Asteraceae	Hairy Goldenrod	*Solidago hispida Muhl. ex Willd.*	S5	
Asteraceae	Early Goldenrod	*Solidago juncea Ait.*	S5	
Asteraceae	Bog Goldenrod	*Solidago uliginosa Nutt.*	S5	
Asteraceae	Field Sow-thistle	*Sonchus arvensis L.*	SNA	
Asteraceae	Lindley's Aster	*Symphyotrichum ciliolatum (Lindl.) A.& D. Löve*	S5	
Asteraceae	Panicled Aster	*Symphyotrichum lanceolatum (Willd.) Nesom*	S5	
Asteraceae	Swamp Aster	*Symphyotrichum puniceum (L.) A.& D. Löve*	S5	
Asteraceae	Common Tansy	*Tanacetum vulgare L.*	SNA	
Asteraceae	Common Dandelion	*Taraxacum officinale G.H. Weber ex Wiggers*	SNA	
Asteraceae	Scentless Chamomile	*Tripleurospermum inodorum (L.) Schultz-Bip.*	SNA	
Balsaminaceae	Spotted Jewelweed	*Impatiens capensis Meerb.*	S5	
Betulaceae	Green Alder	*Alnus alnobetula (Ehrh.) K. Koch*	S5	
Betulaceae	Gray Alder	*Alnus incana (L.) Moench*	S5	
Betulaceae	Heart-leaved Birch	*Betula cordifolia Regel*	S4?	
Betulaceae	Paper Birch	*Betula papyrifera Marsh.*	S5	
Betulaceae	Bog Birch	*Betula pumila L.*	S5	

Family	Common Name	Scientific Name	S-Rank	RR TBD
Betulaceae	Beaked Hazelnut	*Corylus cornuta Marsh.*	S5	
Boraginaceae	Tall Bluebells	*Mertensia paniculata (Ait.) G. Don*	S5	
Brassicaceae	Graham's Rockcress	*Boechera grahamii (Lehmann) Windham & Al-Shehbaz*	S5	
Brassicaceae	Small-flowered Bittercress	*Cardamine parviflora L.*	S4	
Brassicaceae	Pennsylvania Bittercress	*Cardamine pensylvanica Muhl. ex Willd.*	S5	
Brassicaceae	Hare's-ear Mustard	*Conringia orientalis (L.) Andrz.*	SNA	
Brassicaceae	Hoary Draba	*Draba cana Rydb.*	S3	
Brassicaceae	Wormseed Wallflower	*Erysimum cheiranthoides L.*	S5	
Brassicaceae	Marsh Yellowcress	*Rorippa palustris (L.) Bess.*	S5	
Callitrichaceae	Vernal Water-starwort	*Callitriche palustris L.*	S5	
Campanulaceae	Marsh Bellflower	*Campanula aparinoides Pursh*	S5	
Campanulaceae	Harebell	*Campanula rotundifolia L.*	S5	
Campanulaceae	Kalm's Lobelia	*Lobelia kalmii L.*	S5	
Caprifoliaceae	Northern Bush-honeysuckle	*Diervilla lonicera P. Mill.*	S5	
Caprifoliaceae	Twinflower	*Linnaea borealis L.*	S5	
Caprifoliaceae	Canada Fly Honeysuckle	*Lonicera canadensis Bartr. ex Marsh.*	S5	
Caprifoliaceae	Limber Honeysuckle	*Lonicera dioica L.*	S5	
Caprifoliaceae	Bracted Honeysuckle	*Lonicera involucrata Banks ex Spreng.*	S5	
Caprifoliaceae	Mountain Fly Honeysuckle	*Lonicera villosa (Michx.) J.A. Schultes*	S5	
Caprifoliaceae	Red Elderberry	*Sambucus racemosa L.*	S5	
Caprifoliaceae	Squashberry	*Viburnum edule (Michx.) Raf.*	S5	
Caprifoliaceae	Cranberry Viburnum	*Viburnum opulus L.*	S5	
Caryophyllaceae	Nodding Chickweed	*Cerastium nutans Raf.*	S4	
Caryophyllaceae	Bladder Campion	*Silene vulgaris (Moench) Garcke*	SNA	
Caryophyllaceae	Red Sand-spurrey	*Spergularia rubra (L.) J.& K. Presl*	SNA	
Caryophyllaceae	Boreal Starwort	*Stellaria borealis Bigelow*	S5	
Chenopodiaceae	White Goosefoot	*Chenopodium album L.*	SNA	
Clusiaceae	Northern St. John's-wort	*Hypericum boreale (Britt.) Bickn.*	S4?	
Clusiaceae	Pale St. John's-wort	*Hypericum ellipticum Hook.*	S5	
Clusiaceae	Larger Canadian St. John's-wort	*Hypericum majus (Gray) Britt.*	S5	
Clusiaceae	Common St. John's-wort	*Hypericum perforatum L.*	SNA	
Clusiaceae	Fraser's St. John's-wort	*Triadenum fraseri (Spach) Gleason*	S5	
Cornaceae	Bunchberry	*Cornus canadensis L.*	S5	
Cornaceae	Round-leaved Dogwood	*Cornus rugosa Lam.*	S5	
Cornaceae	Red-osier Dogwood	*Cornus sericea L.*	S5	
Droseraceae	Spoon-leaved Sundew	*Drosera intermedia Hayne*	S5	
Droseraceae	Round-leaved Sundew	*Drosera rotundifolia L.*	S5	
Ericaceae	Bog Rosemary	*Andromeda polifolia L.*	S5	
Ericaceae	Common Bearberry	*Arctostaphylos uva-ursi (L.) Spreng.*	S5	
Ericaceae	Leatherleaf	*Chamaedaphne calyculata (L.) Moench*	S5	
Ericaceae	Trailing Arbutus	*Epigaea repens L.*	S5	

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Ericaceae	Creeping Snowberry	*Gaultheria hispidula (L.) Muhl. ex Bigelow*	S5	
Ericaceae	Pale Bog Laurel	*Kalmia polifolia Wangenh.*	S5	
Ericaceae	Common Labrador Tea	*Rhododendron groenlandicum (Oeder) Kron & Judd*	S5	
Ericaceae	Early Lowbush Blueberry	*Vaccinium angustifolium Ait.*	S5	
Ericaceae	Velvet-leaved Blueberry	*Vaccinium myrtilloides Michx.*	S5	
Ericaceae	Small Cranberry	*Vaccinium oxycoccos L.*	S5	
Ericaceae	Mountain Cranberry	*Vaccinium vitis-idaea L.*	S5	
Fabaceae	Cream-colored Vetchling	*Lathyrus ochroleucus Hook.*	S4S5	
Fabaceae	Marsh Vetchling	*Lathyrus palustris L.*	S5	
Fabaceae	Garden Bird's-foot Trefoil	*Lotus corniculatus L.*	SNA	
Fabaceae	Black Medic	*Medicago lupulina L.*	SNA	
Fabaceae	Alsike Clover	*Trifolium hybridum L.*	SNA	
Fabaceae	Red Clover	*Trifolium pratense L.*	SNA	
Fabaceae	White Clover	*Trifolium repens L.*	SNA	
Fabaceae	American Vetch	*Vicia americana Muhl. ex Willd.*	S5	
Fabaceae	Tufted Vetch	*Vicia cracca L.*	SNA	
Fumariaceae	Pale Corydalis	*Capnoides sempervirens (L.) Borkh.*	S5	
Gentianaceae	Spurred Gentian	*Halenia deflexa (Sm.) Griseb.*	S5	
Geraniaceae	Bicknell's Geranium	*Geranium bicknellii Britt.*	S5	
Grossulariaceae	Skunk Currant	*Ribes glandulosum Grauer*	S5	
Grossulariaceae	Northern Black Currant	*Ribes hudsonianum Richards.*	S5	
Grossulariaceae	Canada Gooseberry	*Ribes oxyacanthoides L.*	S5	
Grossulariaceae	Swamp Red Currant	*Ribes triste Pallas*	S5	
Haloragaceae	Whorled Water-milfoil	*Myriophyllum verticillatum L.*	S5	
Hippuridaceae	Common Mare's-tail	*Hippuris vulgaris L.*	S5	
Lamiaceae	Bifid Hemp-nettle	*Galeopsis bifida Boenn.*	SNA	
Lamiaceae	Common Hemp-nettle	*Galeopsis tetrahit L.*	SNA	
Lamiaceae	Northern Water-horehound	*Lycopus uniflorus Michx.*	S5	
Lamiaceae	Lemon Balm	*Melissa officinalis L.*	SNA	
Lamiaceae	Canada Mint	*Mentha canadensis L.*	S5	
Lamiaceae	Self-heal	*Prunella vulgaris L.*	S5	
Lamiaceae	Hooded Skullcap	*Scutellaria galericulata L.*	S5	
Lentibulariaceae	Horned Bladderwort	*Utricularia cornuta Michx.*	S5	
Lentibulariaceae	Flat-leaved Bladderwort	*Utricularia intermedia Hayne*	S5	
Lentibulariaceae	Lesser Bladderwort	*Utricularia minor L.*	S5	
Lentibulariaceae	Greater Bladderwort	*Utricularia vulgaris L.*	S5	
Lythraceae	Purple Loosestrife	*Lythrum salicaria L.*	SNA	
Monotropaceae	Indian-pipe	*Monotropa uniflora Linnaeus*	S5	
Myricaceae	Sweet Gale	*Myrica gale L.*	S5	
Nymphaeaceae	Variegated Pond-lily	*Nuphar variegata Dur.*	S5	
Onagraceae	Fireweed	*Chamaenerion angustifolium (Linnaeus) Scopoli*	S5	

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Onagraceae	Small Enchanter's Nightshade	*Circaea alpina L.*	S5	
Onagraceae	Northern Willowherb	*Epilobium ciliatum Raf.*	S5	
Onagraceae	Common Evening-primrose	*Oenothera biennis L.*	S5	
Onagraceae	Small-flowered Evening-primrose	*Oenothera parviflora L.*	S5	Y
Oxalidaceae	Common Wood-sorrel	*Oxalis montana Raf.*	S5	
Plantaginaceae	American Shoreweed	*Littorella americana Fern.*	S3	
Plantaginaceae	Common Plantain	*Plantago major L.*	SNA	
Polygonaceae	Alpine Bistort	*Bistorta vivipara (Linnaeus) Delarbre*	S5	
Polygonaceae	Fringed Black Bindweed	*Fallopia cilinodis (Michx.) Holub*	S5	
Polygonaceae	Water Smartweed	*Persicaria amphibia (L.) Delarbre*	S5	
Polygonaceae	Marshpepper Smartweed	*Persicaria hydropiper (L.) Delarbre*	SNA	
Polygonaceae	Sheep Sorrel	*Rumex acetosella L.*	SNA	
Polygonaceae	Water Dock	*Rumex britannica L.*	S5	
Primulaceae	Northern Starflower	*Lysimachia borealis (Rafinesque) U. Manns & Anderberg*	S5	
Primulaceae	Fringed Loosestrife	*Lysimachia ciliata L.*	S5	
Primulaceae	Swamp Loosestrife	*Lysimachia terrestris (L.) B.S.P.*	S5	
Primulaceae	Bird's-eye Primrose	*Primula mistassinica Michx.*	S4S5	
Pyrolaceae	One-flowered Wintergreen	*Moneses uniflora (L.) Gray*	S5	
Pyrolaceae	Pink Pyrola	*Pyrola asarifolia Michx.*	S5	
Pyrolaceae	Green-flowered Pyrola	*Pyrola chlorantha Sw.*	S4S5	
Ranunculaceae	Red Baneberry	*Actaea rubra (Ait.) Willd.*	S5	
Ranunculaceae	Canada Anemone	*Anemonastrum canadense (Linnaeus) Mosyakin*	S5	
Ranunculaceae	Wood Anemone	*Anemone quinquefolia L.*	S5	
Ranunculaceae	Red Columbine	*Aquilegia canadensis L.*	S5	
Ranunculaceae	Yellow Marsh Marigold	*Caltha palustris L.*	S5	
Ranunculaceae	Goldthread	*Coptis trifolia (L.) Salisb.*	S5	
Ranunculaceae	Kidney-leaved Buttercup	*Ranunculus abortivus L.*	S5	
Ranunculaceae	Tall Buttercup	*Ranunculus acris L.*	SNA	
Ranunculaceae	Lesser Spearwort	*Ranunculus flammula L.*	S5	
Ranunculaceae	Pennsylvania Buttercup	*Ranunculus pensylvanicus L. f.*	S5	
Ranunculaceae	Purple Meadow-rue	*Thalictrum dasycarpum Fisch. & Ave-Lall.*	S4?	
Ranunculaceae	Tall Meadow-rue	*Thalictrum pubescens Pursh*	S5	
Rhamnaceae	Alder-leaved Buckthorn	*Endotropis alnifolia (L'Her.) Hauenschild*	S5	
Rosaceae	Bartram's Serviceberry	*Amelanchier bartramiana (Tausch) M. Roemer*	S5	
Rosaceae	Shrubby Cinquefoil	*Dasiphora fruticosa (L.) Rydb.*	S5	
Rosaceae	Woodland Strawberry	*Fragaria vesca L.*	S5	
Rosaceae	Wild Strawberry	*Fragaria virginiana Duchesne*	S5	
Rosaceae	Yellow Avens	*Geum aleppicum Jacq.*	S5	
Rosaceae	Eastern Ninebark	*Physocarpus opulifolius (L.) Maxim.*	S5	
Rosaceae	Silverweed	*Potentilla anserina L.*	S5	

Family	Common Name	Scientific Name	S-Rank	RR TBD
Rosaceae	Norwegian Cinquefoil	*Potentilla norvegica L.*	S5	
Rosaceae	Pin Cherry	*Prunus pensylvanica L. f.*	S5	
Rosaceae	Prickly Rose	*Rosa acicularis Lindl.*	S5	
Rosaceae	Smooth Rose	*Rosa blanda Ait.*	S5	
Rosaceae	Common Red Raspberry	*Rubus idaeus L.*	S5	
Rosaceae	Thimbleberry	*Rubus parviflorus Nutt.*	S4	
Rosaceae	Dewberry	*Rubus pubescens Raf.*	S5	
Rosaceae	Three-toothed Cinquefoil	*Sibbaldia tridentata (Ait.) Paule & Sojak*	S5	
Rosaceae	American Mountain-ash	*Sorbus americana Marsh.*	S5	
Rosaceae	Northern Mountain-ash	*Sorbus decora (Sarg.) Schneid.*	S5	
Rubiaceae	Rough Bedstraw	*Galium asprellum Michx.*	S5	
Rubiaceae	Stiff Marsh Bedstraw	*Galium tinctorium (L.) Scop.*	S5	
Rubiaceae	Three-petalled Bedstraw	*Galium trifidum L.*	S5	
Rubiaceae	Three-flowered Bedstraw	*Galium triflorum Michx.*	S5	
Salicaceae	Balsam Poplar	*Populus balsamifera L.*	S5	
Salicaceae	Trembling Aspen	*Populus tremuloides Michx.*	S5	
Salicaceae	Pussy Willow	*Salix discolor Muhl.*	S5	
Salicaceae	Heart-leaved Willow	*Salix eriocephala Michx.*	S5	
Salicaceae	Prairie Willow	*Salix humilis Marsh.*	S5	
Salicaceae	Shining Willow	*Salix lucida Muhl.*	S5	
Salicaceae	Bog Willow	*Salix pedicellaris Pursh*	S5	
Salicaceae	Satiny Willow	*Salix pellita (Anderss.) Anderss. ex Schneid.*	S5	
Salicaceae	Meadow Willow	*Salix petiolaris Sm.*	S5	
Sarraceniaceae	Northern Pitcher Plant	*Sarracenia purpurea L.*	S5	
Saxifragaceae	Early Saxifrage	*Micranthes virginiensis (Michx.) Small*	S5	
Saxifragaceae	Naked Mitrewort	*Mitella nuda L.*	S5	
Saxifragaceae	Small-flowered Grass-of-Parnassus	*Parnassia parviflora DC.*	S4	
Scrophulariaceae	Stiff Eyebright	*Euphrasia stricta D. Wolff ex J.F. Lehm.*	SNA	
Scrophulariaceae	American Cow-wheat	*Melampyrum lineare Desr.*	S5	
Scrophulariaceae	Red Odontites	*Odontites vulgaris Moench*	SNA	
Scrophulariaceae	Little Yellow Rattle	*Rhinanthus minor L.*	S4?	
Scrophulariaceae	American Speedwell	*Veronica americana Schwein. ex Benth.*	S5	
Scrophulariaceae	Purslane Speedwell	*Veronica peregrina L.*	S5	
Scrophulariaceae	Marsh Speedwell	*Veronica scutellata L.*	S5	
Urticaceae	Stinging Nettle	*Urtica dioica L.*	S5	
Violaceae	Sweet White Violet	*Viola blanda Willd.*	S5	
Violaceae	Smooth White Violet	*Viola macloskeyi Lloyd*	S5	
Violaceae	Yellow Violet	*Viola pubescens Ait.*	S5	

Appendix 4. Location of rare taxa observed in the GenPGM study area, 2008-2010 and 2020.

Rarity	Common Name	Scientific Name	Date Observed	Easting	Northing
SAR	Canada Warbler	*Cardellina canadensis*	2020-06-06	548368	5404171
SAR	Canada Warbler	*Cardellina canadensis*	2020-06-06	548429	5404671
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-07	548542	5404065
SAR	Canada Warbler	*Cardellina canadensis*	2009-07-17	548906	5404335
SAR	Canada Warbler	*Cardellina canadensis*	2009-07-17	548947	5404544
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-21	549305	5403838
SAR	Canada Warbler	*Cardellina canadensis*	2009-07-15	549496	5403835
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-20	549600	5403353
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-20	549617	5403283
SAR	Canada Warbler	*Cardellina canadensis*	2009-07-18	549695	5406269
SAR	Canada Warbler	*Cardellina canadensis*	2009-07-18	549743	5406060
SAR	Canada Warbler	*Cardellina canadensis*	2020-06-08	549836	5404785
SAR	Canada Warbler	*Cardellina canadensis*	2010-06-01	549868	5402578
SAR	Canada Warbler	*Cardellina canadensis*	2009-07-18	549986	5404990
SAR	Canada Warbler	*Cardellina canadensis*	2009-07-18	550026	5405058
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-20	550039	5403767
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-09	550061	5404371
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-21	550083	5402099
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-09	550084	5402605
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-21	550248	5402001
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-21	550248	5402001
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-20	550299	5404395
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-21	550306	5401712
SAR	Canada Warbler	*Cardellina canadensis*	2020-06-08	550315	5405018
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-09	550448	5402608
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-21	550479	5400757
SAR	Canada Warbler	*Cardellina canadensis*	2020-06-08	550546	5406130
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-21	550575	5401057
SAR	Canada Warbler	*Cardellina canadensis*	2009-06-21	550577	5400925
SAR	Canada Warbler	*Cardellina canadensis*	2009-07-16	550903	5403688
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-09	551041	5402545
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-09	551330	5402586
SAR	Canada Warbler	*Cardellina canadensis*	2020-06-07	549839	5404747
SAR	Canada Warbler	*Cardellina canadensis*	2020-06-07	549791	5405502
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-08	549345	5404945
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-09	549417	5404984
SAR	Canada Warbler	*Cardellina canadensis*	2020-07-09	549316	5404949
SAR	Eastern Wood-Pewee	*Contopus virens*	2010-06-01	549926	5402795
SAR	Evening Grosbeak	*Coccothraustes vespertinus*	2008-06-01	550277	5401910

Rarity	Common Name	Scientific Name	Date Observed	Easting	Northing
SAR	Evening Grosbeak	*Coccothraustes vespertinus*	2009-06-20	550466	5405811
SAR	Little Brown Myotis	*Myotis lucifugus*	June-July 2020	550241	5407094
SAR	Little Brown Myotis	*Myotis lucifugus*	June-July 2020	549795	5404612
SAR	Little Brown Myotis	*Myotis lucifugus*	July-Aug 2020	549417	5403507
SAR	Little Brown Myotis	*Myotis lucifugus*	July-Aug 2020	546974	5402335
SAR	Little Brown Myotis	*Myotis lucifugus*	2020-07-07	551105	5402544
SAR	Little Brown Myotis	*Myotis lucifugus*	June-July 2020	550765	5403587
SAR	Little Brown Myotis	*Myotis lucifugus*	July-Aug 2020	550759	5406145
SAR	Little Brown Myotis	*Myotis lucifugus*	June-July 2020	550183	5405289
SAR	Little Brown Myotis	*Myotis lucifugus*	July-Aug 2020	550695	5405701
SAR	Little Brown Myotis	*Myotis lucifugus*	June-July 2020	549791	5405502
SAR	Little Brown Myotis	*Myotis lucifugus*	July-Aug 2020	551105	5402544
SAR	Little Brown Myotis	*Myotis lucifugus*	July-Aug 2020	547506	5402808
SAR	Little Brown Myotis	*Myotis lucifugus*	June-July 2020	548257	5403376
SAR	Little Brown Myotis	*Myotis lucifugus*	July-Aug 2020	550244	5407086
SAR	Monarch	*Danaus plexippus*	2020-07-07	550173	5403809
SAR	Monarch	*Danaus plexippus*	2020-07-07	549551	5403530
SAR	Monarch	*Danaus plexippus*	2020-07-08	550526	5406272
SAR	Monarch	*Danaus plexippus*	2020-07-08	550012	5404632
SAR	Monarch	*Danaus plexippus*	2020-07-07	551463	5402560
SAR	Northern Myotis	*Myotis septentrionalis*	July-Aug 2020	546974	5402335
SAR	Olive-sided Flycatcher	*Contopus cooperi*	2009-07-18	549695	5406269
SAR	Rusty Blackbird	*Euphagus carolinus*	2009-07-15	550204	5405309
SAR	Yellow-banded Bumble Bee	*Bombus terricola*	2020-06-08	551497	5402554
SAR	Yellow-banded Bumble Bee	*Bombus terricola*	2020-06-08	549670	5402695
PR	Alga Pondweed	*Potamogeton confervoides*	2009-08-06	548136	5403376
PR	Alga Pondweed	*Potamogeton confervoides*	2009-08-24	548934	5404289
PR	Alpine Woodsia	*Woodsia alpina*	2009-07-17	549342	5403777
PR	American shoreweed	*Littorella americana*	2009-08-07	543934	5403309
PR	Braun's Holly Fern	*Polystichum braunii*	2009-07-18	549460	5404968
PR	Hoary Draba	*Draba cana*	2009-08-05	546618	5406889
PR	Mountain Firmoss	*Huperzia appressa*	2009-08-05	548875	5407566
PR	Ski-tipped Emerald	*Somatochlora elongata*	2020-08-12	549829	5402631
RR	Tall Millet	*Milium effusum*	2009-07-15	550870	5402600
RR	Broad-lipped Twayblade	*Neottia convallarioides*	2009-07-16	550748	5405958
RR	Canada Ricegrass	*Piptatheropsis canadensis*	2009-07-16	550664	5403490
RR	Common Ragweed	*Ambrosia artemisiifolia*	2009-08-06	550440	5405800
RR	Northern St. John's-wort	*Hypericum boreale*	2009-08-06	548136	5403376
RR	Oakes' Pondweed	*Potamogeton oakesianus*	2009-08-06	547936	5403292
RR	Oakes' Pondweed	*Potamogeton oakesianus*	2009-08-06	548268	5403327
RR	Oakes' Pondweed	*Potamogeton oakesianus*	2009-07-17	548587	5404096

Rarity	Common Name	Scientific Name	Date Observed	Easting	Northing
RR	Oakes' Pondweed	*Potamogeton oakesianus*	2009-08-24	548927	5404538
RR	Oakes' Pondweed	*Potamogeton oakesianus*	2009-08-24	548934	5404289
RR	Small Pondweed	*Potamogeton pusillus*	2009-07-17	548897	5404411
RR	Small-flowered Evening Primrose	*Oenothera parviflora*	2009-07-17	548897	5404411
RR	Tall Millet	*Milium effusum*	2009-08-04	549216	5403852

Appendix 5. Odonate (dragonfly and damselfly) species confirmed in the Marathon Palladium Project study area.

Family	Common Name	Scientific Name	S-Rank	MPGM 2008-2010	MPGM 2020
Aeshnidae	Canada Darner	*Aeshna canadensis*	S5	Y	Y
Aeshnidae	Lake Darner	*Aeshna eremita*	S5		Y
Aeshnidae	Variable (Interrupted) Darner	*Aeshna interrupta interrupta*	S5	Y	Y
Aeshnidae	Shadow Darner	*Aeshna umbrosa*	S5		Y
Corduliidae	American Emerald	*Cordulia shurtleffii*	S5	Y	
Corduliidae	Racket-tailed Emerald	*Dorocordulia libera*	S5	Y	
Corduliidae	Ski-tipped Emerald	*Somatochlora elongata*	S3?		Y
Corduliidae	Ocellated Emerald	*Somatochlora minor*	S4	Y	Y
Gomphidae	Dragonhunter	*Hagenius brevistylus*	S5	Y	
Gomphidae	Zebra Clubtail	*Stylurus scudderi*	S4	Y	
Libellulidae	Chalk-fronted Corporal	*Ladona julia*	S5	Y	
Libellulidae	Hudsonian Whiteface	*Leucorrhinia hudsonica*	S5	Y	Y
Libellulidae	Belted Whiteface	*Leucorrhinia proxima*	S5	Y	
Libellulidae	Twelve-spotted Skimmer	*Libellula pulchella*	S5		Y
Libellulidae	Four-spotted Skimmer	*Libellula quadrimaculata*	S5	Y	
Libellulidae	Black Meadowhawk	*Sympetrum danae*	S4		Y
Libellulidae	White-faced Meadowhawk	*Sympetrum obtrusum*	S5		Y
Libellulidae	Band-winged Meadowhawk	*Sympetrum semicinctum*	S4	Y	
Coenagrionidae	Subarctic Bluet	*Coenagrion interrogatum*	S4	Y	
Coenagrionidae	Boreal Bluet	*Enallagma boreale**	S5	Y	
Coenagrionidae	Hagen's Bluet	*Enallagma hageni*	S5	Y	Y
Coenagrionidae	Eastern Forktail	*Ischnura verticalis*	S5	Y	
Coenagrionidae	Sedge Sprite	*Nehalennia irene*	S5	Y	
Lestidae	Northern Spreadwing	*Lestes disjunctus*	S5	Y	Y
Lestidae	Emerald Spreadwing	*Lestes dryas*	S5		Y

*formerly *E. cyathigerum*

Appendix 6. Butterfly species confirmed in the Marathon Palladium Project study area.

Family	Common Name	Scientific Name	S_RANK	MPGM 2008-2010	MPGM 2020
Hesperiidae	Common Roadside Skipper	*Amblyscirtes vialis*	S4	Y	Y
Hesperiidae	Peck's Skipper	*Polites peckius*	S5	Y	
Hesperiidae	European Skipper	*Thymelicus lineola*	SNA		Y
Lycaenidae	Brown Elfin	*Callophrys augustinus*	S5		Y
Lycaenidae	Eastern Pine Elfin	*Callophrys niphon*	S5		Y
Lycaenidae	Northern Spring Azure	*Celastrina lucia*	S5		Y
Lycaenidae	Dorcas Copper	*Lycaena dorcas*	S5	Y	
Lycaenidae	Striped Hairstreak	*Satyrium liparops*	S5		Y
Nymphalidae	Silver-bordered Fritillary	*Boloria selene*	S5		Y
Nymphalidae	Silvery Checkerspot	*Chlosyne nycteis*	S5		Y
Nymphalidae	Monarch	*Danaus plexippus*	S2N,S4B		Y
Nymphalidae	White Admiral	*Limenitis arthemis arthemis*	S5	Y	
Nymphalidae	Mourning Cloak	*Nymphalis antiopa*	S5	Y	Y
Nymphalidae	Compton Tortoiseshell	*Nymphalis l-album*	S5		Y
Nymphalidae	Northern Crescent	*Phyciodes cocyta*	S5	Y	
Nymphalidae	Green Comma	*Polygonia faunus*	S4		Y
Nymphalidae	Hoary Comma	*Polygonia gracilis*	S4	Y	
Nymphalidae	Great Spangled Fritillary	*Speyeria cybele*	S5	Y	Y
Nymphalidae	Red Admiral	*Vanessa atalanta*	S5	Y	
Nymphalidae	Painted Lady	*Vanessa cardui*	S5		Y
Papilionidae	Canadian Tiger Swallowtail	*Papilio canadensis*	S5	Y	Y
Pieridae	Pink-edged Sulphur	*Colias interior*	S5	Y	
Pieridae	Mustard White	*Pieris oleracea*	S4	Y	

Appendix 7. Potential and confirmed amphibian and reptiles for the Marathon Palladium Project study area (MPGM)*.

Family	Common Name	Scientific Name	MPGM Status	Notes
Bufonidae	American Toad	*Anaxyrus americanus*	confirmed	Common and widespread in MPGM study area
Hylidae	Gray Treefrog	*Hyla versicolor*	unlikely	Near northern limit of its range and few documented records along the north shore of Lake Superior, none between Nipigon and White River.
Hylidae	Spring Peeper	*Pseudacris crucifer*	confirmed	Common and widespread in MPGM study area
Hylidae	Boreal Chorus Frog	*Pseudacris maculata*	confirmed	Heard on song recorders at in MPGM study area. Numerous records along the north shore of Lake Superior and suitable habitat in the MPGM study area
Ranidae	Green Frog	*Lithobates clamitans*	confirmed	Common and widespread in MPGM study area
Ranidae	Northern Leopard Frog	*Lithobates pipiens*	confirmed	Observed in L13 and Stream 4 (Ecometrix Inc. 2012)
Ranidae	Mink Frog	*Lithobates septentrionalis*	confirmed	Common and widespread in MPGM study area
Ranidae	Wood Frog	*Lithobates sylvaticus*	confirmed	Common and widespread in MPGM study area
Ambystomatidae	Blue-spotted Salamander	*Ambystoma laterale*	confirmed	One individual observed in MPGM study area
Ambystomatidae	Spotted Salamander	*Ambystoma maculatum*	possible	Documented records within 100 km and potentially suitable habitat in the study area
Plethodontidae	Eastern Red-backed Salamander	*Plethodon cinereus*	confirmed	Two individuals observed in MPGM study area
Proteidae	Mudpuppy	*Necturus maculosus*	unlikely	At northern limit of its range and no records along north shore of Lake Superior within 200 km (all in Lake Superior tributaries below barriers).
Salamandridae	Eastern Newt	*Notophthalmus viridescens*	confirmed	Confirmed in six ponds and small lakes in the MPGM study area during fish community sampling (Ecometrix Inc. 2012)
Chelydridae	Snapping Turtle	*Chelydra serpentina*	unlikely	Very few documented occurrences along the north shore of Lake Superior, with only a single Pukaskwa N.P. as the only record between Sibley Peninsula and Wawa. Near northern limit of its range where it may be limited by cool climate (COSEWIC 2008). Marginal habitat in the study area due to lack of large productive wetlands preferred by this species (COSEWIC 2008)
Emydidae	Western Painted Turtle	*Chrysemys picta bellii*	possible	Very few occurrences along the north shore of Lake Superior. Potentially suitable habitat in the study area however, and more abundant inland (e.g., White River).
Colubridae	Red-bellied Snake	*Storeria occipitomaculata*	unlikely	At northern limit of its range and only one record (Sibley Peninsula) along the north shore of Lake Superior.
Colubridae	Eastern Gartersnake	*Thamnophis sirtalis sirtalis*	probable	Numerous records along north shore of Lake Superior and potentially suitable habitat in study area

*based on Caspar (2002), Foster et al. (2004), Harding (2006), Harris and Foster (2006b); iNat (2020), Ontario Nature (2019), Rowell (2012), TBFN (2016)

Appendix 8. Results of three nocturnal surveys June-July 2020 in the Marathon Palladium Project study area*.

Station #	Easting	Northing	Notes: Survey #1 (June 4)	Notes: Survey #2 (June 6)	Notes: Survey #3 (July 7)
1	550177	5407039	AMWO, NSWO, SWTH, WTSP; SPPE	HETH, WTSP; SPPE	HETH
2	550464	5406676	SWTH, WTSP; SPPE; bat (*Myotis* sp.?) flew past	AMRO; SPPE	
3	550526	5406273	SPPE; moths	HETH; SPPE	GRFR
4	550467	5405821	AMTO, SPPE	HETH, SWTH; SPPE; moths	
5	550403	5405343	AMTO, SPPE	SPPE	SPPE; hoary bat (n=2)
6	550321	5405024	AMTO, SPPE	ALFL, WTSP; SPPE	moths
7	550132	5404668	AMTO, SPPE	SPPE	
8	550200	5404144	AMTO, SPPE	SPPE; moths	
9	550167	5403812	AMTO		
10	549775	5403511	SPPE	AMTO, SPPE; moths	NSWO
11	549645	5403156	WISN; SPPE	WISN	
12	549683	5402684	WTSP; AMTO, SPPE	AMRO; AMTO, SPPE	
13	550202	5402598	SPPE	SPPE, moths	
14	550670	5402631	RUGR		
15	551150	5402557	AMTO	AMTO	little brown myotis (n=1)
16	550240	5400168	SPPE		

*AMRO = American rob AMWO = American woodcock, HETH = hermit thrush, NSWO = northern saw-whet owl, RUGR = ruffed grouse, SWTH = Swainson's thrush, WISN = Wilson's snipe, WTSP = white-throated sparrow,

AMTO = American toad; SPPE=Spring Peeper, GRFR = Green Frog

Appendix 9. Bird species of the Generation PGM study area and adjacent landscape.

The following species were observed or heard in or near the Generation PGM study area during point counts (PC) in 2008-2010 or 2020, as well as incidental observations (Inc.). Additional species recorded 1976 to 2004 on a Breeding Bird Survey (BBS) route in the Marathon area but not within the GenPGM property are also provided for comparison. Taxonomic order and nomenclature follow AOS (2020).

Nesting Evidence (NE)

Nest evidence codes follow the Ontario Breeding Bird Atlas (Cadman et al. 2007):

POSSIBLE BREEDING

H Species observed in its breeding season in suitable nesting habitat.

S Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat.

PROBABLE BREEDING

P Pair observed in their breeding season in suitable nesting habitat.

T Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart, at the same place.

D Courtship or display between a male and a female or 2 males, including courtship feeding or copulation.

V Visiting probable nest site.

A Agitated behaviour or anxiety calls of an adult.

B Brood patch on adult female or cloacal protuberance on adult male.

N Nest-building or excavation of nest hole.

CONFIRMED BREEDING

DD Distraction display or injury feigning.

NU Used nest or egg shell found (occupied or laid within the period of the study).

FY Recently fledged young or downy young, including young incapable of sustained flight.

AE Adults leaving or entering nest site in circumstances indicating occupied nest.

FS Adult carrying faecal sac.

CF Adult carrying food for young.

NE Nest containing eggs.

NY Nest with young seen or heard.

Family	Common Name	Scientific Name	Species at Risk	NE 2008 - 2020	PC 2008-2010	PC 2020	Inc. Obs 2020	BBS
Gaviidae	Common Loon	*Gavia immer*		H	Y	Y		
Phalacrocoracidae	Double-crested Cormorant	*Phalacrocorax auritus*		X				
Ardeidae	Great Blue Heron	*Ardea herodias*		H				
Ardeidae	American Bittern	*Botaurus lentiginosus*						Y
Anatidae	Wood Duck	*Aix sponsa*						Y
Anatidae	American Wigeon	*Anas americana*						Y
Anatidae	Green-winged Teal	*Anas crecca*						Y
Anatidae	Blue-winged Teal	*Anas discors*						Y
Anatidae	Mallard	*Anas platyrhynchos*		H	Y	Y	Y	
Anatidae	American Black Duck	*Anas rubripes*		H				
Anatidae	Lesser Scaup	*Aythya affinis*						Y
Anatidae	Ring-necked Duck	*Aythya collaris*		P			Y	
Anatidae	Canada Goose	*Branta canadensis*		H	Y	Y		
Anatidae	Common Goldeneye	*Bucephala clangula*		FY	Y	Y		
Anatidae	Hooded Merganser	*Lophodytes cucullatus*		FY				
Anatidae	Common Merganser	*Mergus merganser*		P			Y	
Anatidae	Red-breasted Merganser	*Mergus serrator*		P				
Cathartidae	Turkey Vulture	*Cathartes aura*		X			Y	Y
Accipitridae	Northern Goshawk	*Accipiter gentilis*						Y
Accipitridae	Sharp-shinned Hawk	*Accipiter striatus*						Y
Accipitridae	Red-tailed Hawk	*Buteo jamaicensis*		H		Y		
Accipitridae	Broad-winged Hawk	*Buteo platypterus*		S		Y		
Falconidae	Merlin	*Falco columbarius*		H				
Falconidae	American Kestrel	*Falco sparverius*						Y
Phasianidae	Ruffed Grouse	*Bonasa umbellus*		FY	Y	Y	Y	
Phasianidae	Spruce Grouse	*Falcipennis canadensis*		FY		Y	Y	
Charadriidae	Killdeer	*Charadrius vociferus*		H	Y			

Family	Common Name	Scientific Name	Species at Risk	NE 2008 - 2020	PC 2008-2010	PC 2020	Inc. Obs 2020	BBS
Scolopacidae	Spotted Sandpiper	*Actitis macularius*		H	Y		Y	
Scolopacidae	Wilson's Snipe	*Gallinago delicata*		S	Y		Y	
Gruidae	Sandhill Crane	*Grus canadensis*		H			Y	
Scolopacidae	American Woodcock	*Scolopax minor*		S			Y	
Scolopacidae	Solitary Sandpiper	*Tringa solitaria*		P			Y	
Laridae	Herring Gull	*Larus argentatus*		H	Y		Y	
Laridae	Ring-billed Gull	*Larus delawarensis*						Y
Columbidae	Rock Pigeon	*Columba livia*						Y
Columbidae	Mourning Dove	*Zenaida macroura*						Y
Cuculidae	Black-billed Cuckoo	*Coccyzus erythropthalmus*						Y
Strigidae	Northern Saw-whet Owl	*Aegolius acadicus*		S			Y	
Caprimulgidae	Common Nighthawk	*Chordeiles minor*	Y					Y
Trochilidae	Ruby-throated Hummingbird	*Archilochus colubris*		H				
Tyrannidae	Olive-sided Flycatcher	*Contopus cooperi*	Y	H				
Tyrannidae	Eastern Wood-Pewee	*Contopus virens*	Y	S	Y			
Tyrannidae	Alder Flycatcher	*Empidonax alnorum*		S	Y	Y		
Tyrannidae	Yellow-bellied Flycatcher	*Empidonax flaviventris*		S	Y	Y		
Tyrannidae	Least Flycatcher	*Empidonax minimus*		S	Y	Y		
Alcedinidae	Belted Kingfisher	*Megaceryle alcyon*		NU	Y	Y		
Tyrannidae	Eastern Phoebe	*Sayornis phoebe*		S	Y			
Tyrannidae	Eastern Kingbird	*Tyrannus tyrannus*						Y
Picidae	Northern Flicker	*Colaptes auratus*		S	Y	Y		
Picidae	Pileated Woodpecker	*Dryocopus pileatus*		S	Y		Y	
Picidae	Red-headed Woodpecker	*Melanerpes erythrocephalus*	Y					Y
Picidae	Black-backed Woodpecker	*Picoides arcticus*		H		Y	Y	
Picidae	Downy Woodpecker	*Picoides pubescens*		H	Y	Y		
Picidae	Hairy Woodpecker	*Picoides villosus*		S	Y	Y		

Family	Common Name	Scientific Name	Species at Risk	NE 2008 - 2020	PC 2008-2010	PC 2020	Inc. Obs 2020	BBS
Picidae	Yellow-bellied Sapsucker	*Sphyrapicus varius*		H	Y	Y		
Hirundinidae	Barn Swallow	*Hirundo rustica*	Y					Y
Hirundinidae	Cliff Swallow	*Petrochelidon pyrrhonota*						Y
Hirundinidae	Bank Swallow	*Riparia riparia*	Y					Y
Hirundinidae	Northern Rough-winged Swallow	*Stelgidopteryx serripennis*						Y
Hirundinidae	Tree Swallow	*Tachycineta bicolor*						Y
Corvidae	American Crow	*Corvus brachyrhynchos*		H	Y	Y		
Corvidae	Common Raven	*Corvus corax*		NE	Y	Y		
Corvidae	Blue Jay	*Cyanocitta cristata*		S	Y	Y	Y	
Corvidae	Canada Jay	*Perisoreus canadensis*		FY	Y	Y	Y	
Paridae	Black-capped Chickadee	*Poecile atricapillus*		S	Y	Y		
Paridae	Boreal Chickadee	*Poecile hudsonicus*		H	Y	Y		
Sittidae	Red-breasted Nuthatch	*Sitta canadensis*		S	Y	Y		
Certhiidae	Brown Creeper	*Certhia americana*		S	Y			
Troglodytidae	House Wren	*Troglodytes aedon*						Y
Troglodytidae	Winter Wren	*Troglodytes hiemalis*		S	Y	Y		
Regulidae	Ruby-crowned Kinglet	*Regulus calendula*		S	Y	Y		
Regulidae	Golden-crowned Kinglet	*Regulus satrapa*		S	Y	Y		
Turdidae	Veery	*Catharus fuscescens*		S	Y	Y		
Turdidae	Hermit Thrush	*Catharus guttatus*		S	Y	Y	Y	
Turdidae	Swainson's Thrush	*Catharus ustulatus*		S	Y	Y	Y	
Turdidae	Eastern Bluebird	*Sialia sialis*						Y
Turdidae	American Robin	*Turdus migratorius*		S	Y	Y		
Mimidae	Gray Catbird	*Dumetella carolinensis*						Y
Mimidae	Brown Thrasher	*Toxostoma rufum*						Y
Bombycillidae	Cedar Waxwing	*Bombycilla cedrorum*		H	Y	Y		
Sturnidae	European Starling	*Sturnus vulgaris*		H	Y			

Family	Common Name	Scientific Name	Species at Risk	NE 2008 - 2020	PC 2008-2010	PC 2020	Inc. Obs 2020	BBS
Vireonidae	Red-eyed Vireo	*Vireo olivaceus*		S	Y	Y		
Vireonidae	Philadelphia Vireo	*Vireo philadelphicus*		S	Y			
Vireonidae	Blue-headed Vireo	*Vireo solitarius*		S	Y	Y	Y	
Parulidae	Canada Warbler	*Cardellina canadensis*	Y	A	Y	Y	Y	
Parulidae	Wilson's Warbler	*Cardellina pusilla*		S	Y			
Parulidae	Mourning Warbler	*Geothlypis philadelphia*		S	Y	Y		
Parulidae	Common Yellowthroat	*Geothlypis trichas*		S			Y	
Parulidae	Black-and-white Warbler	*Mniotilta varia*		S	Y		Y	
Parulidae	Connecticut Warbler	*Oporornis agilis*						Y
Parulidae	Tennessee Warbler	*Oreothlypis peregrina*		S	Y	Y		
Parulidae	Nashville Warbler	*Oreothlypis ruficapilla*		S	Y	Y		
Parulidae	Northern Waterthrush	*Parkesia noveboracensis*		S	Y	Y		
Parulidae	Ovenbird	*Seiurus aurocapilla*		S	Y	Y		
Parulidae	Northern Parula	*Setophaga americana*		S	Y	Y	Y	
Parulidae	Black-throated Blue Warbler	*Setophaga caerulescens*		S	Y	Y	Y	
Parulidae	Bay-breasted Warbler	*Setophaga castanea*		S	Y	Y		
Parulidae	Yellow-rumped Warbler	*Setophaga coronata*		S	Y	Y		
Parulidae	Blackburnian Warbler	*Setophaga fusca*		S	Y	Y		
Parulidae	Magnolia Warbler	*Setophaga magnolia*		S	Y	Y		
Parulidae	Palm Warbler	*Setophaga palmarum*		S	Y			
Parulidae	Chestnut-sided Warbler	*Setophaga pensylvanica*		S	Y	Y		
Parulidae	Yellow Warbler	*Setophaga petechia*		S	Y	Y		
Parulidae	American Redstart	*Setophaga ruticilla*		CF	Y	Y		
Parulidae	Cape May Warbler	*Setophaga tigrina*		S		Y		Y
Parulidae	Black-throated Green Warbler	*Setophaga virens*		S	Y	Y		
Cardinalidae	Indigo Bunting	*Passerina cyanea*						Y
Cardinalidae	Rose-breasted Grosbeak	*Pheucticus ludovicianus*		S	Y			

Family	Common Name	Scientific Name	Species at Risk	NE 2008 - 2020	PC 2008-2010	PC 2020	Inc. Obs 2020	BBS
Passerellidae	Dark-eyed Junco	*Junco hyemalis*		S	Y	Y		
Passerellidae	Swamp Sparrow	*Melospiza georgiana*		S		Y		
Passerellidae	Lincoln's Sparrow	*Melospiza lincolnii*		S	Y		Y	
Passerellidae	Song Sparrow	*Melospiza melodia*		P	Y		Y	
Passerellidae	Savannah Sparrow	*Passerculus sandwichensis*						Y
Passerellidae	Fox Sparrow	*Passerella iliaca*		H	Y	Y		
Passerellidae	Vesper Sparrow	*Pooecetes gramineus*						Y
Passerellidae	Clay-colored Sparrow	*Spizella pallida*						Y
Passerellidae	Chipping Sparrow	*Spizella passerina*		S	Y	Y		
Passerellidae	White-throated Sparrow	*Zonotrichia albicollis*		S	Y	Y	Y	
Passerellidae	White-crowned Sparrow	*Zonotrichia leucophrys*		S	Y	Y		
Icteridae	Red-winged Blackbird	*Agelaius phoeniceus*						Y
Icteridae	Bobolink	*Dolichonyx oryzivorus*	Y					Y
Icteridae	Rusty Blackbird	*Euphagus carolinus*	Y	FY				
Icteridae	Brewer's Blackbird	*Euphagus cyanocephalus*						Y
Icteridae	Brown-headed Cowbird	*Molothrus ater*		H	Y			
Icteridae	Common Grackle	*Quiscalus quiscula*						Y
Fringillidae	Evening Grosbeak	*Coccothraustes vespertinus*	Y	H	Y			
Fringillidae	Purple Finch	*Haemorhous purpureus*		S	Y	Y		
Fringillidae	Red Crossbill	*Loxia curvirostra*						Y
Fringillidae	White-winged Crossbill	*Loxia leucoptera*		H	Y	Y		Y
Fringillidae	Pine Grosbeak	*Pinicola enucleator*		H		Y		
Fringillidae	Pine Siskin	*Spinus pinus*		S	Y	Y		
Fringillidae	American Goldfinch	*Spinus tristis*		S		Y		Y

Appendix 10. Morning point count data for the Marathon Palladium Project, June-July 2020.

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-001-2020a	American Goldfinch	0	0	0	0	0	0	1	0	0	1
PC-001-2020a	Blackburnian Warbler	1	0	0	0	0	0	0	0	0	1
PC-001-2020a	Black-throated Green Warbler	0	0	0	0	0	0	0	1	0	1
PC-001-2020a	Chestnut-sided Warbler	1	0	0	0	0	0	0	0	0	1
PC-001-2020a	Dark-eyed Junco	1	0	0	0	0	0	0	0	0	1
PC-001-2020a	Golden-crowned Kinglet	1	0	0	0	0	0	0	0	0	1
PC-001-2020a	Pine Siskin	0	0	0	15	0	0	0	0	0	15
PC-001-2020a	Purple Finch	0	1	0	0	0	0	0	0	0	1
PC-001-2020a	Red-breasted Nuthatch	0	2	0	0	0	0	0	0	0	2
PC-001-2020a	Red-eyed Vireo	0	0	0	1	0	0	0	0	0	1
PC-001-2020a	Swainson's Thrush	0	0	0	0	0	0	0	0	1	1
PC-001-2020a	White-throated Sparrow	0	1	0	0	0	0	0	1	0	2
PC-001-2020a	White-winged Crossbill	0	1	0	0	0	0	0	0	0	1
PC-001-2020a	Yellow-bellied Flycatcher	0	0	0	1	0	0	0	0	0	1
PC-001-2020a	Yellow-rumped Warbler	2	0	0	0	0	0	0	0	0	2
PC-002-2020a	American Crow	0	1	0	0	0	0	0	0	0	1
PC-002-2020a	American Redstart	0	0	0	1	0	0	0	0	0	1
PC-002-2020a	Black-capped Chickadee	1	0	0	0	0	0	0	0	0	1
PC-002-2020a	Black-throated Green Warbler	0	1	0	0	0	0	0	0	0	1
PC-002-2020a	Common Goldeneye	0	0	1	0	0	0	0	0	0	1
PC-002-2020a	Hermit Thrush	0	0	0	0	0	0	0	0	1	1
PC-002-2020a	Nashville Warbler	2	0	0	0	0	0	0	0	0	2
PC-002-2020a	Pine Siskin	0	1	0	0	0	0	0	0	5	6
PC-002-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-002-2020a	Ruby-crowned Kinglet	0	0	0	0	1	0	0	0	0	1
PC-002-2020a	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2
PC-002-2020a	White-throated Sparrow	0	0	0	0	0	1	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-002-2020a	Winter Wren	0	0	0	0	1	0	0	0	0	1
PC-002-2020a	Yellow-bellied Flycatcher	0	0	0	0	0	0	1	1	0	2
PC-003-2020a	Black-capped Chickadee	0	0	0	0	0	0	1	0	0	1
PC-003-2020a	Black-throated Green Warbler	1	0	0	0	0	0	1	1	0	3
PC-003-2020a	Common Raven	0	0	2	0	0	0	0	0	0	2
PC-003-2020a	Pine Siskin	30	0	0	0	0	0	0	0	0	30
PC-003-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	1	0	0	1
PC-003-2020a	Ruby-crowned Kinglet	0	0	0	1	0	0	0	0	0	1
PC-003-2020a	Tennessee Warbler	0	0	0	0	0	0	1	0	0	1
PC-003-2020a	Winter Wren	0	0	0	0	0	0	0	1	0	1
PC-003-2020a	Yellow-bellied Flycatcher	0	0	0	1	0	0	0	0	0	1
PC-003-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-004-2020a	Bay-breasted Warbler	0	0	0	0	0	0	1	0	0	1
PC-004-2020a	Blackburnian Warbler	1	0	0	0	0	0	0	0	0	1
PC-004-2020a	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-004-2020a	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-004-2020a	Hermit Thrush	0	0	2	0	0	0	0	0	1	3
PC-004-2020a	Nashville Warbler	1	0	0	1	0	0	0	0	0	2
PC-004-2020a	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-004-2020a	Pine Siskin	0	0	0	0	0	0	3	0	0	3
PC-004-2020a	Ruby-crowned Kinglet	0	0	0	1	0	0	0	1	0	2
PC-004-2020a	Swainson's Thrush	1	1	0	0	0	0	0	0	0	2
PC-004-2020a	White-throated Sparrow	0	0	0	0	0	0	0	0	1	1
PC-004-2020a	Winter Wren	0	0	0	0	0	0	0	1	0	1
PC-004-2020a	Yellow-bellied Flycatcher	0	0	0	1	0	0	0	0	0	1
PC-004-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-005-2020a	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-005-2020a	Nashville Warbler	2	0	0	0	0	0	0	0	0	2
PC-005-2020a	Pine Siskin	10	0	0	0	0	0	0	0	0	10
PC-005-2020a	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-005-2020a	Swainson's Thrush	0	0	0	0	0	1	0	0	0	1
PC-005-2020a	Yellow-rumped Warbler	1	1	0	0	0	0	0	0	0	2
PC-006-2020a	American Crow	0	0	1	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-006-2020a	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-006-2020a	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-006-2020a	Black-throated Green Warbler	2	0	0	0	0	0	0	0	0	2
PC-006-2020a	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-006-2020a	Hermit Thrush	0	1	1	0	0	0	0	0	0	2
PC-006-2020a	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-006-2020a	Pine Siskin	15	0	0	0	0	0	0	0	0	15
PC-006-2020a	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-006-2020a	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-006-2020a	White-throated Sparrow	0	0	0	0	0	0	0	0	1	1
PC-006-2020a	Winter Wren	0	0	0	0	0	0	0	1	0	1
PC-006-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	0	1	0	1
PC-007-2020x	Black-throated Green Warbler	1	0	0	0	0	0	1	0	0	2
PC-007-2020x	Boreal Chickadee	0	0	0	0	0	0	1	0	0	1
PC-007-2020x	Dark-eyed Junco	0	0	0	1	0	0	0	0	0	1
PC-007-2020x	Pine Siskin	5	0	0	0	0	0	0	0	0	5
PC-007-2020x	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-007-2020x	Swainson's Thrush	1	1	0	0	0	0	0	0	0	2
PC-007-2020x	White-throated Sparrow	0	0	0	0	0	0	0	1	0	1
PC-007-2020x	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-007-2020x	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-029-2020a	Alder Flycatcher	0	1	0	0	0	0	0	0	0	1
PC-029-2020a	American Redstart	0	0	0	1	0	0	0	0	0	1
PC-029-2020a	Chestnut-sided Warbler	0	1	0	0	0	0	0	0	0	1
PC-029-2020a	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-029-2020a	Red-eyed Vireo	0	1	0	0	0	0	0	2	0	3
PC-029-2020a	White-throated Sparrow	0	0	0	0	0	0	1	0	0	1
PC-029-2020a	White-winged Crossbill	0	0	0	0	1	0	0	0	0	1
PC-029-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-030-2020a	American Redstart	0	0	0	0	0	1	0	0	0	1
PC-030-2020a	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-030-2020a	Pine Siskin	0	1	0	0	0	0	1	0	0	2
PC-030-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	1	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-030-2020a	Red-eyed Vireo	0	0	0	0	0	1	0	0	0	1
PC-030-2020a	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-030-2020a	White-throated Sparrow	0	1	0	1	0	0	0	0	0	2
PC-031-2020a	Alder Flycatcher	0	0	1	0	0	0	0	0	0	1
PC-031-2020a	American Redstart	0	1	0	0	0	0	0	0	0	1
PC-031-2020a	Chipping Sparrow	0	1	0	0	0	0	0	0	0	1
PC-031-2020a	Pine Siskin	0	1	0	1	0	0	0	0	0	2
PC-031-2020a	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-031-2020a	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-031-2020a	White-throated Sparrow	1	0	0	0	0	0	0	0	1	2
PC-032-2020a	Blackburnian Warbler	0	0	0	0	0	0	1	0	0	1
PC-032-2020a	Canada Jay	0	0	0	0	0	0	1	0	0	1
PC-032-2020a	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-032-2020a	Hermit Thrush	1	1	1	0	0	0	0	0	0	3
PC-032-2020a	Ovenbird	0	0	0	0	0	0	0	1	0	1
PC-032-2020a	Pine Siskin	0	0	0	0	1	0	0	0	0	1
PC-032-2020a	Ruby-crowned Kinglet	0	0	0	0	1	0	0	0	0	1
PC-032-2020a	Yellow-rumped Warbler	0	1	0	0	0	0	0	0	0	1
PC-033-2020a	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-033-2020a	Hermit Thrush	0	0	0	0	1	1	0	1	0	3
PC-033-2020a	Least Flycatcher	0	0	0	0	0	0	1	0	0	1
PC-033-2020a	Pine Siskin	0	0	0	0	0	0	3	0	0	3
PC-033-2020a	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	1	2
PC-033-2020a	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-033-2020a	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-034-2020a	American Redstart	0	2	0	0	0	0	0	0	0	2
PC-034-2020a	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-034-2020a	Hermit Thrush	0	1	1	1	0	0	0	0	0	3
PC-034-2020a	Pine Siskin	0	0	0	1	0	0	0	0	0	1
PC-034-2020a	Ruby-crowned Kinglet	0	0	0	0	0	0	0	1	0	1
PC-034-2020a	White-throated Sparrow	0	0	0	0	0	0	0	1	0	1
PC-034-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	0	1	0	1
PC-035-2020x	Dark-eyed Junco	0	0	0	0	0	0	1	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-035-2020x	Hermit Thrush	0	1	2	0	0	0	0	0	0	3
PC-035-2020x	Least Flycatcher	0	0	0	0	1	0	0	0	0	1
PC-035-2020x	Ovenbird	0	0	1	0	0	0	0	0	0	1
PC-035-2020x	Pine Siskin	0	0	0	0	0	0	1	0	0	1
PC-035-2020x	Pine Siskin	0	0	0	0	1	0	0	0	0	1
PC-035-2020x	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-035-2020x	White-crowned Sparrow	1	0	0	0	0	0	0	0	0	1
PC-035-2020x	White-throated Sparrow	1	0	0	0	0	0	1	0	0	2
PC-035-2020x	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-036-2020x	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-036-2020x	Black-throated Green Warbler	0	0	0	0	1	0	0	0	0	1
PC-036-2020x	Downy Woodpecker	0	0	1	0	0	0	0	0	0	1
PC-036-2020x	Hermit Thrush	0	0	1	0	1	0	0	0	0	2
PC-036-2020x	Least Flycatcher	0	1	0	0	0	0	0	0	0	1
PC-036-2020x	Red-eyed Vireo	0	0	0	0	0	1	0	0	0	1
PC-036-2020x	Winter Wren	0	0	1	0	0	0	0	0	0	1
PC-036-2020x	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-008-2020a	Golden-crowned Kinglet	0	0	0	0	1	0	0	0	0	1
PC-008-2020a	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-008-2020a	Northern Flicker	0	1	0	0	0	0	0	0	0	1
PC-008-2020a	Pine Siskin	8	0	0	0	0	0	0	0	0	8
PC-008-2020a	White-throated Sparrow	0	0	1	0	0	1	0	0	0	2
PC-008-2020a	Winter Wren	0	1	0	0	0	0	0	0	1	2
PC-008-2020a	Yellow-bellied Flycatcher	2	0	0	0	0	0	0	0	0	2
PC-009-2020a	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-009-2020a	Canada Jay	4	0	0	0	0	0	0	0	0	4
PC-009-2020a	Hermit Thrush	0	0	0	0	0	0	0	0	1	1
PC-009-2020a	Nashville Warbler	1	0	0	0	1	0	0	0	0	2
PC-009-2020a	Northern Waterthrush	0	1	0	0	0	0	0	1	0	2
PC-009-2020a	Pine Siskin	15	0	0	0	0	0	0	0	0	15
PC-009-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	0	0	1	1
PC-009-2020a	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-009-2020a	White-throated Sparrow	0	0	1	0	0	0	0	1	0	2

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-009-2020a	Winter Wren	0	2	0	0	0	0	0	1	0	3
PC-009-2020a	Yellow-bellied Flycatcher	2	0	0	0	0	0	0	0	0	2
PC-009-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-010-2020a	American Robin	0	0	1	0	0	0	0	0	0	1
PC-010-2020a	Bay-breasted Warbler	0	0	0	1	0	0	0	0	0	1
PC-010-2020a	Canada Warbler	0	0	0	0	0	0	1	0	0	1
PC-010-2020a	Common Raven	1	0	0	0	0	0	0	1	0	2
PC-010-2020a	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-010-2020a	Nashville Warbler	0	0	0	0	0	0	0	0	0	0
PC-010-2020a	Northern Flicker	0	0	0	0	1	0	0	0	0	1
PC-010-2020a	Northern Waterthrush	0	0	0	0	0	1	0	0	0	1
PC-010-2020a	Pine Siskin	5	0	0	0	0	0	0	0	0	5
PC-010-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-010-2020a	Ruby-crowned Kinglet	1	0	0	0	0	0	0	0	0	1
PC-010-2020a	White-throated Sparrow	0	3	0	0	0	0	0	0	0	3
PC-010-2020a	Winter Wren	1	0	0	0	0	0	1	0	0	2
PC-010-2020a	Yellow-bellied Flycatcher	0	0	0	0	0	0	1	0	0	1
PC-010-2020a	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-011-2020a	Black-throated Green Warbler	0	0	0	1	0	0	1	1	0	3
PC-011-2020a	Canada Warbler	0	0	1	0	0	0	0	0	0	1
PC-011-2020a	Nashville Warbler	1	0	0	0	0	0	1	0	0	2
PC-011-2020a	Northern Waterthrush	0	0	0	0	0	1	0	0	0	1
PC-011-2020a	Pine Siskin	6	0	0	0	0	0	0	0	0	6
PC-011-2020a	Red-breasted Nuthatch	1	0	0	0	0	0	1	0	0	2
PC-011-2020a	Swainson's Thrush	1	1	0	0	1	0	0	0	0	3
PC-011-2020a	White-throated Sparrow	0	0	1	0	1	0	0	0	0	2
PC-011-2020a	Yellow-rumped Warbler	0	0	0	1	0	0	1	0	0	2
PC-012-2020x	American Robin	0	0	0	0	0	0	0	0	1	1
PC-012-2020x	Boreal Chickadee	1	0	0	0	0	0	0	0	0	1
PC-012-2020x	Dark-eyed Junco	1	0	0	0	0	0	0	0	0	1
PC-012-2020x	Fox Sparrow	1	0	0	0	0	0	0	0	0	1
PC-012-2020x	Magnolia Warbler	0	0	0	2	0	0	0	0	0	2
PC-012-2020x	Northern Flicker	0	0	0	0	0	0	0	1	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-012-2020x	Pine Siskin	5	0	0	0	0	0	0	0	0	5
PC-012-2020x	Ruby-crowned Kinglet	1	0	0	0	0	0	0	0	0	1
PC-012-2020x	Swainson's Thrush	1	0	0	0	0	0	0	0	0	1
PC-012-2020x	White-throated Sparrow	0	0	0	0	0	0	0	1	0	1
PC-013-2020x	Black-backed Woodpecker	0	1	0	0	0	0	0	0	0	1
PC-013-2020x	Boreal Chickadee	0	0	0	1	0	0	0	0	0	1
PC-013-2020x	Nashville Warbler	2	0	0	0	0	0	0	0	0	2
PC-013-2020x	Northern Flicker	0	0	1	0	0	0	0	0	0	1
PC-013-2020x	Swainson's Thrush	2	1	0	0	0	0	0	0	0	3
PC-013-2020x	Yellow-rumped Warbler	0	0	0	1	0	0	1	0	0	2
PC-014-2020x	Alder Flycatcher	0	0	0	1	0	0	0	0	0	1
PC-014-2020x	Black-throated Green Warbler	0	0	0	0	0	0	0	1	0	1
PC-014-2020x	Magnolia Warbler	2	0	0	0	0	0	0	0	0	2
PC-014-2020x	Nashville Warbler	0	0	0	1	0	0	0	0	0	1
PC-014-2020x	Pine Siskin	5	0	0	0	0	0	0	0	0	5
PC-014-2020x	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-014-2020x	White-throated Sparrow	0	0	1	0	0	0	0	0	0	1
PC-014-2020x	Winter Wren	0	0	0	0	0	0	0	0	1	1
PC-037-2020a	Hermit Thrush	0	0	1	0	0	0	1	0	0	2
PC-037-2020a	Mourning Warbler	0	1	0	0	0	0	0	0	0	1
PC-037-2020a	Nashville Warbler	0	0	0	0	0	0	0	1	0	1
PC-037-2020a	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-037-2020a	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-037-2020a	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-037-2020a	Winter Wren	0	0	0	0	1	0	0	0	0	1
PC-038-2020a	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-038-2020a	Blue-headed Vireo	0	0	0	1	0	0	0	0	0	1
PC-038-2020a	Cedar Waxwing	1	0	0	0	0	0	0	0	0	1
PC-038-2020a	Dark-eyed Junco	1	0	0	0	1	0	0	0	0	2
PC-038-2020a	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-038-2020a	Mourning Warbler	0	0	1	0	0	0	0	0	0	1
PC-038-2020a	Northern Flicker	0	0	0	0	0	0	0	0	1	1
PC-038-2020a	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-038-2020a	Swamp Sparrow	0	1	0	0	0	0	0	0	0	1
PC-038-2020a	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-038-2020a	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-038-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	0	1	0	1
PC-039-2020a	Cedar Waxwing	6	0	0	0	0	0	0	0	0	6
PC-039-2020a	Common Raven	0	0	0	0	0	0	0	0	1	1
PC-039-2020a	Dark-eyed Junco	0	0	0	0	1	0	0	0	0	1
PC-039-2020a	Mallard	0	0	0	0	0	0	0	0	1	1
PC-039-2020a	Northern Flicker	0	0	0	0	0	0	0	0	1	1
PC-039-2020a	Pine Siskin	0	0	0	1	0	0	1	0	0	2
PC-039-2020a	Red-eyed Vireo	0	1	1	0	0	0	0	0	0	2
PC-039-2020a	Ruby-crowned Kinglet	2	0	0	0	0	0	0	0	0	2
PC-039-2020a	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-039-2020a	White-throated Sparrow	0	1	0	0	0	0	1	0	0	2
PC-039-2020a	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-040-2020x	American Redstart	0	1	0	0	0	0	0	0	0	1
PC-040-2020x	Bay-breasted Warbler	0	0	0	0	0	0	1	0	0	1
PC-040-2020x	Blackburnian Warbler	0	0	0	0	0	0	1	0	0	1
PC-040-2020x	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-040-2020x	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-040-2020x	Northern Flicker	0	0	1	0	0	0	0	0	0	1
PC-040-2020x	Pine Siskin	0	0	0	0	0	1	0	0	0	1
PC-040-2020x	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-040-2020x	Ruby-crowned Kinglet	0	0	0	1	0	0	0	0	0	1
PC-040-2020x	White-throated Sparrow	1	1	0	0	0	0	0	0	0	2
PC-040-2020x	White-winged Crossbill	0	0	0	0	0	0	0	2	0	2
PC-040-2020x	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-041-2020x	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-041-2020x	Hermit Thrush	0	0	0	0	0	1	0	0	0	1
PC-041-2020x	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-041-2020x	Northern Flicker	0	0	0	0	0	1	0	0	0	1
PC-041-2020x	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-041-2020x	Ruby-crowned Kinglet	0	1	0	0	0	0	0	1	0	2

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-041-2020x	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-041-2020x	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-042-2020x	American Robin	0	0	0	1	0	0	0	0	0	1
PC-042-2020x	Canada Jay	1	0	0	0	0	0	0	0	0	1
PC-042-2020x	Common Raven	0	1	0	0	0	0	0	0	0	1
PC-042-2020x	Red-breasted Nuthatch	0	0	0	0	0	0	1	0	0	1
PC-042-2020x	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-042-2020x	White-throated Sparrow	1	0	0	0	0	0	0	0	1	2
PC-043-2020a	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-043-2020a	Black-throated Green Warbler	0	0	0	0	0	0	1	0	0	1
PC-043-2020a	Common Raven	0	0	0	1	0	0	0	0	0	1
PC-043-2020a	Hermit Thrush	0	0	2	0	0	0	0	0	1	3
PC-043-2020a	Northern Flicker	0	0	0	0	0	1	0	0	0	1
PC-043-2020a	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-043-2020a	Ruby-crowned Kinglet	1	0	0	0	0	0	0	0	0	1
PC-015-2020a	Alder Flycatcher	1	0	0	1	0	0	0	0	0	2
PC-015-2020a	American Redstart	1	0	0	1	0	0	0	0	0	2
PC-015-2020a	American Robin	3	0	0	0	0	0	0	0	0	3
PC-015-2020a	Black-capped Chickadee	0	0	0	1	0	0	0	0	0	1
PC-015-2020a	Black-throated Green Warbler	0	1	0	0	0	0	0	0	0	1
PC-015-2020a	Hairy Woodpecker	0	1	0	0	0	0	0	0	0	1
PC-015-2020a	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-015-2020a	Pine Siskin	8	0	0	0	0	0	0	0	0	8
PC-015-2020a	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-015-2020a	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-015-2020a	Ruby-crowned Kinglet	1	0	0	0	1	0	0	1	0	3
PC-015-2020a	White-throated Sparrow	0	0	1	0	0	0	1	0	0	2
PC-015-2020a	Yellow-bellied Sapsucker	0	0	0	0	1	0	0	0	0	1
PC-016-2020a	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-016-2020a	American Robin	1	0	0	0	0	0	0	0	0	1
PC-016-2020a	Black-throated Green Warbler	2	1	0	0	0	0	0	0	0	3
PC-016-2020a	Common Loon	0	0	0	0	0	0	0	0	1	1
PC-016-2020a	Hairy Woodpecker	0	1	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-016-2020a	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-016-2020a	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-016-2020a	Pine Siskin	0	0	0	0	0	0	1	0	0	1
PC-016-2020a	Swainson's Thrush	0	1	1	0	0	0	0	0	0	2
PC-016-2020a	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-017-2020x	American Crow	0	1	0	0	0	0	0	0	0	1
PC-017-2020x	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-017-2020x	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-017-2020x	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-017-2020x	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-018-2020a	American Crow	0	0	2	0	0	0	0	0	0	2
PC-018-2020a	Common Raven	0	0	2	0	0	0	0	0	0	2
PC-018-2020a	Dark-eyed Junco	1	0	0	0	0	0	0	0	0	1
PC-018-2020a	Hermit Thrush	0	0	0	0	0	0	0	0	1	1
PC-018-2020a	Nashville Warbler	2	0	0	0	0	0	0	0	0	2
PC-018-2020a	Purple Finch	0	0	0	0	0	0	0	1	0	1
PC-018-2020a	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-018-2020a	White-throated Sparrow	0	0	1	0	1	0	0	0	0	2
PC-018-2020a	White-winged Crossbill	10	0	0	0	0	0	0	0	0	10
PC-018-2020a	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-019-2020a	Black-capped Chickadee	0	0	0	0	0	0	1	0	0	1
PC-019-2020a	Common Raven	4	0	0	0	0	0	0	0	0	4
PC-019-2020a	Dark-eyed Junco	1	0	0	0	0	0	0	0	0	1
PC-019-2020a	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-019-2020a	Pine Siskin	0	0	0	0	0	0	12	0	0	12
PC-019-2020a	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-019-2020a	Swainson's Thrush	1	0	0	0	1	0	0	0	0	2
PC-019-2020a	White-throated Sparrow	0	0	1	0	0	0	0	0	1	2
PC-019-2020a	Yellow-rumped Warbler	0	0	0	1	0	0	0	0	0	1
PC-044-2020a	Hermit Thrush	1	0	1	0	0	0	0	0	0	2
PC-044-2020a	Northern Flicker	0	0	0	0	0	1	0	0	0	1
PC-044-2020a	Pine Siskin	0	0	0	1	0	0	0	0	0	1
PC-044-2020a	Ruffed Grouse	0	0	1	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-045-2020a	American Robin	0	0	1	0	0	0	0	0	0	1
PC-045-2020a	Hairy Woodpecker	0	0	1	0	0	0	0	0	0	1
PC-045-2020a	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-045-2020a	Nashville Warbler	1	1	0	0	0	0	0	0	0	2
PC-045-2020a	Pine Siskin	0	0	0	0	0	0	0	1	0	1
PC-045-2020a	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-045-2020a	Ruby-crowned Kinglet	0	0	1	0	0	0	0	0	0	1
PC-045-2020a	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-045-2020a	White-throated Sparrow	0	0	0	0	0	0	0	1	0	1
PC-045-2020a	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-046-2020a	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-046-2020a	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-046-2020a	Hermit Thrush	0	1	0	0	0	0	0	0	0	1
PC-046-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-046-2020a	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-046-2020a	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-047-2020x	Black-throated Green Warbler	0	0	0	0	0	0	1	0	0	1
PC-047-2020x	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-047-2020x	Pine Siskin	0	0	0	0	0	0	1	0	0	1
PC-047-2020x	Swainson's Thrush	0	0	2	0	0	0	0	0	0	2
PC-047-2020x	White-throated Sparrow	0	0	0	0	0	0	0	1	0	1
PC-047-2020x	Winter Wren	0	0	0	0	1	0	0	0	0	1
PC-048-2020a	Bay-breasted Warbler	0	0	0	0	0	0	1	0	0	1
PC-048-2020a	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-048-2020a	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-048-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-020-2020a	American Redstart	0	1	0	0	0	0	0	0	0	1
PC-020-2020a	Bay-breasted Warbler	0	1	0	0	0	0	0	0	0	1
PC-020-2020a	Black-capped Chickadee	0	0	0	1	0	0	0	0	0	1
PC-020-2020a	Blue-headed Vireo	0	0	0	0	0	0	1	0	0	1
PC-020-2020a	Canada Warbler	1	0	0	0	0	0	0	0	0	1
PC-020-2020a	Dark-eyed Junco	0	0	0	0	0	0	0	1	0	1
PC-020-2020a	Golden-crowned Kinglet	0	1	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-020-2020a	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-020-2020a	Northern Waterthrush	1	0	0	0	0	0	0	0	0	1
PC-020-2020a	Pine Siskin	5	0	0	0	0	0	0	0	0	5
PC-020-2020a	Red-breasted Nuthatch	0	0	0	1	0	0	0	0	0	1
PC-020-2020a	Swainson's Thrush	0	1	0	0	0	1	0	0	0	2
PC-020-2020a	White-throated Sparrow	0	0	1	0	0	0	0	0	1	2
PC-020-2020a	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-021-2020x	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-021-2020x	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-021-2020x	Least Flycatcher	0	1	0	0	0	0	0	0	0	1
PC-021-2020x	Magnolia Warbler	2	0	0	0	0	0	0	0	0	2
PC-021-2020x	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-021-2020x	Pine Siskin	3	0	0	0	0	0	0	0	0	3
PC-021-2020x	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-021-2020x	Swainson's Thrush	0	2	0	0	0	0	0	0	1	3
PC-021-2020x	White-throated Sparrow	0	1	1	0	0	1	0	0	0	3
PC-021-2020x	Winter Wren	1	0	0	0	0	0	0	0	1	2
PC-022-2020x	American Redstart	0	1	0	0	0	0	0	0	0	1
PC-022-2020x	Canada Jay	1	0	0	0	0	0	0	0	0	1
PC-022-2020x	Hermit Thrush	0	1	0	0	0	0	0	0	0	1
PC-022-2020x	Magnolia Warbler	0	0	0	0	0	0	1	0	0	1
PC-022-2020x	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-022-2020x	Pine Siskin	10	0	0	0	0	0	0	0	0	10
PC-022-2020x	Red-eyed Vireo	0	1	0	0	0	0	0	0	0	1
PC-022-2020x	Ruby-crowned Kinglet	0	0	0	0	1	0	0	0	0	1
PC-022-2020x	Swainson's Thrush	1	1	0	0	1	0	0	0	0	3
PC-022-2020x	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-022-2020x	Yellow-bellied Flycatcher	1	0	0	0	0	0	0	0	0	1
PC-022-2020x	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-023-2020a	Alder Flycatcher	1	0	0	0	0	0	0	0	0	1
PC-023-2020a	American Robin	0	0	0	0	0	0	0	1	0	1
PC-023-2020a	Canada Jay	0	0	0	0	0	0	0	1	0	1
PC-023-2020a	Common Raven	0	0	1	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-023-2020a	Fox Sparrow	0	1	0	0	0	0	0	0	0	1
PC-023-2020a	Least Flycatcher	0	1	0	0	0	0	0	0	0	1
PC-023-2020a	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-023-2020a	Pine Siskin	6	0	0	0	0	0	0	0	0	6
PC-023-2020a	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-023-2020a	Swainson's Thrush	0	0	0	0	0	1	0	0	0	1
PC-023-2020a	Swamp Sparrow	1	0	0	0	0	0	0	0	0	1
PC-023-2020a	White-throated Sparrow	0	0	1	0	0	0	0	1	0	2
PC-023-2020a	Winter Wren	0	2	0	0	0	0	0	0	0	2
PC-024-2020a	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-024-2020a	American Robin	0	0	0	0	0	0	1	0	0	1
PC-024-2020a	American Robin	1	0	0	0	0	0	0	0	0	1
PC-024-2020a	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-024-2020a	Blue-winged Warbler	0	1	0	0	0	0	0	0	0	1
PC-024-2020a	Canada Warbler	0	0	0	0	0	0	0	1	0	1
PC-024-2020a	Cape May Warbler	1	0	0	0	0	0	0	0	0	1
PC-024-2020a	Mourning Warbler	1	0	0	0	0	0	0	0	0	1
PC-024-2020a	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-024-2020a	Swainson's Thrush	0	1	0	0	0	0	0	2	0	3
PC-024-2020a	White-throated Sparrow	0	0	0	0	0	1	0	0	0	1
PC-024-2020a	Yellow-bellied Sapsucker	1	0	0	0	0	0	0	0	0	1
PC-025-2020x	Bay-breasted Warbler	2	0	0	0	0	0	0	0	0	2
PC-025-2020x	Canada Jay	0	0	0	0	0	0	0	1	0	1
PC-025-2020x	Common Raven	0	0	0	0	0	0	0	0	1	1
PC-025-2020x	Hermit Thrush	0	1	1	0	0	0	0	0	0	2
PC-025-2020x	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-025-2020x	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-025-2020x	Pine Siskin	3	0	0	0	0	0	0	0	0	3
PC-025-2020x	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-025-2020x	Ruby-crowned Kinglet	1	0	0	0	0	0	0	0	0	1
PC-025-2020x	Swainson's Thrush	0	0	0	0	0	0	0	1	0	1
PC-025-2020x	White-throated Sparrow	0	0	0	0	0	0	0	0	1	1
PC-025-2020x	Winter Wren	0	1	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-025-2020x	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-026-2020a	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-026-2020a	American Robin	0	1	0	0	0	0	0	0	0	1
PC-026-2020a	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-026-2020a	Canada Goose	0	0	0	0	0	0	0	0	1	1
PC-026-2020a	Cedar Waxwing	1	0	0	0	0	0	0	0	0	1
PC-026-2020a	Fox Sparrow	0	1	0	0	0	0	0	0	0	1
PC-026-2020a	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-026-2020a	Nashville Warbler	2	0	0	0	0	0	0	0	0	2
PC-026-2020a	Pine Siskin	8	0	0	0	0	0	10	0	0	18
PC-026-2020a	Ruby-crowned Kinglet	0	1	0	1	0	0	0	0	0	2
PC-026-2020a	Swainson's Thrush	0	0	0	0	0	0	1	0	0	1
PC-026-2020a	White-throated Sparrow	1	2	0	0	0	0	0	0	0	3
PC-026-2020a	Winter Wren	0	0	0	0	1	0	0	0	0	1
PC-026-2020a	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-027-2020a	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-027-2020a	Black-throated Green Warbler	0	1	0	0	0	0	1	0	0	2
PC-027-2020a	Broad-winged Hawk	0	0	0	0	1	0	0	0	0	1
PC-027-2020a	Canada Warbler	1	0	0	0	0	0	1	0	0	2
PC-027-2020a	Common Raven	0	1	0	0	0	0	0	0	0	1
PC-027-2020a	Least Flycatcher	2	0	0	0	0	0	0	0	0	2
PC-027-2020a	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-027-2020a	Swainson's Thrush	0	1	0	0	1	0	0	0	0	2
PC-027-2020a	White-throated Sparrow	0	1	0	0	0	0	0	0	1	2
PC-027-2020a	Winter Wren	1	1	0	0	0	0	0	0	0	2
PC-028-2020x	American Redstart	2	0	0	0	0	0	0	0	0	2
PC-028-2020x	Bay-breasted Warbler	0	0	0	1	0	0	0	0	0	1
PC-028-2020x	Black-throated Green Warbler	1	1	0	0	0	0	0	0	0	2
PC-028-2020x	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-028-2020x	Ruffed Grouse	1	0	0	0	0	0	0	0	0	1
PC-028-2020x	Winter Wren	0	0	0	0	1	0	0	0	0	1
PC-049-2020a	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-049-2020a	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-049-2020a	Dark-eyed Junco	0	1	0	0	0	0	0	0	0	1
PC-049-2020a	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-049-2020a	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-049-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-049-2020a	Red-eyed Vireo	0	1	0	0	0	0	0	0	0	1
PC-049-2020a	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-050-2020a	Alder Flycatcher	1	1	0	0	0	0	0	0	0	2
PC-050-2020a	Blue Jay	0	0	0	0	0	0	0	0	1	1
PC-050-2020a	Northern Waterthrush	0	1	0	0	0	0	0	0	0	1
PC-050-2020a	Pine Siskin	4	0	0	0	0	0	0	0	0	4
PC-050-2020a	Ruby-crowned Kinglet	0	0	1	0	0	0	0	0	1	2
PC-050-2020a	Swainson's Thrush	0	0	0	0	0	0	0	0	1	1
PC-050-2020a	White-throated Sparrow	0	0	1	0	0	0	0	0	0	1
PC-050-2020a	Winter Wren	0	1	1	0	0	0	0	0	0	2
PC-051-2020x	American Robin	0	0	0	0	0	0	0	2	0	2
PC-051-2020x	Northern Waterthrush	1	0	0	0	0	0	0	0	0	1
PC-051-2020x	Pine Siskin	3	0	0	0	0	0	0	0	0	3
PC-051-2020x	Red-eyed Vireo	0	0	2	0	0	0	0	0	0	2
PC-051-2020x	White-throated Sparrow	0	0	1	1	0	0	0	0	0	2
PC-052-2020x	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-052-2020x	Least Flycatcher	1	0	0	0	0	0	0	0	0	1
PC-052-2020x	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-052-2020x	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-052-2020x	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-052-2020x	White-throated Sparrow	0	0	1	0	0	0	0	0	0	1
PC-052-2020x	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-053-2020x	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-053-2020x	Black-throated Green Warbler	0	1	0	0	0	0	0	0	0	1
PC-053-2020x	Downy Woodpecker	0	0	0	0	0	0	0	1	0	1
PC-053-2020x	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-053-2020x	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-053-2020x	Purple Finch	0	0	0	0	1	0	0	0	0	1
PC-053-2020x	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-053-2020x	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-053-2020x	Winter Wren	0	0	1	0	0	0	0	0	1	2
PC-054-2020x	Black-throated Green Warbler	0	1	0	0	0	0	0	0	0	1
PC-054-2020x	Hermit Thrush	0	0	2	0	0	0	0	0	0	2
PC-054-2020x	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-054-2020x	Northern Waterthrush	0	1	0	0	0	0	0	0	0	1
PC-054-2020x	Red-eyed Vireo	0	0	0	0	0	0	0	0	1	1
PC-054-2020x	Ruby-crowned Kinglet	1	0	0	0	0	0	0	0	0	1
PC-054-2020x	Winter Wren	0	0	0	0	0	1	0	0	0	1
PC-055-2020a	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-055-2020a	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-055-2020a	Pine Siskin	0	0	0	1	0	0	0	0	0	1
PC-055-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-055-2020a	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1
PC-055-2020a	Ruby-crowned Kinglet	0	0	1	0	0	0	0	0	0	1
PC-055-2020a	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-056-2020x	Bay-breasted Warbler	0	0	0	0	0	0	1	0	0	1
PC-056-2020x	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-056-2020x	Least Flycatcher	1	0	0	0	0	0	0	0	0	1
PC-056-2020x	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-056-2020x	Red-eyed Vireo	0	0	2	0	0	0	0	0	0	2
PC-056-2020x	Ruffed Grouse	0	0	1	0	0	0	0	0	0	1
PC-056-2020x	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-056-2020x	Yellow-rumped Warbler	0	0	0	1	0	0	0	0	0	1
PC-057-2020a	American Robin	0	0	1	0	0	0	0	0	0	1
PC-057-2020a	Blue-headed Vireo	2	0	0	0	0	0	0	0	0	2
PC-057-2020a	Chestnut-sided Warbler	1	0	0	0	0	0	0	0	0	1
PC-057-2020a	Least Flycatcher	1	0	0	0	0	0	0	0	0	1
PC-057-2020a	Magnolia Warbler	0	1	0	0	0	0	0	0	0	1
PC-057-2020a	Pine Siskin	7	0	0	0	0	0	0	0	0	7
PC-057-2020a	Ruffed Grouse	0	0	1	0	0	0	0	0	0	1
PC-057-2020a	White-throated Sparrow	1	0	0	0	0	0	0	1	0	2
PC-058-2020a	American Redstart	1	0	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-058-2020a	Blue Jay	0	1	0	0	0	0	0	0	0	1
PC-058-2020a	Blue-headed Vireo	0	0	0	0	1	0	0	0	0	1
PC-058-2020a	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-058-2020a	Least Flycatcher	0	1	0	0	0	0	0	0	0	1
PC-058-2020a	Magnolia Warbler	0	1	0	0	0	0	0	0	0	1
PC-058-2020a	Pine Siskin	0	0	0	0	0	0	15	0	0	15
PC-058-2020a	Ruby-crowned Kinglet	0	0	1	0	0	0	0	0	0	1
PC-058-2020a	White-throated Sparrow	0	0	1	0	0	0	0	0	0	1
PC-059-2020a	Alder Flycatcher	1	0	0	0	0	0	0	0	0	1
PC-059-2020a	American Robin	0	0	1	0	0	0	0	0	0	1
PC-059-2020a	Nashville Warbler	1	0	0	0	0	0	1	0	0	2
PC-059-2020a	Pine Siskin	0	0	0	2	0	0	0	0	50	52
PC-059-2020a	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-059-2020a	Ruby-crowned Kinglet	0	1	0	0	0	0	0	1	0	2
PC-059-2020a	White-throated Sparrow	1	1	1	0	0	0	0	0	0	3
PC-060-2020a	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-060-2020a	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-060-2020a	Hermit Thrush	0	0	0	0	0	1	0	0	0	1
PC-060-2020a	Northern Parula	1	0	0	0	0	0	0	0	0	1
PC-060-2020a	Pine Siskin	0	0	0	0	0	0	1	0	0	1
PC-060-2020a	White-throated Sparrow	0	0	1	0	0	0	0	0	0	1
PC-001-2020b	Blue-headed Vireo	0	1	0	0	0	0	0	0	0	1
PC-001-2020b	Dark-eyed Junco	0	1	0	0	0	0	0	0	0	1
PC-001-2020b	Pine Siskin	12	0	0	0	0	0	0	0	0	12
PC-001-2020b	White-throated Sparrow	0	0	1	0	0	0	0	0	1	2
PC-002-2020b	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-002-2020b	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-002-2020b	Dark-eyed Junco	0	1	0	0	0	0	0	0	0	1
PC-002-2020b	Hermit Thrush	0	0	2	0	0	0	0	0	0	2
PC-002-2020b	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-002-2020b	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-003-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-003-2020b	Common Raven	0	2	0	0	0	0	0	0	0	2

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-003-2020b	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-003-2020b	Pine Siskin	0	0	0	0	0	0	0	3	0	3
PC-003-2020b	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-003-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-003-2020b	White-throated Sparrow	0	0	1	0	0	0	0	0	1	2
PC-003-2020b	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-003-2020b	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-004-2020b	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-004-2020b	Spruce Grouse	3	0	0	0	0	0	0	0	0	3
PC-004-2020b	White-throated Sparrow	1	0	0	0	0	0	0	0	0	1
PC-004-2020b	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-005-2020b	American Redstart	0	0	0	0	0	0	0	1	0	1
PC-005-2020b	Black-throated Green Warbler	0	0	0	0	0	0	0	1	0	1
PC-005-2020b	Magnolia Warbler	0	0	0	0	0	0	1	0	0	1
PC-005-2020b	Nashville Warbler	0	0	0	0	0	0	0	1	0	1
PC-005-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-005-2020b	White-throated Sparrow	0	0	0	1	0	0	0	0	0	1
PC-006-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-006-2020b	Hermit Thrush	0	0	2	0	0	0	0	0	0	2
PC-006-2020b	Ruby-crowned Kinglet	0	0	0	0	1	0	0	0	0	1
PC-006-2020b	White-throated Sparrow	0	0	1	0	1	0	0	0	0	2
PC-006-2020b	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-008-2020b	Black-throated Green Warbler	0	0	0	0	0	0	1	0	0	1
PC-008-2020b	Hermit Thrush	0	0	1	0	0	0	0	0	1	2
PC-008-2020b	Nashville Warbler	0	0	0	0	0	0	0	1	0	1
PC-008-2020b	Ruby-crowned Kinglet	0	0	1	0	0	0	0	0	0	1
PC-008-2020b	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-008-2020b	White-throated Sparrow	0	0	1	0	0	0	0	0	0	1
PC-009-2020b	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-009-2020b	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-009-2020b	Pine Siskin	0	2	0	0	0	0	0	0	0	2
PC-009-2020b	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-009-2020b	Swamp Sparrow	1	0	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-009-2020b	Veery	0	0	1	0	0	0	0	0	0	1
PC-009-2020b	White-throated Sparrow	0	0	0	0	0	0	0	0	1	1
PC-009-2020b	White-throated Sparrow	0	0	0	1	0	0	0	0	0	1
PC-009-2020b	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-010-2020b	Black-throated Green Warbler	0	0	0	0	0	0	1	0	0	1
PC-010-2020b	Blue-headed Vireo	0	0	0	0	0	0	0	0	1	1
PC-010-2020b	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-010-2020b	Nashville Warbler	0	2	0	0	0	0	0	0	0	2
PC-010-2020b	Northern Waterthrush	0	0	1	0	0	0	0	0	0	1
PC-010-2020b	Pine Siskin	0	0	1	0	0	0	0	0	0	1
PC-010-2020b	Red-breasted Nuthatch	0	0	0	0	0	0	1	0	0	1
PC-010-2020b	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1
PC-010-2020b	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-010-2020b	White-throated Sparrow	1	0	0	0	0	0	0	0	0	1
PC-011-2020b	American Robin	0	0	1	0	0	0	0	0	0	1
PC-011-2020b	Common Raven	1	0	0	0	0	0	0	0	0	1
PC-011-2020b	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-011-2020b	Magnolia Warbler	0	0	0	0	0	0	1	0	0	1
PC-011-2020b	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-011-2020b	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-011-2020b	Swamp Sparrow	0	1	0	0	0	0	0	0	0	1
PC-011-2020b	White-throated Sparrow	0	1	0	0	0	0	0	1	0	2
PC-011-2020b	Winter Wren	0	0	1	0	0	0	0	0	0	1
PC-029-2020b	Alder Flycatcher	0	0	0	0	0	0	1	0	0	1
PC-029-2020b	American Redstart	0	1	0	0	0	0	0	0	0	1
PC-029-2020b	Black-throated Green Warbler	0	0	0	1	0	0	0	0	0	1
PC-029-2020b	Swainson's Thrush	0	0	0	0	1	0	0	1	0	2
PC-029-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-029-2020b	Winter Wren	0	0	0	0	0	0	0	1	0	1
PC-030-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-030-2020b	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-030-2020b	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-030-2020b	Ovenbird	0	1	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-030-2020b	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-030-2020b	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2
PC-030-2020b	White-throated Sparrow	0	1	0	0	0	1	0	0	0	2
PC-030-2020b	Winter Wren	1	1	0	0	0	0	0	0	0	2
PC-031-2020b	Black-throated Green Warbler	0	0	0	0	0	0	1	0	0	1
PC-031-2020b	Dark-eyed Junco	0	0	0	0	0	0	1	0	0	1
PC-031-2020b	Hermit Thrush	0	0	0	0	0	0	0	1	0	1
PC-031-2020b	Magnolia Warbler	0	0	0	0	0	0	1	0	0	1
PC-031-2020b	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-031-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	1	2
PC-031-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-032-2020b	Common Raven	0	2	0	0	0	0	0	0	0	2
PC-032-2020b	Hermit Thrush	0	0	2	0	0	0	0	0	0	2
PC-032-2020b	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-032-2020b	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-032-2020b	Red-tailed Hawk	0	0	0	0	0	0	0	0	1	1
PC-032-2020b	Ruby-crowned Kinglet	0	0	0	0	0	0	0	1	0	1
PC-032-2020b	Spruce Grouse	0	0	0	0	0	0	0	0	1	1
PC-032-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	1	2
PC-033-2020b	Ruby-crowned Kinglet	0	1	0	0	0	0	0	0	0	1
PC-033-2020b	Swainson's Thrush	0	0	2	0	0	0	0	0	0	2
PC-034-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-034-2020b	Bay-breasted Warbler	0	0	0	0	0	0	1	0	0	1
PC-034-2020b	Boreal Chickadee	1	0	0	0	0	0	0	0	0	1
PC-034-2020b	Hermit Thrush	0	1	0	0	0	0	0	0	0	1
PC-034-2020b	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-034-2020b	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2
PC-034-2020b	White-throated Sparrow	0	1	0	0	1	0	0	0	0	2
PC-034-2020b	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-037-2020b	Hermit Thrush	0	0	0	0	0	0	1	0	0	1
PC-037-2020b	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-037-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-037-2020b	White-throated Sparrow	0	0	0	0	1	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-037-2020b	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-038-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-038-2020b	Black-throated Green Warbler	0	0	0	1	0	0	0	0	0	1
PC-038-2020b	Canada Warbler	1	0	0	0	0	0	0	0	0	1
PC-038-2020b	Nashville Warbler	0	0	0	0	0	0	1	0	0	1
PC-038-2020b	Northern Waterthrush	1	0	0	0	0	0	0	0	0	1
PC-038-2020b	Pine Siskin	0	1	0	0	0	0	0	0	0	1
PC-038-2020b	Red-breasted Nuthatch	0	0	0	0	0	0	1	0	0	1
PC-038-2020b	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-038-2020b	Ruby-crowned Kinglet	0	0	0	0	1	0	0	0	0	1
PC-038-2020b	Swainson's Thrush	0	0	0	0	0	0	0	1	0	1
PC-038-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	1	2
PC-038-2020b	Winter Wren	0	0	0	0	1	0	0	0	0	1
PC-039-2020b	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-039-2020b	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-039-2020b	Dark-eyed Junco	1	0	0	0	0	0	0	0	0	1
PC-039-2020b	Fox Sparrow	0	1	0	0	0	0	0	0	0	1
PC-039-2020b	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-039-2020b	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-039-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-039-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-043-2020b	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-043-2020b	Dark-eyed Junco	0	1	0	0	0	0	0	0	0	1
PC-043-2020b	Hermit Thrush	0	0	1	0	0	0	0	0	1	2
PC-043-2020b	Nashville Warbler	0	0	0	0	0	0	0	1	0	1
PC-043-2020b	Northern Flicker	1	0	0	0	0	0	0	0	0	1
PC-043-2020b	Pine Siskin	0	0	0	0	0	0	35	0	0	35
PC-043-2020b	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-043-2020b	Yellow-rumped Warbler	0	1	0	0	0	0	0	0	0	1
PC-061-2020x	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-061-2020x	Magnolia Warbler	0	1	0	0	0	0	0	0	0	1
PC-061-2020x	Ovenbird	0	1	1	0	0	0	0	0	0	2
PC-061-2020x	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-061-2020x	Winter Wren	0	0	0	0	0	1	0	0	0	1
PC-062-2020x	Nashville Warbler	1	0	0	0	0	0	0	0	0	1
PC-062-2020x	Ovenbird	1	0	0	0	0	0	0	0	0	1
PC-062-2020x	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-062-2020x	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-062-2020x	Swainson's Thrush	1	1	0	0	0	0	0	0	0	2
PC-062-2020x	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-062-2020x	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-063-2020x	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-063-2020x	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-063-2020x	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-063-2020x	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-063-2020x	Yellow-rumped Warbler	0	1	0	0	0	0	0	0	0	1
PC-064-2020x	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-064-2020x	Boreal Chickadee	1	0	0	0	0	0	0	0	0	1
PC-064-2020x	Dark-eyed Junco	1	0	0	0	0	0	0	0	0	1
PC-064-2020x	Nashville Warbler	0	0	0	0	0	0	1	0	0	1
PC-064-2020x	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-065-2020x	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-065-2020x	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-065-2020x	Pine Siskin	2	0	0	0	0	0	0	0	0	2
PC-065-2020x	Red-eyed Vireo	0	0	0	0	0	0	0	0	1	1
PC-065-2020x	Swainson's Thrush	1	0	0	0	0	0	0	0	0	1
PC-065-2020x	White-throated Sparrow	1	1	1	0	0	0	0	0	0	3
PC-066-2020x	Alder Flycatcher	0	0	0	0	0	0	1	0	0	1
PC-066-2020x	Black-throated Green Warbler	0	0	0	0	1	0	0	0	0	1
PC-066-2020x	Nashville Warbler	2	0	0	0	0	0	0	0	0	2
PC-066-2020x	Northern Parula	0	0	0	0	0	0	0	1	0	1
PC-066-2020x	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-066-2020x	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-066-2020x	Swainson's Thrush	0	0	0	0	0	0	0	0	1	1
PC-066-2020x	Swamp Sparrow	1	0	0	0	0	0	0	0	0	1
PC-066-2020x	White-throated Sparrow	1	1	1	0	0	0	0	0	0	3

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-066-2020x	Yellow Warbler	1	0	0	0	0	0	0	0	0	1
PC-067-2020x	Golden-crowned Kinglet	0	0	0	0	0	0	1	0	0	1
PC-067-2020x	Hermit Thrush	0	0	2	0	0	0	0	0	0	2
PC-067-2020x	Magnolia Warbler	0	0	0	0	0	0	1	0	0	1
PC-067-2020x	Pine Siskin	3	0	0	0	0	0	0	0	0	3
PC-067-2020x	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1
PC-067-2020x	White-throated Sparrow	0	0	0	0	0	1	0	0	1	2
PC-024-2020b	American Redstart	2	0	0	0	0	0	0	0	0	2
PC-024-2020b	Black-throated Green Warbler	0	0	0	0	1	0	0	0	0	1
PC-024-2020b	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-024-2020b	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2
PC-024-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-024-2020b	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-026-2020b	American Goldfinch	0	0	0	1	0	0	0	0	0	1
PC-026-2020b	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-026-2020b	Black-throated Green Warbler	2	0	0	0	0	0	0	0	0	2
PC-026-2020b	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-026-2020b	Pine Siskin	8	0	0	0	0	0	0	0	0	8
PC-026-2020b	Red-breasted Nuthatch	0	0	0	1	0	0	0	0	0	1
PC-026-2020b	White-throated Sparrow	0	2	0	0	1	0	0	0	0	3
PC-026-2020b	Yellow-rumped Warbler	0	0	0	0	0	0	1	0	0	1
PC-027-2020b	American Robin	1	0	0	0	0	0	0	0	0	1
PC-027-2020b	Least Flycatcher	1	0	0	0	0	0	0	0	0	1
PC-027-2020b	Least Flycatcher	0	0	0	0	1	0	0	0	0	1
PC-027-2020b	Red-eyed Vireo	1	0	1	0	0	0	0	0	0	2
PC-027-2020b	Swainson's Thrush	0	0	2	0	0	0	0	0	0	2
PC-027-2020b	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-028-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-028-2020b	Bay-breasted Warbler	0	0	0	1	0	0	0	0	0	1
PC-028-2020b	Blue-headed Vireo	1	0	0	0	0	0	0	0	0	1
PC-028-2020b	Canada Warbler	0	0	0	0	0	0	1	0	0	1
PC-028-2020b	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-028-2020b	Red-breasted Nuthatch	0	0	0	0	0	0	1	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-028-2020b	Red-eyed Vireo	2	0	0	0	0	0	0	0	0	2
PC-028-2020b	Swainson's Thrush	1	0	0	0	0	0	1	0	0	2
PC-028-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	1	2
PC-028-2020b	Yellow-bellied Sapsucker	0	0	0	0	1	0	0	0	0	1
PC-044-2020b	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-044-2020b	Cedar Waxwing	0	0	0	0	0	0	0	0	1	1
PC-044-2020b	Magnolia Warbler	0	0	0	0	0	0	1	0	0	1
PC-044-2020b	Pine Siskin	0	0	0	0	0	0	10	0	0	10
PC-044-2020b	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-044-2020b	Ruby-crowned Kinglet	0	0	0	0	0	0	1	0	0	1
PC-044-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-044-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	1	2
PC-044-2020b	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-049-2020b	Black-capped Chickadee	0	1	0	0	0	0	0	0	0	1
PC-049-2020b	Pine Siskin	0	0	0	0	0	0	0	2	0	2
PC-049-2020b	Red-eyed Vireo	0	0	0	0	0	0	0	0	1	1
PC-049-2020b	Swainson's Thrush	0	0	2	0	0	0	0	0	0	2
PC-049-2020b	White-throated Sparrow	1	0	0	0	0	0	0	0	0	1
PC-055-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-055-2020b	American Robin	0	0	0	0	0	0	1	0	0	1
PC-055-2020b	Blue Jay	2	0	0	0	0	0	0	0	0	2
PC-055-2020b	Nashville Warbler	0	0	0	0	0	0	1	0	0	1
PC-055-2020b	Pine Siskin	1	0	0	0	0	0	0	0	0	1
PC-055-2020b	Red-eyed Vireo	2	0	0	0	0	0	0	0	0	2
PC-055-2020b	Swainson's Thrush	0	1	1	0	0	0	0	0	0	2
PC-055-2020b	White-throated Sparrow	0	0	2	0	0	0	0	0	0	2
PC-055-2020b	Winter Wren	0	0	0	0	0	0	0	1	0	1
PC-057-2020b	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-057-2020b	American Robin	1	0	0	0	0	0	0	0	0	1
PC-057-2020b	Chestnut-sided Warbler	1	0	0	0	0	0	0	0	0	1
PC-057-2020b	Least Flycatcher	2	0	0	0	0	0	0	0	0	2
PC-057-2020b	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-057-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-057-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-057-2020b	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-058-2020b	American Redstart	0	1	0	0	0	0	0	0	0	1
PC-058-2020b	Black-capped Chickadee	0	0	0	0	0	0	1	0	0	1
PC-058-2020b	Mourning Warbler	1	0	0	0	0	0	0	0	0	1
PC-058-2020b	Nashville Warbler	0	0	0	0	1	0	0	0	0	1
PC-058-2020b	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-058-2020b	Red-eyed Vireo	0	1	1	0	0	1	0	0	0	3
PC-058-2020b	White-throated Sparrow	1	1	0	0	0	0	0	0	0	2
PC-059-2020b	Alder Flycatcher	0	1	0	0	0	0	0	0	0	1
PC-059-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-059-2020b	American Robin	1	0	1	0	0	0	0	0	0	2
PC-059-2020b	Bay-breasted Warbler	0	0	0	0	1	0	0	0	0	1
PC-059-2020b	Cedar Waxwing	0	6	0	0	0	0	0	0	0	6
PC-059-2020b	Hairy Woodpecker	0	0	0	0	0	0	0	1	0	1
PC-059-2020b	Hermit Thrush	0	0	0	0	0	0	0	0	1	1
PC-059-2020b	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-059-2020b	Pine Siskin	0	4	0	0	0	0	0	0	0	4
PC-059-2020b	Red-eyed Vireo	0	1	0	0	0	0	0	0	0	1
PC-059-2020b	White-throated Sparrow	1	1	0	0	0	0	0	0	0	2
PC-059-2020b	Winter Wren	0	0	1	0	0	0	0	0	0	1
PC-060-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-060-2020b	American Robin	0	0	0	1	0	0	0	0	0	1
PC-060-2020b	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-060-2020b	Red-breasted Nuthatch	0	0	0	1	0	0	0	0	0	1
PC-060-2020b	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-060-2020b	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2
PC-060-2020b	White-throated Sparrow	0	1	0	0	0	1	0	0	0	2
PC-060-2020b	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-068-2020x	American Redstart	2	0	0	0	0	0	0	0	0	2
PC-068-2020x	American Robin	1	0	0	0	0	0	0	0	0	1
PC-068-2020x	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-068-2020x	Hairy Woodpecker	0	1	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-068-2020x	Nashville Warbler	0	0	0	1	0	0	0	0	0	1
PC-068-2020x	Northern Waterthrush	0	1	0	0	0	0	0	0	0	1
PC-068-2020x	Pine Siskin	0	0	0	0	0	0	0	12	0	12
PC-068-2020x	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-068-2020x	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2
PC-068-2020x	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-068-2020x	Yellow-bellied Sapsucker	0	0	0	1	0	0	0	0	0	1
PC-069-2020x	Hermit Thrush	0	0	0	0	0	1	0	0	0	1
PC-069-2020x	Nashville Warbler	0	0	0	0	0	0	0	1	0	1
PC-069-2020x	Red-eyed Vireo	0	2	0	0	0	0	0	0	0	2
PC-069-2020x	Ruby-crowned Kinglet	0	0	0	0	0	0	0	1	0	1
PC-069-2020x	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-070-2020x	American Robin	1	0	0	0	0	0	0	0	0	1
PC-070-2020x	Black-throated Green Warbler	0	0	0	0	1	0	0	1	0	2
PC-070-2020x	Chipping Sparrow	0	0	0	0	0	0	1	0	0	1
PC-070-2020x	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-070-2020x	Least Flycatcher	2	0	0	0	0	0	0	0	0	2
PC-070-2020x	Northern Parula	0	0	0	0	0	0	1	0	0	1
PC-070-2020x	Pine Siskin	0	0	0	15	0	0	0	0	0	15
PC-070-2020x	Red-breasted Nuthatch	0	0	0	0	0	0	1	0	0	1
PC-070-2020x	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-070-2020x	Swainson's Thrush	0	0	0	0	0	0	0	1	0	1
PC-070-2020x	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-071-2020x	American Robin	0	1	0	0	0	0	0	0	0	1
PC-071-2020x	Common Raven	0	0	3	0	0	0	0	0	0	3
PC-071-2020x	Red-breasted Nuthatch	0	1	0	0	0	0	0	0	0	1
PC-071-2020x	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1
PC-071-2020x	Swainson's Thrush	0	0	0	1	0	0	0	0	0	1
PC-071-2020x	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-072-2020x	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-072-2020x	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-072-2020x	Blue-headed Vireo	1	0	0	0	0	0	0	0	0	1
PC-072-2020x	Common Raven	0	1	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-072-2020x	Mourning Warbler	1	0	0	0	0	0	0	0	0	1
PC-072-2020x	Pine Siskin	7	0	0	0	0	0	0	0	0	7
PC-072-2020x	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-072-2020x	Swainson's Thrush	0	1	0	0	1	0	0	0	0	2
PC-072-2020x	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-073-2020x	American Redstart	0	0	0	0	0	0	1	0	0	1
PC-073-2020x	American Robin	0	0	1	0	0	0	0	0	0	1
PC-073-2020x	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-073-2020x	Black-throated Blue Warbler	0	0	0	0	0	0	0	0	1	1
PC-073-2020x	Black-throated Green Warbler	0	0	0	0	0	0	0	1	0	1
PC-073-2020x	Canada Warbler	0	0	0	0	0	0	0	2	0	2
PC-073-2020x	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-073-2020x	Nashville Warbler	0	0	0	0	0	0	0	1	0	1
PC-073-2020x	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1
PC-073-2020x	Swainson's Thrush	0	0	0	0	0	0	1	0	0	1
PC-073-2020x	Swainson's Thrush	0	0	2	0	0	0	0	0	0	2
PC-073-2020x	White-throated Sparrow	0	0	0	0	1	0	0	0	0	1
PC-073-2020x	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-074-2020x	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-074-2020x	Canada Warbler	0	0	0	1	0	0	0	0	0	1
PC-074-2020x	Chipping Sparrow	1	0	0	0	0	0	0	0	0	1
PC-074-2020x	Northern Parula	0	0	0	1	0	0	0	0	0	1
PC-074-2020x	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-074-2020x	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2
PC-074-2020x	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-075-2020x	Black-capped Chickadee	0	0	0	0	0	0	0	1	0	1
PC-075-2020x	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-075-2020x	Northern Parula	0	1	0	0	0	0	0	0	0	1
PC-075-2020x	Ovenbird	0	0	0	0	0	0	0	1	0	1
PC-075-2020x	Ruffed Grouse	0	0	0	0	0	0	1	0	0	1
PC-075-2020x	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-075-2020x	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-075-2020x	Winter Wren	0	0	0	0	0	0	0	1	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-076-2020x	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-076-2020x	Black-capped Chickadee	0	0	0	4	0	0	0	0	0	4
PC-076-2020x	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-076-2020x	Canada Warbler	1	0	0	0	0	0	0	0	0	1
PC-076-2020x	Common Raven	0	1	0	0	0	0	0	0	0	1
PC-076-2020x	Northern Parula	1	0	0	0	0	0	0	0	0	1
PC-076-2020x	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-076-2020x	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-076-2020x	Swainson's Thrush	0	0	0	0	0	0	0	1	0	1
PC-076-2020x	Winter Wren	0	0	0	0	1	0	0	0	0	1
PC-077-2020x	American Redstart	0	0	0	0	1	0	0	0	0	1
PC-077-2020x	American Robin	0	0	0	0	1	0	0	0	0	1
PC-077-2020x	Black-throated Green Warbler	0	0	0	0	0	0	0	1	0	1
PC-077-2020x	Blue-headed Vireo	0	1	0	0	0	0	0	0	0	1
PC-077-2020x	Canada Warbler	0	0	0	0	1	0	0	0	0	1
PC-077-2020x	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-077-2020x	Ovenbird	0	1	0	0	0	0	0	0	0	1
PC-077-2020x	Red-eyed Vireo	0	0	1	0	0	1	0	0	0	2
PC-077-2020x	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-078-2020x	Pine Siskin	0	8	0	0	0	0	0	0	0	8
PC-078-2020x	Red-eyed Vireo	0	0	0	0	0	1	0	0	0	1
PC-078-2020x	Ruby-crowned Kinglet	0	0	0	0	0	0	1	0	0	1
PC-078-2020x	Swainson's Thrush	0	0	2	0	0	0	0	0	0	2
PC-078-2020x	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-079-2020x	Blue-headed Vireo	1	0	0	0	0	0	0	0	0	1
PC-079-2020x	Ovenbird	0	1	0	0	0	0	0	0	0	1
PC-079-2020x	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1
PC-079-2020x	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-079-2020x	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-079-2020x	White-winged Crossbill	0	0	0	0	1	0	0	0	0	1
PC-079-2020x	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-015-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-015-2020b	American Robin	1	0	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-015-2020b	Black-capped Chickadee	1	0	0	0	0	0	0	0	0	1
PC-015-2020b	Black-throated Green Warbler	0	0	0	1	0	0	0	0	0	1
PC-015-2020b	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-015-2020b	Magnolia Warbler	1	0	0	0	0	0	0	0	0	1
PC-015-2020b	Mourning Warbler	1	0	0	0	0	0	0	0	0	1
PC-015-2020b	Red-breasted Nuthatch	1	0	0	0	0	0	0	0	0	1
PC-015-2020b	Red-eyed Vireo	1	0	0	0	0	0	0	0	0	1
PC-015-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-015-2020b	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-015-2020b	Winter Wren	0	0	0	0	0	0	0	1	0	1
PC-016-2020b	American Robin	1	0	0	0	0	0	0	0	0	1
PC-016-2020b	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-016-2020b	Canada Jay	0	0	0	0	0	0	0	1	0	1
PC-016-2020b	Common Raven	0	0	2	0	0	0	0	0	0	2
PC-016-2020b	Mourning Warbler	1	0	0	0	0	0	0	0	0	1
PC-016-2020b	Pine Siskin	0	0	0	0	0	0	5	0	0	5
PC-016-2020b	Purple Finch	0	0	0	0	0	0	1	0	0	1
PC-016-2020b	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2
PC-016-2020b	White-throated Sparrow	1	1	0	0	0	0	0	0	0	2
PC-016-2020b	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-016-2020b	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-018-2020b	Black-throated Green Warbler	1	0	0	1	0	0	0	0	0	2
PC-018-2020b	Boreal Chickadee	0	0	0	0	0	0	1	0	0	1
PC-018-2020b	Dark-eyed Junco	2	0	0	0	0	0	0	0	0	2
PC-018-2020b	Hairy Woodpecker	0	1	0	0	0	0	0	0	0	1
PC-018-2020b	Swainson's Thrush	1	1	1	0	0	0	0	0	0	3
PC-018-2020b	White-throated Sparrow	0	2	1	0	0	0	0	0	0	3
PC-018-2020b	Winter Wren	1	0	0	0	0	0	0	0	0	1
PC-019-2020b	Common Raven	0	0	2	0	0	0	0	0	0	2
PC-019-2020b	Dark-eyed Junco	3	0	0	0	0	0	0	0	0	3
PC-019-2020b	Hermit Thrush	0	0	0	0	1	0	0	0	0	1
PC-019-2020b	Nashville Warbler	0	0	0	0	0	0	0	1	0	1
PC-019-2020b	Swainson's Thrush	0	2	0	0	0	0	0	0	0	2

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-019-2020b	Tennessee Warbler	1	0	0	0	0	0	0	0	0	1
PC-019-2020b	Winter Wren	0	1	0	0	0	0	0	0	0	1
PC-019-2020b	Yellow-rumped Warbler	1	0	0	0	0	0	0	0	0	1
PC-020-2020b	Black-throated Green Warbler	0	0	0	0	0	0	1	0	0	1
PC-020-2020b	Nashville Warbler	0	1	0	0	0	0	0	0	0	1
PC-020-2020b	Swainson's Thrush	0	1	0	0	0	0	0	0	0	1
PC-020-2020b	White-throated Sparrow	0	0	0	0	0	1	0	0	0	1
PC-020-2020b	Winter Wren	0	2	0	0	0	0	0	0	0	2
PC-023-2020b	American Redstart	0	0	0	0	0	0	0	1	0	1
PC-023-2020b	Cedar Waxwing	0	1	0	0	0	0	0	0	0	1
PC-023-2020b	Common Goldeneye	0	7	0	0	0	0	0	0	0	7
PC-023-2020b	Dark-eyed Junco	0	0	1	0	0	0	0	0	0	1
PC-023-2020b	Fox Sparrow	0	0	1	0	0	0	0	0	0	1
PC-023-2020b	Nashville Warbler	0	0	0	0	0	0	0	1	0	1
PC-023-2020b	Pine Siskin	0	1	0	0	0	0	0	0	0	1
PC-023-2020b	Swainson's Thrush	0	0	2	0	0	0	0	0	0	2
PC-023-2020b	Swamp Sparrow	0	1	0	0	0	0	0	0	0	1
PC-023-2020b	White-throated Sparrow	0	1	0	0	0	0	0	0	0	1
PC-023-2020b	Winter Wren	0	2	0	0	0	0	0	0	0	2
PC-045-2020b	Mourning Warbler	0	1	0	0	0	0	0	0	0	1
PC-045-2020b	Pine Siskin	0	0	0	12	0	0	0	0	0	12
PC-045-2020b	Swainson's Thrush	0	0	2	0	0	0	0	0	0	2
PC-045-2020b	White-throated Sparrow	0	0	1	0	0	0	1	0	0	2
PC-045-2020b	Winter Wren	0	0	1	0	0	0	0	0	0	1
PC-045-2020b	Yellow-rumped Warbler	0	1	0	0	0	0	0	0	0	1
PC-046-2020b	American Robin	0	0	0	0	0	0	0	1	0	1
PC-046-2020b	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-046-2020b	Common Raven	0	0	1	0	0	0	0	0	0	1
PC-046-2020b	Mourning Warbler	0	1	0	0	0	0	0	0	0	1
PC-046-2020b	Pine Siskin	0	2	0	0	0	0	0	0	0	2
PC-046-2020b	Red-breasted Nuthatch	0	0	0	0	0	0	3	0	0	3
PC-046-2020b	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1
PC-046-2020b	Ruffed Grouse	0	1	0	0	0	0	0	0	0	1

Point Count	Species	0 to 3 Minutes			3 to 5 minutes			5 to 10 minutes			Total
		0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	0-50 m	50-100 m	>100 m	
PC-046-2020b	Swainson's Thrush	0	0	1	0	0	0	0	0	0	1
PC-046-2020b	Swainson's Thrush	1	0	0	0	0	0	0	0	0	1
PC-046-2020b	White-throated Sparrow	0	2	0	0	0	0	0	0	0	2
PC-048-2020b	American Redstart	1	0	0	0	0	0	0	0	0	1
PC-048-2020b	Bay-breasted Warbler	1	0	0	0	0	0	0	0	0	1
PC-048-2020b	Black-throated Green Warbler	1	0	0	0	0	0	0	0	0	1
PC-048-2020b	Chipping Sparrow	0	0	0	0	0	0	1	0	0	1
PC-048-2020b	Hermit Thrush	0	0	1	0	0	0	0	0	0	1
PC-048-2020b	Pine Grosbeak	0	0	0	2	0	0	0	0	0	2
PC-048-2020b	White-throated Sparrow	0	0	0	0	0	1	0	0	0	1
PC-050-2020b	Alder Flycatcher	0	0	1	0	0	0	0	0	0	1
PC-050-2020b	Belted Kingfisher	1	0	0	0	0	0	0	0	0	1
PC-050-2020b	Black-throated Blue Warbler	0	1	0	0	0	0	0	0	0	1
PC-050-2020b	Red-breasted Nuthatch	0	0	0	0	0	0	0	1	0	1
PC-050-2020b	Red-eyed Vireo	0	0	1	0	0	0	0	0	0	1
PC-050-2020b	Swainson's Thrush	0	0	0	0	0	0	0	0	1	1
PC-050-2020b	White-throated Sparrow	0	1	1	0	0	0	0	0	0	2
PC-050-2020b	Winter Wren	0	0	1	0	0	0	0	0	0	1
PC-050-2020b	Winter Wren	1	0	0	0	0	0	0	0	0	1

Appendix 11. Mammal species documented for the Marathon Palladium Project area.

Common Name	Scientific Name	2008-2010	2020
ORDER LAGOMORPHA - Pikas, Hares, and Rabbits			
Family Leporidae - Hares and Rabbits			
Snowshoe Hare	*Lepus americanus*	Y	Y
European Hare*	*Lepus europaeus*		
ORDER SORICOMORPHA – Insectivores			
Family Soricidae - Shrews			
Northern Short-tailed Shrew	*Blarina brevicauda*		
Arctic Shrew	*Sorex arcticus*		
Masked Shrew	*Sorex cinereus*		Y
Smoky Shrew	*Sorex fumeus*		
Pygmy Shrew	*Sorex hoyi*		
Water Shrew	*Sorex palustris*		
Family Talpidae - Moles			
Star-nosed Mole	*Condylura cristata*		
ORDER CHIROPTERA - Bats			
Family Vespertilionidae - Vesper Bats			
Big Brown Bat	*Eptesicus fuscus*		Y
Silver-haired Bat	*Lasionycteris noctivagans*		Y
Eastern Red Bat	*Lasiurus borealis*		Y
Hoary Bat	*Lasiurus cinereus*		Y
Little Brown Myotis	*Myotis lucifugus*		Y
Northern Myotis	*Myotis septentrionalis*		Y
ORDER CARNIVORA - Carnivores			
Family Canidae - Dogs, Foxes, and Wolves			
Coyote	*Canis latrans*		
Eastern Wolf	*Canis lupus lycaon*		
Northern Gray Wolf	*Canis lupus occidentalis*	Y	Y
Grey Fox	*Urocyon cinereoargenteus*		
Red Fox	*Vulpes vulpes*	Y	Y
Family Felidae - Cats			
Canada Lynx	*Lynx canadensis*		Y
Bobcat	*Lynx rufus*		
Mountain Lion or Cougar	*Puma concolor*		
Family Mephitidae - Skunks			
Striped Skunk	*Mephitis mephitis*		
Family Mustelidae - Weasels, Otters, and Badgers			
Wolverine	*Gulo gulo*		
North American River Otter	*Lontra canadensis*	Y	
American Marten	*Martes americana*	Y	Y
Ermine	*Mustela erminea*		
Long-tailed Weasel	*Mustela frenata*		
Least Weasel	*Mustela nivalis*		
American Mink	*Neovison vison*		

Common Name	Scientific Name	2008-2010	2020
Fisher	*Pekania pennanti*		
American Badger	*Taxidea taxus*		
Family Procyonidae - Raccoons, Ringtails, and Coatis			
Northern Raccoon	*Procyon lotor*		
Family Ursidae - Bears			
American Black Bear	*Ursus americanus*	Y	Y
ORDER ARTIODACTYLA - Even-toed Ungulates			
Family Cervidae - Deer			
Moose	*Alces americanus*	Y	Y
Elk	*Cervus elaphus*		
White-tailed Deer	*Odocoileus virginianus*		Y
Boreal Caribou	*Rangifer tarandus*		
ORDER RODENTIA - Rodents			
Family Castoridae - Beavers			
Beaver	*Castor canadensis*	Y	Y
Family Cricetidae - New World Mice, Rats, and Voles			
Rock Vole	*Microtus chrotorrhinus*		
Meadow Vole	*Microtus pennsylvanicus*		Y
Southern Red-backed Vole	*Myodes gapperi*		Y
Muskrat	*Ondatra zibethicus*		
Deer Mouse	*Peromyscus maniculatus*		
Eastern Heather Vole	*Phenacomys ungava*		
Northern Bog Lemming	*Synaptomys borealis*		
Southern Bog Lemming	*Synaptomys cooperi*		
Family Dipodidae - Jumping Mice			
Woodland Jumping Mouse	*Napaeozapus insignis*		Y
Meadow Jumping Mouse	*Zapus hudsonius*		
Family Erethizontidae - New World Porcupines			
Porcupine	*Erethizon dorsatum*	Y	
Family Muridae - Old World Mice and Rats			
House Mouse*	*Mus musculus*		
Norway Rat*	*Rattus norvegicus*		
Family Mycocastoridae - Coypus			
Nutria*	*Myocastor coypus*		
Family Sciuridae - Squirrels			
Northern Flying Squirrel	*Glaucomys sabrinus*		
Woodchuck	*Marmota monax*		
Least Chipmunk	*Neotamias minimus*	Y	Y
Eastern Gray Squirrel	*Sciurus carolinensis*		
Eastern Chipmunk	*Tamias striatus*		Y
Red Squirrel	*Tamiasciurus hudsonicus*	Y	Y

Appendix 12. Wildlife observations on trail cameras deployed June-August 2020 at the Marathon Palladium Project study area.

Camera #	Date	Time	Taxa	# Ind.	# Photos	Notes
3a	2020-06-10	09:00	grey wolf	2	3	
3a	2020-06-11	22:39	grey wolf	1	3	
3a	2020-06-12	20:30	moose	1	3	cow
3a	2020-06-15	21:27	moose	1	3	bull
3a	2020-06-15	23:03	black bear	1	3	
3a	2020-06-17	00:10	moose	1	3	bull
3a	2020-06-17	05:36	black bear	1	3	
3a	2020-06-18	00:34	moose	1	3	cow
3a	2020-06-21	12:28	moose	1	3	cow
3a	2020-06-22	21:03	moose	1	3	cow
3a	2020-06-23	00:42	moose	1	3	
3a	2020-06-29	04:03	moose	1	3	bull
3b	2020-07-15	22:11	grey wolf	1	3	
3b	2020-07-16	11:37	white-tailed deer	1	3	spike buck
3b	2020-07-16	13:09	black bear	1	3	
3b	2020-07-16	21:16	grey wolf	1	3	
3b	2020-07-16	21:41	grey wolf	1	3	dark pelage
3b	2020-07-29	21:28	grey wolf	1	1	
3b	2020-07-31	07:23	grey wolf	1	3	
3b	2020-08-08	21:38	black bear	1	2	
6a	2020-06-06	06:23	grey wolf	1	3	
6a	2020-06-16	05:10	moose	1	3	cow
6a	2020-06-16	05:15	moose	1	3	cow (same individual?)
6a	2020-06-20	09:20	grey wolf	1	3	
6a	2020-06-23	10:56	grey wolf	1	3	
6a	2020-06-23	11:29	grey wolf	1	3	different individual
6a	2020-06-23	11:31	grey wolf	1	2	different individual
6a	2020-06-23	12:40	grey wolf	1	3	dark pelage
6a	2020-06-26	05:43	black bear	1	3	
6a	2020-06-26	11:42	moose	1	3	cow
6a	2020-06-26	14:26	grey wolf	2	3	one dark pelage, the other buffy
6a	2020-07-01	05:51	moose	1	3	cow
6a	2020-07-06	04:35	grey wolf	1	3	
7a	2020-06-06	05:46	grey wolf	1	3	dark pelage
7a	2020-06-10	05:55	grey wolf	1	3	
7a	2020-06-15	07:53	grey wolf	1	1	buffy pelage
7a	2020-06-15	08:10	grey wolf	1	3	dark pelage,
7a	2020-06-15	09:28	grey wolf	1	3	buffy pelage
7a	2020-06-15	10:54	grey wolf	1	3	
7a	2020-06-15	13:14	grey wolf	1	3	dark pelage
7a	2020-06-18	04:40	grey wolf	1	1	
7a	2020-06-18	05:28	grey wolf	1	3	dark pelage
7a	2020-06-20	06:51	grey wolf	1	3	dark pelage
7a	2020-06-20	06:58	grey wolf	1	3	buffy pelage
7a	2020-06-20	09:12	grey wolf	1	3	buffy pelage
7a	2020-06-20	10:00	grey wolf	1	3	buffy pelage (different individual?)
7a	2020-06-20	10:10	grey wolf	1	3	

Camera #	Date	Time	Taxa	# Ind.	# Photos	Notes
7a	2020-06-20	23:49	grey wolf	1	3	
7a	2020-06-22	18:43	moose	1	3	dark patch on shoulder
7a	2020-07-06	05:16	grey wolf	1	3	
7b	2020-07-07	05:57	grey wolf	1	3	
7b	2020-07-09	05:12	grey wolf	1	3	
7b	2020-07-09	16:29	grey wolf	3	3	pups
7b	2020-07-12	08:02	grey wolf	1	3	grey pelage
7b	2020-07-14	05:56	grey wolf	1	1	
7b	2020-07-14	07:28	grey wolf	1	2	buffy pelage
7b	2020-07-16	11:54	white-tailed deer	1	3	spike buck
7b	2020-07-19	05:45	grey wolf	1	3	
7b	2020-07-20	21:39	black bear	1	3	
7b	2020-07-21	16:44	black bear	1	3	
7b	2020-07-23	14:53	grey wolf	1	1	
7b	2020-07-28	04:58	white-tailed deer	1	1	
7b	2020-07-30	13:06	sandhill crane	1	3	
7b	2020-07-31	12:51	black bear	1	3	
7b	2020-08-03	14:13	grey wolf	1	3	dark pelage
7b	2020-08-11	13:42	beaver	1	3	
7b	2020-08-12	00:40	grey wolf	1	3	
8a	2020-06-18	05:57	moose	1	3	bull?
8a	2020-06-21	17:56	black bear	1	2	
8a	2020-06-25	09:31	American marten	1	1	
8a	2020-07-03	10:59	black bear	1	3	
8a	2020-07-03	18:52	black bear	1	2	tilted camera
8a	2020-07-09	04:07	snowshoe hare	1	3	
8b	2020-07-12	09:19	black bear	1	3	cub
8b	2020-07-18	07:51	black bear	1	2	adult
8b	2020-08-01	13:14	black bear	1	3	yearling?
8b	2020-08-05	19:02	black bear	1	3	adult
8b	2020-08-05	19:12	black bear	1	3	adult

Appendix 13. Representative trail camera photos from 2020 deployments at the Marathon Palladium Project study area.

Trail Camera #3a


Bushnell NORBIO030 59°F15°C 06-15-2020 21:27:44


Bushnell NORBIO030 51°F10°C 06-17-2020 05:36:38

Trail Camera #3b


Bushnell M NORBIO030 60°F15°C
07-16-2020 13:09:39


Bushnell M NORBIO030 53°F11°C
07-16-2020 21:16:37


Bushnell M NORBIO030 53°F11°C
07-16-2020 21:41:48


Bushnell M NORBIO030 46°F7°C
07-31-2020 07:23:47

Trail Camera #6a

Trail Camera #7a


2020-06-15 9:28:57 AM M 1/3
13°C
HC500 HYPERFIRE
RECONYX


2020-06-15 10:54:14 AM M 2/3
15°C
HC500 HYPERFIRE
RECONYX

Trail Camera #7b


2020-07-14 7:28:33 AM M 1/3 11°C
HC500 HYPERFIRE
RECONYX


2020-07-15 8:02:57 PM M 2/3 16°C
HC500 HYPERFIRE
RECONYX


2020-07-16 11:54:52 AM M 3/3 21°C
HC500 HYPERFIRE
RECONYX


2020-07-20 9:39:38 PM M 3/3 11°C
HC500 HYPERFIRE
RECONYX


2020-07-21 4:44:53 PM M 2/3 18°C
HC500 HYPERFIRE
RECONYX


2020-07-30 1:06:13 PM M 1/3 29°C
HC500 HYPERFIRE
RECONYX


2020-08-03 2:13:01 PM M 1/3 22°C
HC500 HYPERFIRE
RECONYX


2020-08-11 11:42:19 PM M 1/3 9°C
HC500 HYPERFIRE
RECONYX

Trail Camera #8a


2020-06-25 9:31:22 AM M 1/3
20°C
NORBIO8
RECONYX


2020-07-03 10:59:57 AM M 1/3
37°C
NORBIO8
RECONYX


2020-07-03 6:52:13 PM M 3/3
28°C
NORBIO8
RECONYX


2020-07-09 4:07:39 AM M 1/3
16°C
NORBIO8
RECONYX

Trail Camera #8b


2020-08-01 1:14:16 PM M 3/3 30°C
NORBIO8
RECONYX


2020-08-05 7:02:41 PM M 2/3 15°C
NORBIO8
RECONYX

Appendix 14. Eastern whip-poor-will survey protocol and Marathon conditions.

According to OMNRF's draft survey protocol (OMNR 2013), ideally surveys for eastern whip-poor-will should occur under the following conditions:

- Between May 18-June 30
- Within one week of the full moon
- Start 15 minutes after sunset once moon above the horizon; must end 15 minutes before sunrise
- Air temperature at least 10°C
- Wind < 12 kph (Beaufort scale 3)
- Clear skies i.e., little or no cloud cover
- 3 surveys, ideally 2 surveys should be completed in the late May/first week of June period and a 3rd survey in the next available moon phase period which might be the middle/end of June

Available hourly air temperature and wind speed data from Marathon airport and daily precipitation data from Pukaskwa National Park (park HQ) were compiled and compared to moon phase and moonrise information available from https://www.timeanddate.com for Marathon to assess the suitability of recent survey windows and potential calling/foraging conditions for eastern whip-poor-will. Hourly periods between 22:00 and 05:00 for each date between May 18 and June 31 (inclusive) for the period 2015 and 2017-2019[13] inclusive were checked to determine if they met the preferred survey conditions above. Hourly data for cloud cover and precipitation were not available, so dates where >5 mm of precipitation were excluded due to the likelihood of rain or at least cloud cover during the survey window. This likely underestimates the number of days where there is cloud cover or fog that obscures the sky, however.

Results are presented in the following table. In 2017, there was sometimes only one suitable survey window due to the timing of the moon phases in the May 18-June 30 survey window. In most years, there are limited opportunities with suitable survey conditions. During both 2015 and 2019 there were only two dates on which a 2-hr survey could be conducted in ideal conditions, which would have precluded fully meeting the OMNRF's draft protocol of three surveys.

Survey conditions at the Marathon Palladium Project site based on reported weather and moon phases*.

Year	May														June																							Total # Nights	
	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1 hr	2+ hr
2015																X	XX		XX																				X				2	2
2017																	XX		XX	XX		XX	X			X			XX														2	5
2018						XX	XX	XX	XX	XX	XX	XX	XX																					XX	XX	X	X				XX			2	11
2019																										X			XX						X			XX							2	2

*dark blue shaded dates represent full moons; light blue dates represent the period preceding and after a full moon where there is still at least 50% illumination.

X denotes that there was a single 1-hr survey period on that date with suitable conditions

XX denotes that there was at least a 2-hr survey period on that date with suitable conditions

Total # of nights indicates how many calendar days there were that year with suitable survey periods of either 1-hour or 2+ hour duration.

[13] 2016 was excluded since suitable data were lacking for most of June.

Appendix 15. Bats detected using acoustic recorders deployed June-August 2020 in the GenPGM study area*.

Unit #	Date Recorded	Big Brown Bat	Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Northern Myotis	Total (All Species)
1a	2020-06-07		1		3	1		5
1a	2020-06-08	3		3	5			11
1a	2020-06-09	4		3	1	1		9
1a	2020-06-10		2		1			3
1a	2020-06-11		4	1				5
1a	2020-06-12		2	3	6	1		12
1a	2020-06-13		3	5	1			9
1a	2020-06-14	15	2	13	1	2		33
1a	2020-06-15		1	6	4			11
1a	2020-06-16		6	15	7	1		29
1a	2020-06-17			12	6	4		22
1b	2020-07-11			7	3			10
1b	2020-07-12			13		1		14
1b	2020-07-13		1	7		1		9
1b	2020-07-14			7	2	1		10
1b	2020-07-15			1		1		2
1b	2020-07-16			4	1	3		8
1b	2020-07-17			12		2		14
1b	2020-07-18				1			1
1b	2020-07-19		1			1		2
1b	2020-07-20		1	4				5
1b	2020-07-21			3		1		4
1b	2020-07-22			4				4
1b	2020-07-23			5	1			6
1b	2020-07-24	1	1	15				17
1b	2020-07-25		1	4				5
1b	2020-07-27		4	2	3	2		11
1b	2020-07-28		2			2		4
1b	2020-07-29			4		2		6
1b	2020-07-30	1	1	8	3			13
1b	2020-07-31		1	5	2			8
1b	2020-08-01		1	3	1			5
1b	2020-08-02			3	8	1		12
1b	2020-08-03			7	1			8
1b	2020-08-04		1	5		1		7
1b	2020-08-05			6	1			7
1b	2020-08-06			2	2			4
1b	2020-08-07			4	1			5
1b	2020-08-08			3				3
1b	2020-08-09			4	1			5
1b	2020-08-10		1	1				2
1b	2020-08-11	1		2	1	1		5
1b	2020-08-12		1	5	6	1		13
1b	2020-08-13		2	5				7

Unit #	Date Recorded	Big Brown Bat	Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Northern Myotis	Total (All Species)
1b	2020-08-14			1				1
2a	2020-06-07				1			1
2a	2020-06-08				5			5
2a	2020-06-09		3		4			7
2a	2020-06-10		7		8			15
2a	2020-06-11		5		8	1		14
2a	2020-06-12		2	1	7			10
2a	2020-06-13		4	1	7			12
2a	2020-06-14		5		6			11
2a	2020-06-15		7		7	1		15
2a	2020-06-16		6		6			12
2a	2020-07-08			2				2
2b	2020-07-09	1	1	1	2			5
2b	2020-07-10			1				1
2b	2020-07-11			2	5	3		10
2b	2020-07-12			4	1	1		6
2b	2020-07-13			3		2		5
2b	2020-07-14	1		5		5		11
2b	2020-07-15			6				6
2b	2020-07-16			8		2		10
2b	2020-07-17			8	1	2		11
2b	2020-07-18			7				7
2b	2020-07-19			1				1
2b	2020-07-20			3				3
2b	2020-07-21	1		1	1	2		5
2b	2020-07-22		1	4	1	2		8
2b	2020-07-23	2	1	3	5			11
2b	2020-07-24		1	6		2		9
2b	2020-07-25	1		8	1			10
2b	2020-07-27		3	3	2	2		10
2b	2020-07-28		2			2		4
2b	2020-07-29	1	2	6	5	3		17
2b	2020-07-30	1	2	8	5	1		17
2b	2020-07-31			5	3	4		12
2b	2020-08-01		1		3	1		5
2b	2020-08-02			5	5			10
2b	2020-08-03		3	5	7			15
2b	2020-08-04	1	2	2	1			6
2b	2020-08-05		2	7				9
2b	2020-08-06			2		2		4
2b	2020-08-07		4	2	4			10
2b	2020-08-08			6	1			7
2b	2020-08-09			2	2			4
2b	2020-08-10		1		1			2
2b	2020-08-11		149	4	5			158
2b	2020-08-12		47	7	6	9		69

Unit #	Date Recorded	Big Brown Bat	Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Northern Myotis	Total (All Species)
2b	2020-08-13		6	6	2	3		17
3a	2020-06-08				2			2
3a	2020-06-09			1	9	2		12
3a	2020-06-10			4	7	2		13
3a	2020-06-11				4	1		5
3a	2020-06-12		1		5	2		8
3a	2020-06-13		1	1	6	1		9
3a	2020-06-14			5	6	1		12
3a	2020-06-15			80	7	11		98
3a	2020-06-16			26	15	1		42
3a	2020-06-17			92	76	4		172
3a	2020-06-18	1	2	23	4	2		32
3a	2020-06-19		2	7	5	1		15
3a	2020-06-20			14	6	2		22
3a	2020-06-21		2	8	3	2		15
3a	2020-06-22		3	11	3	2		19
3a	2020-06-23			23	7	1		31
3a	2020-06-24		4	23	5			32
3a	2020-06-25		4	214	7			225
3a	2020-06-26		2	12	2			16
3a	2020-06-27		1	5	2	1		9
3a	2020-06-28		2	8	2			12
3a	2020-06-29		1	54	1			56
3a	2020-06-30		2	220		1		223
3a	2020-07-01			189	1			190
3a	2020-07-02	5		323	1	1		330
3a	2020-07-03			45	1	1		47
3a	2020-07-04	3	1	27	3	1		35
3a	2020-07-05			87	1			88
3a	2020-07-06	3	1	59	1			64
3a	2020-07-07	4		31	2			37
3a	2020-07-08			20				20
3a	2020-07-09		1	1	5			7
3b	2020-07-10			20	1			21
3b	2020-07-11			17	2	1		20
3b	2020-07-12	1		32	6	2		41
3b	2020-07-13			4				4
3b	2020-07-14			1	12			13
3b	2020-07-15			18	2	2		22
3b	2020-07-16			17	13			30
3b	2020-07-17		1	8	3			12
3b	2020-07-18			16	9			25
3b	2020-07-19			23				23
3b	2020-07-20			47	8	9		64
3b	2020-07-21			7	2			9
3b	2020-07-22			3	3			6

Unit #	Date Recorded	Big Brown Bat	Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Northern Myotis	Total (All Species)
3b	2020-07-23			3				3
3b	2020-07-24			12				12
3b	2020-07-25		4	19	12	4		39
3b	2020-07-26	1	2	27	8	1		39
3b	2020-07-27	5	3	21	8	1		38
3b	2020-07-28		1	5	2			8
3b	2020-07-29	1		5	1	2		9
3b	2020-07-30		1	7				8
3b	2020-07-31		1	1	3	2		7
3b	2020-08-01			8	2	1		11
3b	2020-08-02		1	1	2	3		7
3b	2020-08-03		4	1	1	3		9
3b	2020-08-04		2	1		1		4
3b	2020-08-05		1	1		3		5
3b	2020-08-06	1	6	1	1			9
3b	2020-08-07	2	1	2	23	2		30
3b	2020-08-08		6	1	1	5		13
3b	2020-08-09		2	2	1	10		15
3b	2020-08-10	2	1	1	4	7		15
3b	2020-08-11		2	1	9	1		13
4a	2020-07-06			1				1
4a	2020-07-07			3				3
4a	2020-07-08			1				1
4a	2020-07-09			6				6
4a	2020-07-10			4				4
4a	2020-07-11			4				4
4a	2020-07-12			10	1			11
4a	2020-07-13			2				2
4a	2020-07-15			1				1
4a	2020-07-16	1		7	2			10
4a	2020-07-17			5				5
4a	2020-07-18			2				2
4a	2020-07-19			2				2
4a	2020-07-20			7		1		8
4a	2020-07-21		1	3	1			5
4a	2020-07-22		2	3				5
4a	2020-07-23			7	2			9
4a	2020-07-24			4				4
4a	2020-07-25			18	3			21
4a	2020-07-26			14				14
4a	2020-07-27			12				12
4a	2020-07-28			15	1			16
4a	2020-07-29			8	5	1		14
4a	2020-07-30			9	8			17
4a	2020-07-31			6	1			7
4a	2020-08-01			4				4

Unit #	Date Recorded	Big Brown Bat	Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Northern Myotis	Total (All Species)
4a	2020-08-02			4	3	1		8
4a	2020-08-03		2	4	2			8
4a	2020-08-05			6	1			7
4a	2020-08-06		1	5		1		7
4a	2020-08-07		2	6	3			11
4a	2020-08-08	1	2	11	2	2		18
4a	2020-08-09			27	2	1		30
4a	2020-08-10			6	4			10
4a	2020-08-12		2	5				7
4a	2020-08-13			6	7			13
4a	2020-08-14			1				1
5a	2020-06-06		8					8
5a	2020-06-07		4		2			6
5a	2020-06-08		1		4			5
5a	2020-06-09		2		5			7
5a	2020-06-10		1		5			6
5a	2020-06-11		2		5			7
5a	2020-06-12		6		2			8
5a	2020-06-13		3		6			9
5a	2020-06-14		3		8			11
5a	2020-06-15		5		7			12
5a	2020-06-16		3		8			11
5a	2020-06-17		4		4			8
5a	2020-06-18		6		6			12
5a	2020-06-19		4		7			11
5a	2020-06-20		3		4			7
5a	2020-06-21		4		6			10
5a	2020-06-22				7			7
5a	2020-06-23		3		6			9
5a	2020-06-24		4		4			8
5a	2020-06-25		4		6			10
5a	2020-06-26		6		3			9
5a	2020-06-27		8		2			10
5a	2020-06-28		7		1			8
5a	2020-06-29		6					6
5a	2020-06-30		5		1	2		8
5a	2020-07-01		8					8
5a	2020-07-02		8			1		9
5a	2020-07-03		4					4
5a	2020-07-04		6					6
5a	2020-07-05		10					10
5a	2020-07-06		6		2			8
5a	2020-07-07		2					2
5b	2020-07-10		2					2
5b	2020-07-11		4					4
5b	2020-07-12		3					3

Unit #	Date Recorded	Big Brown Bat	Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Northern Myotis	Total (All Species)
5b	2020-07-13		1					1
5b	2020-07-14		4					4
5b	2020-07-15		4					4
5b	2020-07-16		4					4
5b	2020-07-17		4					4
5b	2020-07-18		3					3
5b	2020-07-19		4					4
5b	2020-07-20		3		1			4
5b	2020-07-21		3					3
5b	2020-07-22		3					3
5b	2020-07-23		3					3
5b	2020-07-24		3	1				4
5b	2020-07-25		4					4
5b	2020-07-26		3					3
5b	2020-07-27		3					3
5b	2020-07-28		2					2
5b	2020-07-29		3					3
5b	2020-07-30		3					3
5b	2020-07-31		1					1
5b	2020-08-01		4					4
5b	2020-08-02		2					2
5b	2020-08-03		2					2
5b	2020-08-04		1					1
5b	2020-08-05		2					2
5b	2020-08-06		2					2
5b	2020-08-07		3					3
5b	2020-08-08				2			2
5b	2020-08-09		2					2
6a	2020-06-07		4					4
7a	2020-06-10					1		1
7a	2020-06-13					9		9
7a	2020-06-14			1				1
7a	2020-06-15					1		1
7a	2020-06-18		3					3
7a	2020-06-20				1			1
7a	2020-06-29			2				2
7a	2020-07-02	2						2
7a	2020-07-03	22						22
7a	2020-07-05			1				1
7b	2020-07-11			1				1
7b	2020-07-12			1				1
8a	2020-07-06			4	1			5
8a	2020-07-07			6				6
8a	2020-07-09		1					1
8a	2020-07-10			2				2
8a	2020-07-11			4	2			6

Unit #	Date Recorded	Big Brown Bat	Red Bat	Hoary Bat	Silver-haired Bat	Little Brown Myotis	Northern Myotis	Total (All Species)
8a	2020-07-12			2		1		3
8a	2020-07-13			1		1		2
8a	2020-07-15					2		2
8a	2020-07-17			1		1		2
8a	2020-07-18			18				18
8a	2020-07-20			2		1		3
8a	2020-07-21			6				6
8a	2020-07-22		1	12				13
8a	2020-07-23			8				8
8a	2020-07-24			8		2		10
8a	2020-07-25			12	3	2		17
8a	2020-07-26			9		3		12
8a	2020-07-27		1	6		2		9
8a	2020-07-28		2	4	1			7
8a	2020-07-29		1	2				3
8a	2020-07-30			15				15
8a	2020-07-31		1	8				9
8a	2020-08-01			6				6
8a	2020-08-02			5				5
8a	2020-08-03			9	3			12
8a	2020-08-04			3	1			4
8a	2020-08-05		3	11				14
8a	2020-08-06			7				7
8a	2020-08-07			19	1	7		27
8a	2020-08-08			11	9	12		32
8a	2020-08-09			17		2	1**	20
8a	2020-08-10			7				7
8a	2020-08-11		1	5				6
8a	2020-08-12			15	1			16
8a	2020-08-13				1			1

*identified using the Wildlife Acoustics Kaleidoscope Pro software Auto-ID function.

** tentative identification