APPENDIX I
AVIFAUNA BIOPHYSICAL BASELINE REPORT

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AVIFAUNA BIOPHYSICAL BASELINE REPORT
Clydesdale Ridge Wind Power Project

June 24, 2024

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June 24, 2024

Ms. Megan MacIsaac
Clydesdale Holdings Ltd.
#1200 - 1701 Hollis Street
Halifax, NS B3J 3M8

Dear Ms. MacIsaac,

Re: Avifauna Biophysical Baseline Report
Clydesdale Ridge Wind Power Project

Attached is the Avifauna Biophysical Baseline Report prepared for the Clydesdale Ridge Wind Power Project.

The report documents our observations and findings.

We trust this to be satisfactory at this time. Once you have had an opportunity to review this correspondence, please contact us to address any questions you may have.

Thank you,

Samantha Stegen, MREM, P.Biol.
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EXECUTIVE SUMMARY

McCallum Environmental Ltd. (now Strum Consulting) was retained by Clydesdale Holdings Ltd. (Clydesdale Wind LP) to complete avifauna surveys for the proposed Clydesdale Ridge Wind Project (the Project), located in Mount Thom, Pictou and Colchester Counties, Nova Scotia. These assessments are to support the preparation and submission of the provincial Environmental Assessment Registration Document (EARD).

The Project Area comprises a mosaic of habitats including open/disturbed clear-cut areas, ATV trails, immature and mature softwood, hardwood, and mixedwood stands, and open and forested wetlands (i.e., vernal pools, small open water wetlands, and treed swamps). The Project Area provides a range of habitats suitable for a variety of bird species with different habitat requirements. Forests and shrub-dominated areas with stand heterogeneity (i.e., stands with different height classes) provide suitable habitat for foraging and breeding for many passerine species. The northern half of the Project Area has more mature, open forest that varies between mixedwood and hardwood. Whereas the southern half is more low-lying and disturbed with blow down from storms and also fragmentation from clearcutting. However, there are tracts of mature forest in the southern half of the Project Area.

The objective of the avifauna species surveys was to:

- Identify species and habitat usage, including Species at Risk (SAR) and Species of Conservation Interest (SOCI) within and surrounding the Project Area, and
- Determine trends in species composition and bird group usage throughout different seasons

The results of these surveys will be carried forward to the EARD and discussed in the effects assessment.

In June 2023, biophysical field surveys were initiated and continued through June 2024 and a total of 109 hours of surveys were completed by biologists. The field studies were completed as follows:

- Spring migration surveys (April – June 2024)
- Breeding bird surveys (June 2023)
- Nightjar Surveys (June 2023)
- Fall migration surveys (August – October 2023)
- Diurnal Watch Counts (Same time as Spring & Fall Migration Surveys)

Biophysical surveys resulted in the observation of 7,683 individuals, representing 117 bird species within the Project Area.

The most abundant bird group observed (by total number of individuals) was passerines accounting for 81.1% total individuals, followed by other landbirds (4.8%), and waterfowl (1.4%). Nocturnal raptors, diurnal raptors, and other waterfowl and shorebirds make up 1% when combined.

Passerines had the highest species diversity with 72 species observed, followed by diurnal raptors (10 species), waterfowl (eight species) other landbirds, (nine species), other waterbirds (three species), diurnal raptors (ten species), and nocturnal raptors (one species). American robin was the most observed species during all avian surveys (n=1, 042).

Throughout the avifauna baseline surveys, no colonies of birds were observed within or adjacent to the Project Area. During the fall migration, no distinct migration corridors or patterns were noted by surveyors within the Project Area. Overall, the same behaviour from spring migration and breeding bird seasons was noted.

The Project Area lies primarily on land that has previously been cleared for logging activities and utilizes existing dirt/gravel roads. The existing Dalhousie Mountain Wind Project is approximately 2 km east of the Project and to the south is Trunk Highway 4. The Gully Lake Wilderness Area is directly west of infrastructure and within the Project Area.

During the spring, fall, and breeding bird surveys, survey locations associated with old logging roads and shrubby roadside and/or mixed wood forests had the highest species richness and abundance. The proposed turbine layout for this Project is mostly centered along previously cleared woodlands generally bounded to the north and west by undeveloped land and sparsely populated residential areas. A general trend of spring migration counts is on average higher than the fall migration counts at the same point count (PC) locations. Individual counts were higher in spring migration than the fall migration surveys.

Spring migration counts were highest at PCs 1, 27, and 37 all scattered across the extent of the Project Area. Fall migration followed a similar trend, but the counts were generally lower than the spring counts. PC 37 had the highest individual count (347 for spring migration and 114 for fall migration) in both seasons and the highest species diversity for spring (54) and fall (40) migration surveys. PC 37 is located next to an open water wetland complex surrounded by mixed wood forest and an existing old logging road. PC 37 is also adjacent to an open, low-canopy, recently clear-cut area.

During avifauna baseline surveys, most bird groups were observed flying under 100 m in height and observations of groups of passerines, other landbirds, and raptors close to the existing logging roads were common. This suggests the existing logging roads are being used as a streamlined way to move around the area. Fly-over activity was recorded during all seasons and the most common fly-over height recorded for all bird groups was between 50-100 m.

No common nighthawk (*Chordeiles minor*) were observed during the nightjar surveys. This was expected due to the lack of suitable breeding habitat for this species throughout the Project Area. No Eastern whip-poor-will (*Antrostomus vociferus*) were observed during the nightjar surveys.

There were six avian SAR observed during the avifauna baseline surveys:

- Canada warbler (*Cardellina canadensis*)
- eastern wood-pewee (*Contopus virens*)
- evening grosbeak (*Coccothraustes vespertinus*)
- olive-sided flycatcher (*Contopus cooperi*)
- red crossbill (*Loxia curvirostra*)
- rusty blackbird (*Euphagus carolinus*)

Canada warbler were observed at PC 3 in the northwest of the Project Area, PC 30 and 36 in the southeast of the Project Area; all of which are associated with mixed wood forest. PC 36 borders the Gully Lake Wilderness Area, PC 3 and PC 30 are adjacent to a watercourse and a riparian wetland.

Eastern wood-pewee were observed at PC 5 during breeding bird area searches. PC 5 is located in the north end of the Project Area surrounded by medium-aged mixedwood forest. PC 5 is approximately 500 m north of Turbine 1.

Evening grosbeak were observed at PCs 3, 14, and 41. PC 4 and 14 are adjacent to recent clear-cut activity surrounded by mixed wood forest and an existing logging road. PC 3 has watercourse and riparian areas but is also next to a snowmobile/ATV trail and a field with mixed wood forest surroundings.

Olive-sided flycatcher were observed at PC 1, PC 3, and PC 24. PC 1 is located at an existing snowmobile/ATV trail and a watercourse crossing near a riparian wetland and surrounded by young regenerative mixed wood forest. PC 24 is located next to recent clear-cut activity (selective harvesting methods) and mixed wood forest.

Red crossbill was observed at PC 27 and PC 40. PC 40 is next to a road, a watercourse, and a riparian wetland surrounded by mixed wood forest. PC 27 is surrounded by mixed wood forest and recent clearcut activities.

Rusty blackbird was observed at PC 6 which is adjacent to an existing logging road, recent clear-cut activity, snowmobile/ATV trail, and mixed wood forest.

Across all survey seasons, a total of 18 avian SOCI species were observed.

Overall, there is consistency in use by birds based on habitat types in all seasons. Most birds were observed along existing logging roads and regenerating mixedwood forest. There was no evidence of fly-over/migration corridors over the Project Area, but birds do fly through the area.

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LIST OF ACRONYMS

ACCDC	Atlantic Canada Conservation Data Centre
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWS	Canadian Wildlife Service
DWC	Diurnal Watch Count
EA	Environmental Assessment
EARD	Environmental Assessment Registration Document
ECCC	Environment and Climate Change Canada
ESA	*Endangered Species Act,* S.N.S., 1998, c.11
GIS	Geographic Information System
GPS	Global Positioning System
IBA	Important Bird Area
MBBA	Maritime Breeding Bird Atlas
MBS	Migratory Bird Sanctuary
NSNRR	Nova Scotia Natural Resources and Renewables
NS	Nova Scotia
NSE/NSECC	Nova Scotia Environment and Climate Change
NWA	National Wildlife Area
PC	Point Count
SAR	Species at Risk
SARA	*Species at Risk Act*
SOCI	Species of Conservation Interest

LIST OF APPENDICES

1.0 INTRODUCTION

McCallum Environmental Ltd. (now Strum Consulting) was retained by Clydesdale Holdings Ltd. (Clydesdale Wind LP) to complete avifauna bird surveys for the proposed Clydesdale Ridge Wind Project (the Project), located near Mount Thom in Cobequid, Nova Scotia. These assessments are to support the preparation and submission of the provincial Environmental Assessment Registration Document (EARD).

The objective of the avifauna species surveys was to:

- Identify species and habitat usage with a focus on Species at Risk (SAR) and Species of Conservation Interest (SOCI) within and surrounding the Project Area.
- Determine trends in species composition and bird group usage throughout different seasons.

The results of these surveys will be carried forward in the EARD to evaluate the Project's effects on avifauna.

1.1 Regulatory Context

In April 2022, the Canada Wildlife Service (CWS) released an advice update for Environmental Assessments (EA) and monitoring of wind energy in the Atlantic Region (ECCC-CWS, 2007a; ECCC-CWS, 2007b; CWS, 2018). Within this update, CWS states that projects with wind turbines greater than 150 m in height are "Very High" in site sensitivity and thereby categorize as Level or Category 4 concern. This level requires comprehensive baseline surveys that, at minimum, cover a calendar year.

The Project also has potential to interact with avifauna species that may be protected under federal and provincial legislation. The avifauna surveys were designed to detect species that are listed in these documents. Legislation that may direct resource development and conservation of avifauna species and their habitat include:

Federal Legislation

- *Species at Risk Act*
- *Migratory Bird Convention Act*

Provincial Legislation

- *Nova Scotia Wildlife Act*
- *Endangered Species Act, S.N.S., 1998, c.11 (ESA)*

The Project is also driven by policies, guidelines, and standards that provide guidance on the development of the Project and the survey design. These guidance documents and policies include:

- Environment and Climate Change Canada Canadian Wildlife Service (ECCC-CWS) (Atlantic Region) – Wind Energy & Birds Environmental Assessment Guidance Update (CWS, 2022)
- Wind Turbines and Birds – Updated Guidance for Environmental Assessment and Monitoring Canadian Wildlife Service – Atlantic Region (CWS, 2018)
- Wind Turbines and Birds: A Guidance Document for Environmental Assessment (ECCC-CWS, 2007a)
- Recommended Protocols for Monitoring Impacts of Wind Turbines in Birds (ECCC-CWS, 2007b)
- Nova Scotia Wetland Conservation Policy (NSE, 2019)
- The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSE, 2009)
- Various Nova Scotia Natural Resources and Renewables (NSNRR) Special Management Practices (SMP) and Environment and Climate Change Canada (ECCC) Species at Risk Management Plans

1.2 Project Area

The Project Area is bounded by the communities of Upper Kempton to the west, Comeaus Hill to the north of Earltown, and Loganville to the east (Drawing 1a and 1b, Appendix A). The Project Area is 7358 ha in size, and is situated in Mount Thom, Colchester and Pictou Counties (approximate center located at 20T 496832 m E 5045535 m N).

The avifauna survey program occurred within and immediately adjacent to the Project Area.

1.3 Project Team

A Project Team consisting of terrestrial ecologists proficient in avifauna identification were selected to complete the field studies and reporting for these surveys. Team members with integral roles in the surveying, reporting, and project management are listed below (Table 1.1).

Table 1.1: Project Team

Team Member	Role and Duties
Melanie Juurlink, BSc., MREM	Senior review, project management, reporting, regulatory consultation
Jessica Lohnes, BSc.H.	Bird surveys
Nicholas Doane, BSc.	Bird surveys
Samantha Stegen, MREM, P. Biol.	Reporting

1.4 Regulatory Consultation

Avifauna survey methods were shared via email with CWS and NSNRR on September 15, 2023. Survey methods were adjusted based on these responses and will be addressed throughout Section 2.2. NSNRR also recommended an extended fall migratory period and provided Strum with the Environment and Climate Change Canada's Canadian Wildlife

Service (Atlantic Region) – Wind Energy & Birds Environmental Assessment Guidance Update (CWS, 2022; May 18, 2022, pers. comm., Mark McGarrigle, Species at Risk Biologist, NSNRR). This information is included in a separate report (Ausenco, 2024).

Strum confirmed with NSNRR that the extended fall migratory period (i.e., until the end of November) is specific for radar monitoring and the field survey window is adequate. Furthermore, Strum informed NSNRR that the CWS protocol for Nightjar surveys (June 3, 2022, pers. comm., Stephen Zwicker, Environmental Assessment Coordinator, ECCC-CWS) would be followed, with completion of two rounds of focused nightjar surveys (May 31, 2022, pers. comm., Mark McGarrigle, Species at Risk Biologist, NSNRR).

NSNRR assured surveys should have appropriate habitat coverage, including within the Gully Lake Wilderness Area directly southwest of the Project area. PC locations were placed to get appropriate coverage of habitat present on site. PC locations directly southwest of the Gully Lake Wilderness Area and breeding bird area searches were conducted within the wilderness area to get more coverage of this area. More details on the Gully Lake Wilderness Area are provided in Section 3.1.4 of this report.

1.4.1 Canadian Wildlife Service

All CWS recommendations were considered during the avian survey methods design for this Project and an effort was made to incorporate applicable recommendations. Refer to Table 1.2 for a summary of CWS recommendations and notes on their inclusion/exclusion from the avifauna survey program.

Table 1.2: Canadian Wildlife Service Comments on Proposed Avifauna Methods

CWS Comments	Incorporated into Survey Program (Y/N)	Notes or Justification
Winter bird surveys should be completed as they offer information on bird presence and importance of an area and results should be considered as part of impact analysis (e.g., habitat loss).	Y	Incidental birds were recorded during Winter Tracking Surveys which took place on January 31 and February 16, 2024, for a total of 24 hours of effort. The purpose of this survey was to detect avian species that would otherwise not be detected or to adequately capture species abundance.
The stratification of Point Counts (PCs) selection based on habitat is acceptable; however, based on the number of PCs that are roadside or trailside, it would seem that the PCs were assigned a location within a strata to meet a distance apart parameter.	Y	The breeding bird survey (BBS) PCs were set to provide coverage on a layout which has since changed. Because wind project layouts change regularly

CWS Comments	Incorporated into Survey Program (Y/N)	Notes or Justification
This approach reduces the effectiveness and the power of the PC approach; it is important to select off-road PCs since roads and roadside counts do introduce a level of bias into the results. As a result of the approach proposed, it is expected that results will have inherent error and bias. ECCC-CWS recommends referring to Page 15 of the CWS "Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds" (ECCC, 2007b) for further advice on selecting PCs. The proponent indicates on their map that there were layout changes and ECCC-CWS notes that there is a section to the south that is missing breeding bird and nightjar PCs altogether. It is unclear from the information provided for review how this gap in the recommended baseline surveys will be addressed.		through the EA process (i.e., turbine locations may be required to move based on the identification of a wetland or SAR or engineering constraints) we made sure that BBS PCs were placed to get appropriate coverage of habitat present on site. Due to the update in the layout (shift in a cluster of turbines) we have added additional PCs and adjusted them for fall migration surveys (that repeated again during spring of 2024) to get coverage of this area. The readjusted PCs maintain appropriate coverage of habitat as well. We are not proposing to conduct additional BBS in areas where BBS were not completed in 2023.
The proponent plans to undertake "diurnal watch count surveys (i.e., passage migration surveys)" and it is noted in section 2.3.1.2 that "each survey will be 2 hours in length (broken down into 30-minute time blocks)". ECCC-CWS recommends referring to Page 22 of the CWS "Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds" (ECCC, 2007b) for further advice on Passage Migration Counts and diurnal migrating birds which recommends that these surveys be conducted for a duration of 6 hours, dividing observations into one-hour blocks.	N	Round 1 of the diurnal watch count surveys was completed in 30-minute time blocks for a total of 14.5 hours of effort. Round 2 was completed using the same methods for a total of 11.5 hours of effort. The recommendation from ECCC-CWS does not (to any greater degree) increase efficacy of our DWC surveys. Surveyors have found on multiple Wind Projects in Nova Scotia that species abundance and diversity plateaus after around 30 mins of DWC survey time. Surveys were conducted during peak raptor hour (am) and in accordance with industry standards.

CWS Comments	Incorporated into Survey Program (Y/N)	Notes or Justification
The Proponent must ensure that they do not remove the nests of any migratory birds listed on Schedule 1 of MBRs (2022) to ensure compliance with the MBCA and associated regulations. It is the responsibility of the proponent to ensure that activities are managed so as to ensure compliance with the Migratory Birds Convention Act and associated regulations.	Y	Understood.

2.0 METHODOLOGY

Completion of the avifauna surveys is a two-part process consisting of a desktop review and field surveys.

2.1 Desktop Review Methodology

A review of the Canada Important Bird Areas (IBA) database, Atlantic Canada Conservation Data Centre (ACCDC) report, Maritime Breeding Bird Atlas (MBBA), old forest GIS database, and CWS Migratory Bird Sanctuaries (MBS) was completed to support bird survey design.

The Provincial Landscape Viewer was also reviewed to determine whether the Project Area is within, or adjacent to special features, such as protected areas. To ensure the Project Area is not located within any ecologically sensitive regions, the following databases were also reviewed:

- NSNRR Significant Habitats
- *Species at Risk Act (SARA)* Critical Habitat layers
- *SARA* Recovery strategies, and
- Special Management Practice (SMP) layers.

An EARD was prepared in 2012 for a wind project in the same location with a similar layout as the proposed Project (Stantec 2012). The 2012 EARD (Stantec 2012) was reviewed by Strum to advise methodologies and survey design. Data presented in the 2012 EARD is not carried forward herein.

These aforementioned databases were used, and the major vegetation communities and habitat types listed below were identified using a habitat model (referred to as the Strum habitat model) created in QGIS using the forestry, depth-to-water (DTW), and canopy height model (CHM) databases. Depending on the target avifauna species or species groups, a subset or all of the following habitat types were targeted for field surveys:

- Hardwood forests
- Hardwood wet forests
- Mixedwood forests
- Mixedwood wet forests
- Softwood forests
- Softwood wet forests
- Open areas/barrens
- Shrubs/alders
- Cutovers
- Cutover Wetlands
- Open Wetlands (i.e., open canopy swamps, fens, bogs, etc.)
- Anthropogenic (e.g., urban/developed - buildings, roads, quarries, etc.)
- Open waterbodies
- Areas with edge habitat

To determine suitable avifauna survey locations the following databases were used:

- Aerial imagery (provided by Google Earth)
- NSNRR Forest Inventory
- Nova Scotia Environment and Climate Change Canada (NSECC) DTW Model
- NSECC Wet Areas Mapping (WAM) and Flow Accumulation
- NSECC Wetland Inventory
- Nova Scotia Topographic Database (NSTDB) which includes road, watercourse and topography layers
- Province of Nova Scotia Geographic Data Directory – CHM

2.1.1 Priority Species List

Development of a priority species list for birds was completed based on a compilation of listed species from the following sources:

- Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and *SARA*: All species listed as Endangered, Threatened or Special Concern
- *ESA*: All species listed as Endangered, Threatened or Vulnerable
- (ACCDC Conservation Rank: All Species designated as S1, S2, or S3 as defined by the ACCDC.

Breeding bird status qualifiers are used to determine whether a species is a priority species, based on the time of year in which the species was observed. For instance, a bird with an S-Rank of S2S3B, S5N is considered a priority species if observed during the breeding season. If observed outside of breeding season, this species would not be considered a priority species.

Species listed under *SARA* and/or *ESA* are termed SAR and species listed under COSEWIC and/or ACCDC are termed Species of Conservation Interest (SOCI). The priority list of

species was first narrowed by a broad geographic area and then further narrowed by identifying specific habitat requirements for each species. For example, if a listed species on the *ESA* required abandoned or cultivated fields, and that habitat is not present inside the Project Area, this species was not carried forward to the final list of priority species.

The data sets and reports described above and in Section 2.1 were reviewed and used to develop the priority species list. The ACCDC report was one of the key documents used in the development of the priority species list, as this report summarizes known and observed occurrences of rare species in the general location of the Project Area.

The final priority species list is included in Appendix B, the ACCDC report is included in Appendix C, and a list of birds observed during the MBBA atlas in the Project Area within the Cobequid region (squares 20MR95, 20MR94, and 20MR93) is provided in Appendix D.

2.2 Survey Design Methodology

Prior to conducting field surveys, a preliminary desktop survey design was developed to target suitable habitat for avifauna species or groups of interest (e.g., breeding birds, nightjar, owls, etc.). Survey methods were consistent with the guidelines stated in CWS (2018), ECCC-CWS (2007a), and ECCC-CWS (2007b)[1]. These documents provided instructions in the following areas: survey site selection, survey location spacing, number of PCs, survey duration, and season selection.

Based on the CWS guidelines (ECCC-CWS, 2007a, ECCC-CWS, 2007b, and CWS, 2018), The Guide to Addressing Wildlife Species and Habitat in an EA Registration Document (NSE, 2009), regulatory consultation, and the desktop review described above, the following avifauna survey types were selected:

- Spring and fall migration PC surveys
- Spring and fall migration diurnal watch count (DWC) surveys
- Breeding bird point count surveys
- Nightjar surveys

PC locations were selected based on a Strum generated habitat model and were spread throughout the Project Area to provide representative coverage for the diversity of habitats identified. The habitat model is also discussed in Section 2.1. and Section 1.1.2.1. in the Project's EARD Report.

[1] Note that during initial survey design the Environment and Climate Change Canada's Canadian Wildlife Service (Atlantic Region) - Wind Energy & Birds Environmental Assessment Guidance Update (April 2022) was not yet released.

2.2.1 Spring and Fall Migration and Breeding Bird Surveys

2.2.1.1 Point Count Surveys

A total of 42 PC locations were selected in representative habitats within the Project Area and the surrounding areas (Drawing 2a and 2b, Appendix A). These surveys are not species-specific, as avifauna species have different habitat requirements for breeding and migratory purposes, therefore a representative number of all major habitats listed in Section 2.2 were targeted. PC locations were spaced a minimum of 250 m depending on the complexity of habitat types and to reduce, and hopefully eliminate, the risk of double-counting individuals, as recommended in Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (ECCC-CWS, 2007b).

PCs were selected as the preferred method for avian usage surveys due to the large extent of the Project Area and they allow identification of a broad range of species while minimizing the possibly of double counting individuals. Attempts were made to establish a reliable baseline for any avifauna monitoring, should it be conducted. At the time of spring migration survey design, the placement of Project infrastructure was not finalized. Survey design primarily focused on habitat coverage rather than area coverage.

2.2.1.2 Diurnal Watch Count Surveys – Spring and Fall Migration

DWC surveys (i.e., passage migration surveys) were completed to determine migratory patterns of bird species/bird groups within the Project Area and surrounding areas. The methods and results for these surveys are included in the spring and fall migration sections.

DWC surveys were conducted from three observation points established within and surrounding the Project Area (Drawing 3; Appendix A). DWC 1 was within the northeast extent of the Project Area within dense mixed wood forest. While, DWC 2 was located on the southeast, approximately 800 m from the Project Area and within an existing quarry with open viewscapes.

These observation points were selected via aerial imagery based on local topography and adjacent land cover with the intention of allowing for a 360-degree view around the Project Area. Locations were chosen with high visibility of the sky, to observe fly-overs and areas that could potentially serve as stop over sites during migration were also incorporated. All points were verified in the field prior to commencement of surveys.

2.2.2 Nightjar Surveys

The common nighthawk is listed as Special Concern by COSEWIC and Threatened by the *SARA* and the *ESA*. The common nighthawk prefers to nest in gravelly substrates and is best detected while foraging for insects shortly after sunset (MBBA, 2008).

In addition to common nighthawk, these surveys were completed to target Eastern whip-poor-will, which is listed as Threatened by COSEWIC, *SARA*, and *ESA*. The Eastern whip-

poor-will uses a mixture of open lands for foraging and wooded areas for nesting and perching (Birds Canada, 2022). Examples of suitable habitat for Easter whip-poor will include shrubbed wetlands, clearcuts, agricultural fields, rock or sand barrens with scattered trees, savannahs, burned areas, conifer plantations, and various types of forests at early stages of succession or edges of dense forests with similar ground-level structure. This species is found in habitat with moderate tree, shrub, and herbaceous cover (ECCC, 2018b). There is a higher percentage of forested area in the northern parts of the Project Area and the PC locations for the nightjar surveys were spread throughout this area as much as feasible.

Potentially suitable common nighthawk and eastern whip-poor-will breeding and foraging habitat, such as roadside areas/gravel areas, forested areas, marsh, cutovers, and heathland/barrens (Birds Canada, 2022; ECCC, 2018b; MBBA, 2008), were selected as PC locations both within the Project Area and the area bordering the Project Area. A minimum of 1.6 km spacing was used to provide adequate coverage of the area while minimizing overlapping observations (i.e., hearing the same individual at multiple locations). Six PC locations were selected in the preliminary desktop review (one within the Project Area and the remaining five bordering it). All PC locations were roadside except one PC that was on an ATV trail within the Project Area. PCs being along roads or ATV trails also alleviates safety concerns for the surveyor during nocturnal surveys.

2.3 Field Program Methods

Survey locations determined in the desktop survey design (Section 2.2) were visited and adjusted if required. A breakdown of the time of year and survey rationale is described in Table 2.1. Survey dates were selected to provide representative coverage of important stages of avifauna ecology. As an example, by spreading out survey dates the widest variety of migrating birds will be observed.

Table 2.1: Avian Surveys Completed within the Project Area

Survey Type	Survey Rounds	Dates	Rationale	Reference for Survey Dates and Methods
Spring migration (with DWC surveys)	1	April 4, 2024	Bird species begin to migrate back to Canada to breed this time of year. Resident species may begin to breed on March 30. Surveying during this time period will detect any early nesters and the beginning of spring migration.	Nesting Periods – Government of Canada (ECCC, 2018a)
	2	April 17, 2024 April 18, 2024 April 19, 2024		
	3	April 29, 2024 April 30, 2024 May 1, 2024		
	4	May 13, 2024 May 15, 2024 May 17, 2024		
	5	May 29, 2024 May 30, 2024 May 31, 2024		

Survey Type	Survey Rounds	Dates	Rationale	Reference for Survey Dates and Methods
Breeding bird	1	June 13, 2023 June 14, 2023 June 15, 2023 June 16, 2023	June is peak breeding season in Nova Scotia. Different species breed on different schedules, therefore, spreading surveys out within June allowed for greater chances to detect species.	MBBA, 2020
	2	June 26, 2023 June 27, 2023 June 28, 2023 June 29, 2023 June 30, 2023		
Nightjar	2	June 13 and 26, 2023	To understand the use of the land within and surrounding the Project Area by common nighthawk and Eastern whip-poor-will. The ACCDC reported a common nighthawk sighting within 16.7 ± 0 km and an Eastern whip-poor-will sighting within 5.4 ± 7.0 km of the Project Area.	ACCDC, 2023 (ACCDC report in Appendix C)
Fall migration (with DWC surveys)	1	Aug. 15, 2023 Aug. 16, 2023	Bird species begin to migrate south for the winter months from late August to September. Survey rounds began in mid-August and extended into late October to accommodate five survey rounds and potential early/late migrants.	MBBA, 2020
	2	Aug. 29, 2023 Aug. 31, 2023 Sept. 1, 2023		
	3	Sept. 7, 2023 Sept. 8, 2023		
	4	Sept. 28, 2023 Sept. 29, 2023		
	5	Oct. 19, 2023 Oct. 20, 2023		

Habitat descriptions at each PC were recorded and each field-verified PC location was georeferenced by a handheld Garmin GPS. General observations including temperature, visibility, wind speed, date, and start and end time were also recorded during each survey. Bearings were recorded for priority species observed during dedicated survey periods and incidentally.

Surveys were not conducted in wind speeds over 3 on the Beaufort scale (12-19 km/hr), when noise levels make it difficult to hear or distinguish bird calls, or in rain that was more than a light drizzle (ECCC-CWS, 2007b). Incidental observations, those observed outside PC locations or outside allocated survey time, were recorded for novel (e.g., not observed during any other survey) and priority species (SAR/SOCI) or species displaying breeding or other noteworthy behaviour(s).

Refer to Table 2.2 for habitat types at each migration PC location.

Table 2.2: Survey Point Count Locations and Associated Habitats

Point Count	Coordinates (NAD 83 UTM 20)		Habitat Description	Survey
	Easting	Northing		
1	491141	5049456	Snowmobile/ATV trail/road at water crossing by watercourse and riparian wetland. Mixedwood forest surrounding and older clearcut areas nearby.	Spring & Fall Migration, and Breeding Bird
2	491797	5049976	Snowmobile/ATV trail/road. Close to watercourse and fields. Mixedwood forest.	Spring & Fall Migration, and Breeding Bird
3	491952	5050209	Snowmobile/ATV trail/road. Watercourse and riparian wetland to one side. Field to other side. Mixedwood forest surrounding.	Spring & Fall Migration, and Breeding Bird
4	492020	5050967	Snowmobile/ATV trail/road. Right by watercourse and wetland to one side. Mixedwood forest with slightly more hardwood trees.	Spring & Fall Migration, and Breeding Bird
5	492156	5050967	Snowmobile/ATV trail/road. By steep hill dropping towards watercourse. Hardwood dominant forest.	Spring & Fall Migration, and Breeding Bird
6	492370	5051151	Forestry road. Close to older clearcuts. Mixedwood forest. Corner of road and snowmobile/ATV trail/road.	Spring & Fall Migration, and Breeding Bird
7	492734	5050860	Forestry road. Hardwood forest.	Spring & Fall Migration, and Breeding Bird
8	492836	5050651	Forestry road. By clearcut areas and fields. Patches of mixedwood shrub and forest with slightly more softwood trees.	Spring & Fall Migration, and Breeding Bird
9	493079	5050486	Forestry road. By fields and clearcut areas. Mixedwood forest with slightly more softwood trees.	Spring & Fall Migration, and Breeding Bird
10	493279	5050364	Snowmobile/ATV trail/road close to old clearcut. Mixedwood and shrubby forest, slightly more softwood trees.	Spring & Fall Migration, and Breeding Bird
11	493434	5050612	Road. By steep hill dropping towards watercourse. Mixedwood forest with some hardwood dominant sections.	Spring & Fall Migration, and Breeding Bird
12	493745	5050394	Forestry road. Old clearcuts close-by. Mixedwood forest.	Spring & Fall Migration, and Breeding Bird

Point Count	Coordinates (NAD 83 UTM 20)		Habitat Description	Survey
	Easting	Northing		
13	493235	5049937	Road. Edge of grassy field one side and other side is mixedwood forest.	Spring & Fall Migration, and Breeding Bird
14	493045	5049616	Road. Close to recent and old clearcut activity. Softwood dominant forest. Shrubby roadsides.	Spring & Fall Migration, and Breeding Bird
15	492608	5049553	Forestry trail/road. Mixedwood shrubby forest. Shrubby roadsides.	Spring & Fall Migration, and Breeding Bird
16	492186	5049092	Old forestry trail/road overgrown with shrubs/herbaceous veg.	Spring & Fall Migration, and Breeding Bird
17	492676	5049077	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
18	492438	5048518	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
19	493968	5049621	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
20	494095	5049271	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
21	494061	5048917	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
22	493653	5048718	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby. Large open area with low canopy regenerating forest.	Spring & Fall Migration, and Breeding Bird
23	494595	5048980	Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
24	494719	5049449	Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird

Point Count	Coordinates (NAD 83 UTM 20)		Habitat Description	Survey
	Easting	Northing		
25	494627	5048623	Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring and Fall Migration
25	494573	5048480	Softwood dominant forest. Close to recent and old clearcut activity.	Breeding Bird
26	494894	5048574	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
27	495282	5048356	Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
28	495491	5047185	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
29	495530	5046738	Old forestry trail/road. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
30	495948	5046029	Old forestry trail/road. At water crossing with small bridge. At watercourse with riparian wetland. Mixedwood forest and recent clearcuts and selective cutting/forestry activity nearby.	Spring & Fall Migration, and Breeding Bird
31	496803	5045553	Road. Recent selective forestry activity. Recent clearcuts nearby. Mixedwood forest (now spread out/cut in places).	Spring & Fall Migration, and Breeding Bird
32	497221	5044906	Road. By recent clearcuts/forestry activity (appears to be selective cutting). Mixedwood forest. Borders the Gully Lake Wilderness Area.	Spring & Fall Migration, and Breeding Bird
33	497507	5044547	Road. Mixedwood older/mature forest. Bad downfall from most recent hurricane. Borders the Gully Lake Wilderness Area.	Spring and Fall Migration
33	497531	5045376	Road. By recent clearcuts/forestry activity (appears to be selective cutting). Mixedwood forest. Borders the Gully Lake Wilderness Area.	Breeding Bird

Point Count	Coordinates (NAD 83 UTM 20)		Habitat Description	Survey
	Easting	Northing		
34	497794	5044246	Road. At watercourse crossing with riparian wetland. Mixedwood and hardwood forest. Older/mature forest. Borders the Gully Lake Wilderness Area.	Spring and Fall Migration
34	498153	5044581	Road. At watercourse crossing with riparian wetland. Mixedwood and hardwood forest. Older/mature forest. Borders the Gully Lake Wilderness Area.	Breeding Bird
35	498197	5044324	Road by watercourse and riparian wetland and mixedwood and hardwood forest. Mostly hardwood away from watercourse. Older/mature forest. Borders the Gully Lake Wilderness Area.	Spring and Fall Migration
35	498211	5044973	Mixedwood and hardwood forest. Borders the Gully Lake Wilderness Area.	Breeding Bird
36	499747	5043983	Road. Little open water lake and riparian wetland and watercourse by road. Mixedwood forest.	Spring and Fall Migration
36	498376	5045255	Mixedwood and hardwood forest. Borders the Gully Lake Wilderness Area.	Breeding Bird
37	499630	5042847	Road. Lake and riparian wetland by road. Mixedwood forest. Close to watercourse and older clearcuts.	Spring and Fall Migration
37	497889	5045017	Mixedwood and hardwood forest. Borders the Gully Lake Wilderness Area.	Breeding Bird
38	498926	5042803	Old forestry road. Close to old clearcuts. Mixedwood forest with some very tall trees surrounding. Shrubby area.	Spring and Fall Migration
38	497621	5045118	Mixedwood and hardwood forest. Borders the Gully Lake Wilderness Area.	Breeding Bird
39	498362	5042560	Old forestry road. Close to old clearcuts. Shrubby area. Mixedwood forest with slightly more hardwood trees.	Spring and Fall Migration

Point Count	Coordinates (NAD 83 UTM 20)		Habitat Description	Survey
	Easting	Northing		
40	499669	5042060	Road by watercourse and riparian wetland. Looks like open ponded water and waterfall close by. Hardwood and mixedwood forest.	Spring and Fall Migration
41	500238	5043571	Old forestry road. Older clearcuts close by. Shrubby sides. Softwood forest and mixedwood forest in distance.	Spring and Fall Migration
42	500957	5042448	Quarry close-by (can hear at this point). Old trail or forestry road. Shrubby sides. Mixedwood forest with slightly more hardwood trees.	Spring and Fall Migration
DWC1	499244	5045214	Forestry road. Old clearcuts close-by. Mixed wood forest.	Spring and Fall Migration Diurnal Watch Count
DWC2	493749	5050392	Near old logging road, open cleared area with low growing regenerative mixed wood forest.	Spring and Fall Migration Diurnal Watch Count
CONI1	493186	5049942	Road. Edge of grassy field one side and other side is mixed wood forest.	Nightjar
CONI2	492341	5048288	Old forestry trail/road. Mixed wood forest and recent clearcuts and selective cutting/forestry activity nearby.	Nightjar
CONI3	494585	5048951	Old road. Close to recent and old clearcut activity. Softwood dominant forest.	Nightjar
CONI4	496004	5046930	Road. Close to recent and old clearcut activity. Softwood dominant forest. Shrubby roadsides.	Nightjar
CONI5	496762	5045336	Road. Recent selective forestry activity. Recent clearcuts nearby. Mixed wood forest (now spread out/cut in places).	Nightjar
CONI6	498413	5045239	Mixed wood and hardwood forest. Borders the Gully Lake Wilderness Area.	Nightjar

Note: “Low”, “medium” and “high” descriptors refer to shrub height (low - <0.5m, medium - 0.5-1.5m, high - >1.5m).

Bird species were identified based on functional bird groups to understand how each group uses the Project Area. These functional groups include:

1. **Waterfowl:** Ducks, geese, or other large aquatic birds, especially when regarded as game
2. **Shorebirds:** Waders, from the Order Charadriiformes

3. **Other waterbirds:** Includes seabirds (i.e., marine birds), grebes (Order Podicipediformes), loons (Order Gaviiformes), Ciconiiformes (i.e., herons, etc.), pelicans (Order Pelicaniformes), Gruiformes (i.e., cranes and rails), kingfishers, and dippers (the only family of passerines considered waterbirds)
4. **Diurnal Raptors:** Birds within the families Accipitridae (i.e., hawks, eagles, buzzards, harriers, kites, and old-world vultures), Pandidonidae (i.e., osprey), Sagittariidae (i.e., secretary bird), Falconidae (i.e., falcons, caracaras, and forest falcons), Cathartidae (i.e., new world vultures) and one species from the Order Strigiformes (i.e., hawk owl)
5. **Nocturnal Raptors**: Birds of the Order Strigiformes (i.e., owls; with exception of the hawk owl, which is a diurnal species of owl)
6. **Passerines:** Any bird of the Order Passeriformes, which includes more than half of all bird species. This is with exception of the dippers, which are a passerine considered a waterbird.
7. **Other Landbirds:** Birds within the Orders Galliformes (i.e., quail, pheasant, and grouse), Columbiformes (i.e., pigeons and doves), Cuculiformes (i.e., cuckoos), Caprimulgiformes (i.e., nighthawks and whip-poor-wills), Apodiformes (i.e., swifts and hummingbirds) and Piciformes (i.e., woodpeckers, flickers, and sapsuckers).

Survey specifics varied for each survey type are described in detail below.

2.3.1 Spring and Fall Migration Survey

Five rounds of spring migration surveys were completed between April 4 and May 31, 2024. Due to snowy conditions in the Project Area blocking certain access, not all PCs were able to be completed during the first round. All PCs were completed during round 1 of spring migration with the exception of PCs 1 to 3 and 30 to 34. Five rounds of fall migration surveys were completed between August 15 and October 20, 2023. Refer to Table 2.1 for specific timing of each survey round. PC surveys and DWC surveys were completed during both seasons (Drawing 3, Appendix A).

2.3.1.1 Point County Surveys

The same 42 PC locations (Table 2.3; Drawing 2a and 2b, Appendix A) were surveyed for both spring and fall migration[2]. Spring migration surveys had 33.6 hours of effort and fall surveys had 35.2 hours of effort, totaling 68.8 hours between the two migration seasons for PC surveys.

Surveys began at, or within half an hour of, sunrise and were completed within four-and-a-half hours. Each PC was surveyed for a duration of 10 minutes. At each PC, a handheld Garmin GPS unit was used to geo-reference the location (if microsited). During each survey, weather conditions (i.e., temperature, wind speed, precipitation, and visibility) were

[2] PC locations were readjusted after the first survey day of round 1 of fall migration due to changes with the study area and turbine locations. Survey redesign focused on habitat coverage rather than area coverage. All data collected before the survey redesign has been incorporated into the results presented within this report.

monitored and bird observations were recorded at three distance regimes: within a 50 m radius, 50 to 100 m radius, and outside the 100 m radius. All birds identified (auditory and/or visual) were recorded by species, including age and sex if known. Breeding behaviour and fly-overs were also documented (e.g., altitude and flight direction).

Table 2.3: Spring and Fall Migration PC Surveys Dates and Weather Conditions

Round	Dates	Temperature (°C)	Wind (Beaufort Scale)	Precipitation
Spring Migration				
Round 1	April 4, 2024	1-2	2 (with 3 to 4 gusts)	0
Round 2	April 17, 18, & 19, 2024	1-7	0-3 (with 4 gusts)	0
Round 3	April 29, 30, & May 1, 2024	3-10	1-2 (ended survey when wind got to 2-3 with level 4 gusts)	0
Round 4	May 13, 15, & 17, 2024	6-20	0-2	0
Round 5	May 29, 30, & 31, 2024	11-18	0-2	0
Fall Migration				
Round 1	August 15 and 16, 2023	16-21	0-1	0- 1 (light fog)
Round 2	August 29, 31 and September 1, 2023	3-20	0-2	0
Round 3	September 7 and 8, 2023	16-24	1-2	0-2 (light fog)
Round 4	September 28 & 29, 2023	2-20	0-2	0
Round 5	October 19 & 20, 2023	6-12	0-2	0

Note: Weather conditions represent the entire survey (surveyors recorded weather conditions at the start and end of each survey). Precipitation scale is as follows: 0 = none, 1 = drizzle, and 2 = light/moderate. Wind scale (Beaufort scale) is as follows: 0 = <1 km/hr, 1 = 1-5 km/hr, 2 = 6-11 km/hr, and 3 = 12-19 km/hr.

2.3.1.2 Diurnal Watch Count Surveys

Two DWC locations were surveyed during the five rounds of spring migration surveys and five rounds of fall migration surveys. The total survey effort was 26 hours (14.5 hours during spring migration and 11.5 hours during fall migration). Each survey was three hours in length (30-minute time blocks, completed in sets of 3 to 4). DWCs occurred in the morning between 10 am and 12:30 pm in 30-minute time blocks. The Project Area is too far away from tidal influences to consider timing of the tides in the DWC survey. Data collection was the same as the migration PC surveys, with a focus on fly-over activity (e.g., altitude and flight direction). Refer to Drawing 3, Appendix A for survey locations.

2.3.2 Breeding Bird Surveys

Two rounds of breeding bird surveys were completed. The first round was conducted on June 13, 14, 15, and 16, 2023 and the second round was conducted on June 26, 27, 28, 29 and 30, 2023. In total, 38 breeding bird PC locations were surveyed for a total effort of 14.2 hours (Table 2.4, Drawing 4, Appendix A).

The methods for breeding bird surveys mirror those described for spring and fall migration PC surveys (Section 2.2) with the addition of area searches and observing breeding evidence within the Project Area. Area searches are recommended by CWS during the breeding season to visit more habitat types and/or search habitats more thoroughly for species use during the breeding season (EC CWS, 2007b). Qualified biologists conducted area searches after the morning breeding bird surveys. Meandering, non-standardized transects were completed and focused on new habitat or habitat with notable high activity (within or bordering the Project Area). Novel species, priority species, and breeding evidence were recorded in a similar manner to the PC location method. Area searches do not require standardized effort (ECCC-CWS, 2007b); however, there was a minimum of one hour per search and GPS tracks were recorded (Drawing 4, Appendix A). In total, approximately 270 minutes (4.5 hours) of area searches were completed during breeding bird surveys.

Area searches during round 1 lasted 2.55 hours. Area searches during round 2 were 1.95 hours. Survey round, date, location, and weather conditions are listed in Table 2.4.

The breeding status of all bird species observed during breeding bird surveys was recorded. The surveyor documented bird behaviour observed, including distraction display, carrying food, and carrying nesting material. The MBBA has various breeding evidence codes that are used to determine the breeding status based on field observations (MBBA, n.d.). The following are examples of the breeding status indicators described in Atlassing for Species at Risk in the Maritime Provinces (MBBA, 2008):

- **Observed -** species observed in its breeding season
- **Possible -** species observed during breeding season in suitable nesting habitat or singing males or breeding calls heard, in suitable nesting habitat during breeding season
- **Probable** – pair observed in suitable nesting habitat during nesting season, agitated behaviour or anxiety calls of an adult
- **Confirmed** - nest building (including adult carrying nesting material), adult carrying food, distraction display, courtship display or territorial behaviour between two individuals, behaviour indicating active nest, nest containing eggs, recently fledged young (nidicolous species), or downy young (nidifugous species), including incapable of sustained flight

Table 2.4: Breeding Bird PC Survey Dates and Weather Conditions

Round	Date(s)	Temperature (°C)	Wind (Beaufort Scale)	Precipitation
1	June 13-16, 2023	11-21	1-3	None to Some Fog
2	June 26-30, 2023	12-18	2-3	None, Intermittent Drizzle, and Some Fog

Note: Weather conditions represent the entire survey (surveyors recorded weather conditions at the start and end of each survey). Precipitation scale is as follows: 0 = none, 1 = drizzle, and 2 = light/moderate. Wind scale (Beaufort scale) is as follows: 0 = <1 km/hr, 1 = 1-5 km/hr, 2 = 6-11 km/hr, and 3 = 12-19 km/hr.

2.3.3 Nightjar Surveys

Based on ECCC-CWS recommendations (June 3, 2022, pers. comm., Stephen Zwicker, Environmental Assessment Coordinator, ECCC-CWS), playback recordings were not used. The Canadian Nightjar Survey Protocol by Birds Canada (2022) was followed in the field program. Nightjars are crepuscular and the best time to detect these species, particularly common nighthawk, is while they are foraging for insects shortly after sunset (MBBA, 2008). Targeted surveys were selected for nightjars because they are not reliably detected during the breeding bird PC surveys due to their crepuscular nature (Birds Canada, 2022).

The 2022 protocol by Birds Canada recommends one survey round but NSNRR prefers two rounds (May 2022, pers. comm. Mark McGarrigle, SAR Biologist, NSNRR). Dedicated surveys were conducted on June 13 and 26, 2023 at six PC locations (Table 2.5; Drawing 3, Appendix A). These dates were selected because common nighthawk and Eastern whip-poor-will tend to breed between early June and late July in the Maritimes (MBBA, 2020).

Survey timing started within seven days on either side of a full moon (due to potential for Eastern whip-poor-will observations) (Birds Canada, 2022) and surveys were completed between one hour before sunset and two hours after sunset when nightjars are most active (June 3, 2022, pers. comm. Stephen Zwicker, Environmental Assessment Coordinator, ECCC-CWS). Surveys had a total of 12 hrs and 21 mins of survey effort. Survey round, date, location, and weather conditions are listed below in Table 2.5.

At each nightjar PC location (hereafter referred to as CONI PC), surveys consisted of a six-minute passive surveying period. This survey had no call playback or use of flashlights, as per survey protocol by Birds Canada (2022).

All individual nightjar observations were recorded, including behaviours such as vocalizations or wing booms, as well as the gender, distance to surveyor, bearing, and time the observation occurred in (e.g., what type of observation or behaviour was observed) (Birds Canada, 2022). Any other birds observed during the nightjar surveys were also recorded as incidentals.

Table 2.5: Nightjar Survey Dates and Weather Conditions

Survey Round	Date(s)	Temperature (°C)	Wind (Beaufort Scale)	Precipitation	Notes
1	June 13, 2023	15-21	2-3	None	None
2	June 26, 2023	11-12	3-4	None to Intermittent Drizzle	None

Note: Weather conditions represent the entire survey (surveyors recorded weather conditions at the start and end of each survey). Precipitation scale is as follows: 0 = none, 1 = drizzle, and 2 = light/moderate. Wind scale (Beaufort scale) is as follows: 0 = <1 km/hr, 1 = 1-5 km/hr, 2 = 6-11 km/hr, and 3 = 12-19 km/hr.

3.0 RESULTS

Results from the desktop review and field surveys are described below.

3.1 Desktop Results

The ACCDC (Appendix C) identified one avian SAR and six avian SOCI within 5 km of the Project Area (Drawing 1b, Appendix A). The SAR species recorded within 5 km by the ACCDC is the eastern wood-pewee (*Contopus virens*, *SARA* Special Concern, *ESA* Vulnerable).

3.1.1 Important Bird Areas

The closest Important Bird Area (IBA) to the Project Area is the Cobequid Bay IBA (NS019), located approximately 30 km west from the Project Area (Drawing 1a, Appendix A).

The Cobequid Bay IBA (IBA NS019) is approximately 47, 768 ha in size and is situated in the Bay of Fundy near Truro, Nova Scotia. Cobequid Bay is a long (approximately 40 km) and point-shaped bay that widens at the eastern end when it reaches the Minas Basin. Various habitat types, including beaches, tidal rivers/estuaries, saltmarshes, mudflats, and sandflats line the coastline depending on the tide level. The famous Bay of Fundy drastic tide levels is the reason for the change in habitat types along the coastline depending on the time of day (IBA Canada, n.d.).

Cobequid Bay is an important foraging spot for a variety of shorebirds and waterfowl during migration periods (e.g., geese, ducks, plovers, sandpipers, etc.). The high abundance of amphipods in the mud attracts one to two million shorebirds in the mudflats at the head of the Bay of Fundy (including this IBA and adjacent IBAs) before fall migration. The high abundance of food source is estimated to attract 50 to 95% of the world's population of semipalmated sandpipers (*Calidris pusilla*), as well as many other species of shorebirds. Thousands of shorebirds and waterfowl species are also observed using this bay as a stopover area during spring migration (IBA Canada, n.d.).

The Cobequid Bay IBA is a proposed Hemispheric Shorebird Reserve, under the Western Hemisphere Shorebird Reserve Network. Concerns and threats for this site include anthropogenic use and disturbance on the beaches that line the coastline, as well as pollution and pesticide exposure due to developed and agricultural lands surrounding this IBA (IBA Canada, n.d.). The Project Area is approximately 30 km away from any inlet/bay or coastline and does not represent the habitats within the Cobequid Bay IBA.

3.1.2 Provincial Parks

The closest Provincial Park to the Project is the Salt Springs Provincial Park, which is located against the banks of the West River in the Northumberland Shore region (Highway 104, Exit 19 to Highway 4) approximately 8 km southeast of the Project Area. Additionally, the Balmoral Mills Provincial Park is located approximately 15 km northwest from the Project in the Northumberland Shore region, Nova Scotia.

3.1.3 Nature Reserves

The closest Nature Reserve to the Project is the Dalhousie Mountain Nature Reserve, which is 46 hectares in size and located approximately 6 km east of the Project Area and approximately 4 km south of Lower Mount Thom, Nova Scotia. Habitat is dominated by sugar maple and yellow birch with wetland complexes and forested areas (NSECC, n.d.). Additionally, the Mackay Brook Nature Reserve is located 9 km southeast from the Project.

3.1.4 Wilderness Areas

The closest Wilderness Area to the Project is the Gully Lake Wilderness Area, which is directly adjacent to the Project boundary and is roughly 3,991 hectares and protects a mixture of forested land, in north-central Nova Scotia. These forests drain into tributary streams flowing into Truro's Salmon River. Small floodplains support diverse plants, including wetlands, seasonal ponds, and lakes add habitat variety. The forest, rich in sugar maple, yellow birch, red spruce, beech, white ash, red maple, balsam fir, ironwood, black cherry, and hemlock, provides crucial habitat for endangered mainland moose and other species favoring large older forest patches (NSECC, n.d.).

3.1.5 Maritime Breeding Bird Atlas

Three MBBA squares (20MR93, 20MR94, and 20MR95) encompass the entirety of the Project Area (results are provided in Appendix D). Observations for each square are listed below:

- MBBA square 20MR93: first atlas has 9 possible, 24 probable, and 21 confirmed breeders. The second atlas has 21 possible, 42 probable, and 21 confirmed breeders. Of these species, there was one SAR: barn swallow.
- MBBA square 20MR94: first atlas has 12 possible, 24 probable, and 39 confirmed breeders. Second atlas has 9 possible, 27 probable, and 54 confirmed breeders. Of these species, there were four SAR: Canada warbler, olive-sided flycatcher, bank swallow, and barn swallow.
- MBBA square 20MR95: first atlas has 11 possible, 37 probable, and 34 confirmed breeders. Second atlas 21 possible, 48 probable, and 25 confirmed breeders. Of these species, there were two SAR: bank swallow (*Riparia riparia*), barn swallow (*Hirundo rustica*), bobolink (*Dolichonyx oryzivorus*), evening grosbeak, and olive-sided flycatcher,
- SOCI observations within these MBBA squares (or SAR recorded with no breeding evidence) are presented in Appendix D.

All MBBA summary squares (20MR93, 20MR94, and 20MR95) had common nighthawk observations, however there were no observations of Eastern whip-poor-will documented in any of the three summary squares (refer to Appendix D).

3.1.6 Previous Environmental Assessments Completed at the Project Area

Stantec submitted an EARD to Nova Scotia Environment in May 2012[3] and the avifauna sections were reviewed by Strum for the desktop analysis in this baseline report. Passerines and other landbirds were the most abundant species recorded.

Four SOCI were observed by Stantec (2012), including Canada jay (*Perisoreus canadensis*), eastern phoebe (*Sayornis phoebe*), tree swallow (*Tachycineta bicolor*), and Wilson's snipe (*Gallinago delicata*), note that ruby-crowned kinglet (*Regulus calendula*) was ranked Sensitive provincially at the time surveys were conducted. Three avian SAR were observed by Stantec (2012), including olive-sided flycatcher, eastern wood-pewee, and wood thrush (*Hylocichla mustelina*). During the spring and fall migration periods, landbirds flying at or below tree level were the most prevalent. Raptors flew mainly above tree level and seabirds and waterbirds, mainly gull species, frequently flew above tree level. American kestrel (*Falco sparverius*) was recorded with probable breeding status and was not confirmed. Other raptor species observed included northern harrier (*Circus hudsonius*) and red-tailed hawk.

Breeding bird surveys used the PC method, similar to Strum's method, and were completed in June and July 2011. Stantec (2012) reported observing 42 species and 272 individuals. The most common species identified included the American robin (*Turdus migratorius*), dark-eyed junco (*Junco hyemalis*), white-throated sparrow (*Zonotrichia albicollis*), and American goldfinch (*Spinus tristis*). Few raptors were observed in the Study Area during the breeding season, such as the northern harrier, red-tailed hawk (*Buteo jamaicensis*), and American kestrel. Breeding activity was not confirmed for these raptors. The breeding status of the American Kestrel is considered probable, with no nests found in the Study Area. Two avian SAR were observed during the breeding bird surveys (Stantec 2012), including olive-sided flycatcher, with one pair recorded late in the breeding season and eastern wood-peewee, recorded five times during pre-construction surveys and twice during MBBA point counts. Two avian SOCI were observed during the breeding bird surveys in 2012 including, eastern phoebe with five records and tree swallow with records from pre-construction surveys and MBBA PCs.

Fall migration surveys were completed using transects with stop-over counts (PCs along a transect), watch counts, and raptor surveys (a raptor focused watch count). Surveys were completed between August and November 2011. Stantec (2012) reported a total of 54 species of birds observed during the fall migration surveys, totaling 942 individual birds. The most numerous species identified included American robin, cedar waxwing (*Bombycilla cedrorum*), blue jay (*Cyanocitta cristata*), black-capped chickadee (*Poecile atricapillus*), and American goldfinch. The largest flock observed was a group of 300 common grackle (*Quiscalus quiscula*). Waterfowl recorded during fall migration included Canada goose (*Branta canadensis*, including a flock of 11) and American Black Duck (*Anas rubripes*), while one species of waterbird, and four species of raptors were observed. 1 avian SAR, eastern wood-pewee, and four avian SOCI, eastern phoebe, Canada jay, boreal chickadee, and pine

[3] https://novascotia.ca/nse/ea/clydesdale.ridge.wind.farm/Section_5_Part_2.pdf

siskin. Two Canada jays were observed on one occasion in September, none were detected in large numbers. Between one and four eastern wood pewees were noted regularly between August 12 and September 20, for a total of nine birds. Likewise with the spring migration, the counts generally show no evidence of major peaks of arrival or departure. Numbers of species were not reported for watch counts in the 2012 EARD (Stantec, 2012).

Spring migration surveys were completed by Stantec (2012) using transects with stop-over counts and watch counts (same locations as fall migration). Surveys were completed between April - May 2012. During the spring monitoring period, a total of 32 bird species were observed, comprising 195 individual birds. Most birds were seen flying or residing below 30 m, with “passerines/landbirds” being most abundant. The most frequently recorded species included the American robin, American crow (*Corvus brachyrhynchos*), dark-eyed junco, and white-throated sparrow. Large flocks were rare, with the largest consisting of eight American robins. Waterfowl sightings were infrequent, with only five ring-necked ducks (*Aythya collaris*) observed, and the Wilson's snipe was the sole species of waterbird seen. One SAR (wood thrush) and one SOCI (Wilson’s snipe) were observed during spring migration, each observed once. There was no discernible peak in migratory passage for any species or groups.

Winter surveys were completed between December 2011 and January to February 2012 by Stantec (2012) using transects and watch counts (at each transect). During winter, bird observations in the Project Study Area included familiar species such as common raven (*Corvus corax*), American crow, pileated woodpecker (*Dryocopus pileatus*), and black-capped chickadee. American goldfinch was heard once, and a flock of 40 unidentified gulls was seen flying southward on January 30 at an altitude of around 240 m. Additionally, a flock of 15 black-capped chickadees was observed in flight over a forest. Snow bunting (*Plectrophenax nivalis*) are frequent visitors to a farm located 900 meters southwest of the Stantec 2012 substation. Occasionally noted species include blue jay, Canada jay, ring-necked pheasant (*Phasianus colchicus*), and bald eagle (*Haliaeetus leucocephalus*).

Pileated woodpecker were observed during the winter moose tracking surveys without any breeding evidence or nest cavities were observed. Nest sweeps will be conducted prior to construction, including nest cavities.

A summary from the Stantec 2012 EARD is presented in Table 3.1.

Table 3.1. Stantec 2012 EARD Results Summarized

Surveys	**General Findings**	**S**OCI Observed	**SAR Observed**
Breeding Bird June & July 2011	42 species 272 individuals	Eastern phoebe, Tree swallow	Olive-sided flycatcher, Eastern wood-pewee
Fall Migration August & November	54 species 942 individuals	Eastern phoebe, Canada jay,	Eastern wood-pewee

Surveys	General Findings	SOCI Observed	SAR Observed
2011		Boreal chickadee, Pine siskin	
Winter Surveys	11 species 138 individuals	None found	None found
Spring Migration April to May 2012	32 species 195 individuals	Wilson's snipe	Wood thrush

3.2 Field Results

The following subsections outline the survey results of the PC surveys (spring migration, breeding season, fall migration, and nightjar surveys), DWC surveys (included with spring and fall migration surveys), and all incidental observations.

3.2.1 Spring Migration Surveys

3.2.1.1 Point Count Results

During spring migration, a total of 3,762 individuals representing 91 species were observed during dedicated surveys.

A total of 13 avian SOCI were observed during the spring migration surveys (Drawing 5, Appendix A; Table 3.1). Four avian SAR were observed (Evening grosbeak, rusty blackbird, olive-sided flycatcher, and red-crossbill). All avian SAR and SOCI are discussed in Section 3.3.

Passerines comprised 92.3% of the individuals observed, followed by other landbirds (4.4%) and waterfowl (2.3%). Raptors, waterbirds, and shorebirds combined accounted for less than 1% of all observations collectively. American robin (n=669) was the most abundant species observed, followed by dark-eyed junco (n=236), American crow (n=200), and purple finch (*Carpodacus purpureus*) (n=180). All the species identified are native species in this region of Nova Scotia and the province in general. Typical and common habitat to support these species is present within the Project Area and surrounding landscape.

The largest number of individuals observed were documented at PC 37 (n=347) (Drawing 2b, Appendix A). PC 37 was located on an existing logging road next to a lake and riparian wetland and surrounded by mixed wood forest. The PC with the highest species diversity was PC 37 with 54 species, followed by PC 1 and PC 40 tied with 40 species. A high diversity of habitat is available at these locations to attract a variety of birds such as passerines, other landbirds, and diurnal raptors (e.g., mixed wood forest, softwood dominant forest, shrubby road edge, and old logging road).

PC 37 is approximately 600 m west of the nearest proposed turbine (T15). The high abundance of individuals and species were likely relevant to the fact that PC 37 is adjacent to an open water wetland complex surrounded by mixedwood forest and adjacent to an old

logging road. Interestingly, lower species and individuals counts were lower at PC 38 which is much closer to the proposed T15. PC 38 is approximately 150 m south of the proposed T15. Results are presented in Table 3.2 and Table 3.3.

During spring migration surveys, there were multiple observations of early breeding evidence, which includes (refer to Drawing 2a and 2b, Appendix A for PC references). Breeding status was determined by matching bird behaviour observations with the breeding evidence codes by the MBBA (MBBA n.d.)[7]:

Table 3.2: Breeding Evidence During Spring Migration Surveys

Survey Round	Species		Location	Evidence	Breeding Status
1	Mallard	*Anas platyrhynchos*	PC 37	Three male and female pairs	Probable
1	Hooded merganser	*Lophodytes cucullatus*	PC 37	One female and male pair	Probable
2	Purple finch	*Carpodacus purpureus*	PC 11	One male and female pair	Probable
2	Mallard	*Anas platyrhynchos*	PC 37	Two male and female pairs	Probable
2	Common merganser	*Mergus merganser*	PC 37	One male and female pair	Probable
2	Red-winged blackbird	*Agelaius phoeniceus*	PC 37	Two male and female pairs	Probable
3	Yellow-rumped warbler	*Dendroica coronata*	PC 9	Seen and heard singing and competing, chasing each other	Possible
3	Common merganser	*Mergus merganser*	PC 37	One male and female pair	Probable
3	Hooded merganser	*Lophodytes cucullatus*	PC 37	Two male and female pairs	Probable
3	Mallard	*Anas platyrhynchos*	PC 37	One female and male pair	Probable
3	Green-winged teal	*Anas crecca*	PC 37	One male and two female	Probable
4	Yellow-rumped warbler	*Dendroica coronata*	PC 14	One male and female pair	Probable
4	Hooded merganser	*Lophodytes cucullatus*	PC 37	One male and female pair	Probable
4	Wood duck	*Aix sponsa*	PC 37	One male and female pair	Probable
5	Common yellowthroat	*Geothlypis trichas*	PC 20	One juvenile	Confirmed

Survey Round	Species		Location	Evidence	Breeding Status
5	Mallard	*Anas platyrhynchos*	PC 37	One female mallard with six ducklings and two males nearby	Confirmed
1	Bald eagle	*Haliaeetus leucocephalus*	DWC 2	One juvenile	Confirmed

3.2.1.2 Diurnal Watch Count

During DWC spring migration surveys, a total of 625 individuals representing 50 species were observed.

No SAR were observed during DWC surveys in the spring, however four SOCI (Canada jay, boreal chickadee, evening grosbeak, and pine siskin) were observed (Table 3.2). All avian SAR and SOCI are discussed in Section 3.3.

Passerines comprised 83.681% of the species observed, followed by other landbirds (5.12%), diurnal raptors (1.12%), and other waterbirds and shorebirds (0.48% combined). Unknown species that were able to be identified to a bird group are included in these percentages (i.e. unknown warbler is counted within passerines). American robin (n=98) was the most abundant species observed followed by American crow (n=57), and American goldfinch (n=27). Results are presented in Table 3.3.

The two DWCs are along existing logging roads and mixedwood forest (Drawing 3, Appendix A) and the high abundances of passerines and other landbirds are expected. All the species identified, except for the European starling, are native species in this region of Nova Scotia and the province in general. Typical and common habitat to support these species are present within the Project Area and surrounding landscape.

During spring migration DWC surveys, 318 individuals (41 species) were observed at DWC1, while 307 individuals (43 species) were observed at DWC2. The largest flocks of birds observed were 10 American robin passing northeast, north DWC 1, observed during the first round of spring migration.

3.2.1.3 Spring Migration Summary

There were no specific migration patterns or travel corridors observed within the Project Area during these surveys. No observations were made of large colonies within the Project Area. Pileated woodpecker were observed during the spring migration surveys without any breeding evidence or nest cavities were observed. Nest sweeps will be conducted prior to construction, including nest cavities.

Table 3.3: Individual Abundance and Species of Birds Observed During Spring Migration Surveys

Code	Common Name	Scientific Name	*SARA*	*ESA*	SRank	#	Age	Sex	PC Observations	Group
EVGR	**Evening grosbeak**	***Coccothraustes vespertinus***	**SC**	**SC**	**S3B, S3N, S3M**	**1**			**41**	**6**
OSFL	**Olive-sided flycatcher**	***Contopus cooperi***	**SC**	**SC**	**S3B**	**2**			**1, 3**	**6**
RECR	**Red crossbill**	***Loxia curvirostra***	**T**	**T**	**S3S4**	**1**			**40**	**6**
RUBL	**Rusty blackbird**	***Euphagus carolinus***	**SC**	**SC**	**S2B**	**1**			**6**	**6**
BAOR	**Baltimore oriole**	***Icterus galbula***	**-**	**-**	**S2S3B, SUM**	**1**			**40**	**6**
BBWA	**Bay-breasted warbler**	***Setophaga castanea***	**-**	**-**	**S3S4B, S4S5M**	**19**			**1, 12, 13, 14, 15, 18, 19, 20, 21, 22, 24, 25, 35, 36, 37, 41**	**6**
BBWO	**Black-backed woodpecker**	***Picoides arcticus***	**-**	**-**	**S3S4**	**1**			**19**	**7**
BLPW	**Blackpoll warbler**	***Setophaga striata***	**-**	**-**	**S3B, S5M**	**10**			**4, 14, 15, 21, 22, 33, 34, 41**	**6**
BOCH	**Boreal chickadee**	***Poecile hudsonica***	**-**	**-**	**S3**	**24**			**13, 16, 18, 22, 24, 26, 27, 32, 34, 36, 37, 39, 42**	**6**
CAJA	**Canada jay**	***Perisoreus canadensis***	**-**	**-**	**S3**	**10**			**15, 21, 23, 35, 37, 38**	**6**
CMWA	**Cape may warbler**	***Setophaga tigrina***	**-**	**-**	**S3B, SUM**	**2**			**22**	**6**
KILL	**Killdeer**	***Charadrius vociferus***	**-**	**-**	**S3B**	**1**			**8**	**2**
PIGR	**Pine grosbeak**	***Pinicola enucleator***	**-**	**-**	**S3B, S5N, S5M**	**5**			**29**	**6**
PISI	**Pine siskin**	***Spinus pinus***	**-**	**-**	**S3**	**15**			**5, 6, 9, 13, 20, 23, 36**	**6**
RBME	**Red-breasted merganser**	***Mergus serrator***	**-**	**-**	**S3B, S4S5N, S5M**	**2**	**A**	**1 M, 1 F**	**37**	**1**
RBGR	**Rose-breasted grosbeak**	***Pheucticus ludovicianus***	**-**	**-**	**S3B**	**3**			**40**	**6**
WIWA	**Wilson's warbler**	***Cardellina pusilla***	**-**	**-**	**S3B, S5M**	**1**			**19**	**6**
ALFL	Alder flycatcher	*Empidonax alnorum*	-	-	S5B	35			1, 3, 4, 5, 16, 17, 18, 19, 24, 27, 30, 33, 35, 36, 37, 38, 40	6
ABDU	American black duck	*Anas rubripes*	-	-	S5B, S5N	6			37	1
AMCR	American crow	*Corvus brachyrhynchos*	-	-	S5	200			All PC Locations	6
AMGO	American goldfinch	*Carduelis tristis*	-	-	S5	84			1, 2, 4, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 29, 31, 32, 33, 34, 35, 37, 38, 39, 40, 41, 42	6
AMRE	American redstart	*Setophaga ruticilla*	-	-	S5B	74			1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42	6
AMRO	American robin	*Turdus migratorius*	-	-	S5B, S3N	669			All PC Locations	6
BAEA	Bald eagle	*Haliaeetus leucocephalus*	-	-	S5	2			19, 37	4
BDOW	Barred owl	*Strix varia*	-	-	S5	1			11	5
BEKI	Belted kingfisher	*Megaceryle alcyon*	-	-	S4S5B	2			36, 39	3
BAWW	Black-and-white warbler	*Mniotilta varia*	-	-	S5B	39			1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 24, 25, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 40, 41, 42	6
BLBW	Blackburnian warbler	*Setophaga fusca*	-	-	S4B,S5M	21			1, 4, 11, 12, 13, 14, 18, 25, 26, 30, 33, 34, 35, 36, 37, 40, 42	6
BCCH	Black-capped chickadee	*Poecile atricapilla*	-	-	S5	147			All PCs, except 29, 30, and 31	6
BTBW	Black-throated blue warbler	*Setophaga caerulescens*	-	-	S5B	1			34, 35, 40	6
BTNW	Black-throated green warbler	*Setophaga virens*	-	-	S5B	83			All PC Locations	6
BLJA	Blue jay	*Cyanocitta cristata*	-	-	S5	145			All PC Locations	6
BHVI	Blue-headed vireo	*Vireo solitarius*	-	-	S5B	49			All PC Locations, except 22, 27, 33, and 34	6

Code	Common Name	Scientific Name	*SARA*	*ESA*	SRank	#	Age	Sex	PC Observations	Group
BOWA	Bohemian waxwing	*Bombycilla garrulus*	-	-	S4N	2			8	6
BWHA	Broad-winged hawk	*Buteo platypterus*	-	-	S5B	1			33	4
BRCR	Brown creeper	*Certhia americana*	-	-	S5	16			1, 2, 4, 6, 11, 13, 17, 20, 23, 26, 27, 30, 33, 34, 37, 40, 41	6
CAGO	Canada goose	*Branta canadensis*	-	-	SUB, S4N, S5M	32			1, 6, 18, 21, 32, 35, 36, 37, 40	1
CEDW	Cedar waxwing	*Bombycilla cedrorum*	-	-	S5B	2			30	6
CSWA	Chestnut-sided warbler	*Setophaga pensylvanica*	-	-	S5B	19			3, 8, 9, 12, 16, 19, 21, 25, 27, 28, 29, 33	6
CHSP	Chipping sparrow	*Spizella passerina*	-	-	S4B, S5M	6			5, 20, 32, 37, 41	**6**
COGR	Common grackle	*Quiscalus quiscula*	-	-	SNA	86			1, 5, 6, 9, 10, 17, 20, 23, 24, 27, 28, 32, 34, 36, 37, 38, 40, 41, 42	6
COME	Common merganser	*Mergus merganser*	-	-	S5B, S4N	4	A	2 M, 2 F	37	3
CORA	Common raven	*Corvus corax*	-	-	S5	80			2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 18, 23, 25, 26, 27, 28, 29, 30, 32, 34, 35, 36, 37, 38, 39, 40	6
COYE	Common yellowthroat	*Geothlypis trichas*	-	-	S5B	65	A, J	1 M	1, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 34, 35, 36, 37, 38, 39, 40, 41	6
DEJU	Dark-eyed Junco	*Junco hyemalis*	-	-	S4S5	236			All PC Locations	6
EAPH	Eastern phoebe	*Sayornis phoebe*	-	-	S4S5B,S4M	1			38	6
EUST	European starling	*Sturnus vulgaris*	-	-	SNA	2			1, 40	6
GCKI	Golden-crowned kinglet	*Regulus satrapa*	-	-	S5	134			All PC Locations, except 6, 11, 16, 19, 38, 39	6
GWTE	Green-winged teal	*Anas crecca*	-	-	S4S5B, S5M	4	A	2 M, 2 F	37	1
GRCA	Gray catbird	*Dumetella carolinensis*	-	-	S4B	10			2	6
HAWO	Hairy woodpecker	*Picoides villosus*	-	-	S5	6	A	1 M	4, 7, 9, 11, 12, 15, 29	7
HETH	Hermit thrush	*Catharus guttatus*	-	-	S5B	117			All PC Locations, except 13	6
HOME	Hooded merganser	*Lophodytes cucullatus*	-	-	S4S5B,S5M	7	A	4 M, 4 F	37	1
LEFL	Least flycatcher	*Empidonax minimus*	-	-	S4S5B, S5M	24			8	6
LISP	Lincoln's Sparrow	*Melospiza lincolnii*	-	-	S4B,S5M	1			1, 5, 13, 14, 16, 18, 20, 28, 30, 31, 32, 33, 34, 36, 37, 39, 40, 41	6
LESC	Lesser scaup	*Aythya affinis*	-	-	SUM	1			37	1
MAWA	Magnolia warbler	*Dendroica magnolia*	-	-	S5B	84			All PC Locations, except 5, 11, 31, 32, 40	6
MALL	Mallard	*Anas platyrhynchos*	-	-	S5B, S5N	42	A, J	9 M, 9 F, 6 J	35, 37	1
MERL	Merlin	*Falco columbarius*	-	-	S5B	2			4, 18, 31	4
MODO	Mourning dove	*Zenaida macroura*	-	-	S5	5			1, 2, 18	7
MOWO	Mourning warbler	*Geothlypis philadelphia*	-	-	S4B, S5M	21			10, 16, 19, 20, 24, 28, 31, 32, 34, 35, 37, 39, 40	6
NAWA	Nashville warbler	*Vermivora ruficapilla*	-	-	S4B, S5M	16			8, 13, 14, 19, 24, 26, 27, 28, 33, 37, 42	6
NOCA	Northern cardinal	*Cardinalis cardinalis*	-	-	S4	1			21	6
NOFL	Northern Flicker	*Colaptes auratus*	-	-	S5B	93			All PC locations, except 26 and 40	7
NOHA	Northern harrier	*Circus hudsonius*	-	-	S4B, S4S5M	1			8, 37	4
NOPA	Northern parula	*Parula americana*	-	-	S5B	33			1, 2, 3, 4, 5, 7, 8, 11, 12, 13, 16, 18, 25, 26, 27, 29, 32, 33, 34, 35, 36, 37, 39, 40	6

Code	Common Name	Scientific Name	*SARA*	*ESA*	SRank	#	Age	Sex	PC Observations	Group
NOWA	Northern waterthrush	*Parkesia noveboracensis*	-	-	S4B, S5M	6			1, 2, 5, 6, 18, 25, 30, 31, 34, 36, 37, 40	6
OSPR	Osprey	*Pandion haliaetus*	-	-	S4S5B, S5M	1			37, 41	4
OVEN	Ovenbird	*Seiurus aurocapilla*	-	-	S5B	72			All PC Locations	6
PAWA	Palm warbler	*Dendroica palmarum*	-	-	S5B	14			5, 8, 9, 11, 14, 15, 17, 19, 20, 24, 25, 30, 31, 36, 37, 38, 41, 42	6
PIWO	Pileated Woodpecker	*Dryocopus pileatus*	-	-	S5	2			17, 18, 20, 34	7
PUFI	Purple finch	*Carpodacus purpureus*	-	-	S4S5B, S3S4N, S5M	180	A	1 M, 2 F	All PC Locations	6
RBNU	Red-breasted nuthatch	*Sitta canadensis*	-	-	S4S5	11			1, 4, 7, 11, 12, 15, 17, 19, 20, 24, 25, 26, 29, 31, 33, 39, 41	6
REVI	Red-eyed vireo	*Vireo olivaceus*	-	-	S5B	62			All PC Locations, except 14, 22, 33	6
RTHA	Red-tailed hawk	*Buteo jamaicensis*	-	-	S5	2			18, 24	4
RWBL	Red-winged blackbird	*Agelaius phoeniceus*	-	-	S4B	16	A	1 M, 2 F	1, 36, 37, 40	6
RCKI	Ruby-crowned kinglet	*Regulus calendula*	-	-	S4B, S5M	38			All PC Locations, except 17, 25, 26, 40	6
RTHU	Ruby-throated hummingbird	*Archilochus colubris*	-	-	S5B	2	A	1 F	1, 31	6
RUGR	Ruffed grouse	*Bonasa umbellus*	-	-	S5	48			All PC Locations, except 30, 31, 32, 33, 35, 36, 39	7
SAVS	Savannah sparrow	*Passerculus sandwichensis*	-	-	S4S5B, S5M	4			3, 13, 16, 18, 23, 41	6
SOSP	Song sparrow	*Melospiza melodia*	-	-	S5B	96			All PC Locations, except 7, 14, 22, 26, 33, 34	6
SPGR	Spruce grouse	*Falcipennis canadensis*	-	-	S4	2	A	1 M	23, 29	7
SWTH	Swainson's thrush	*Catharus ustulatus*	-	-	S4B, S5M	29			2, 3, 16, 21, 22, 24, 25, 26, 27, 33, 36, 37, 40, 41	6
SWSP	Swamp sparrow	*Melospiza georgiana*	-	-	S5B	28			1, 5, 30, 34, 35, 36, 37, 40	6
TRES	Tree swallow	*Tachycineta bicolor*	-	-	S4B	4			36, 37	6
WTSP	White-throated sparrow	*Zonotrichia albicollis*	-	-	S4S5B, S5M	176			All PC Locations	6
WWCR	White-winged crossbill	*Loxia leucoptera*	-	-	S4S5	25			6, 7, 8, 10, 17, 27, 30, 40, 41	6
WIWR	Winter wren	*Troglodytes troglodytes*	-	-	S5B	49			All PC Locations, except 7, 9, 14, 15, 20, 21, 22, 24, 34, 39	6
WODU	Wood duck	*Aix sponsa*	-	-	S5B	1	A	2 M, 1 F	37	1
YBFL	Yellow-bellied flycatcher	*Empidonax flaviventris*	-	-	S4B, S5M	8			1, 30, 37, 40, 41	6
YBSA	Yellow-bellied sapsucker	*Sphyrapicus varius*	-	-	S5B	10			1, 2, 3, 4, 5, 7, 10, 11, 12, 13, 17, 18, 19, 23, 25, 41	7
YRWA	Yellow-rumped warbler	*Dendroica coronata*	-	-	S5B	68	A	3 M, 1 F	All PC Locations, except 20, 29	6
Total Number of Individuals				**3,762**	**Total Number of Species (does not include unknowns)**					**91**

Notes: Incidental observations not included (those observed outside of point count locations). A=Adult; J=Juvenile. Bird group is coded as: 1 = waterfowl; 2 = shorebirds; 3 = other waterbirds (i.e., that are not waterfowl or shorebirds); 4 = diurnal raptors; 5 = nocturnal raptors; 6 = passerines (excluding dippers), and 7 = other landbirds**. Bolded species** are priority species. **Bolded and underlined** species are SAR. ACCDC rankings retrieved from: http://accdc.com/webranks/NSall.htm (June 2024). "-" represents no federal or provincial designation

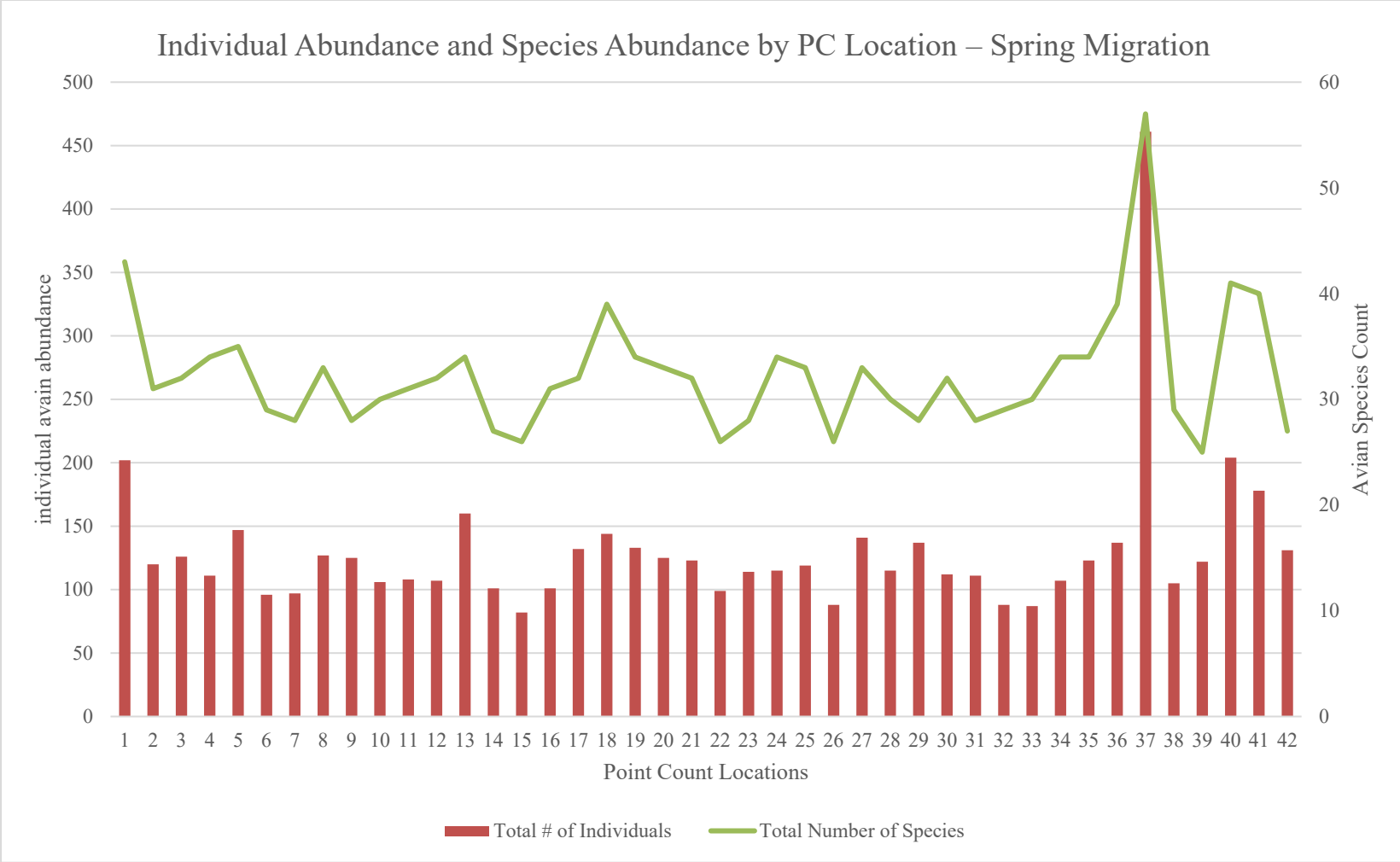

Figure 3.1: Individual Avian Abundance and Species Diversity by PC Location During Spring Migration Surveys

Table 3.4: Individual Abundance and Species of Birds Observed During DWC Surveys (Spring Migration)

Code	Common Name	Scientific Name	*SARA*	*ESA*	SRank	#	Age	Sex	DWC Observations	Group
EVGR	**Evening grosbeak**	***Coccothraustes vespertinus***	**SC**	**SC**	**S3B, S3N, S3M**	**1**			**2**	**6**
PISI	**Pine siskin**	***Spinus pinus***	**-**	**-**	**S3**	**2**			**2**	**6**
ALFL	Alder flycatcher	*Empidonax alnorum*	-	-	S5B	11			2	6
AMCR	American crow	*Corvus brachyrhynchos*	-	-	S5	57			1, 2	6
AMGO	American goldfinch	*Carduelis tristis*	-	-	S5	27			1, 2	6
AMRE	American redstart	*Setophaga ruticilla*	-	-	S5B	6			1, 2	6
AMRO	American robin	*Turdus migratorius*	-	-	S5B, S3N	98			1, 2	6
BAEA	Bald eagle	*Haliaeetus leucocephalus*	-	-	S5	2	J		1	4
BEKI	Belted kingfisher	*Megaceryle alcyon*	-	-	S4S5B	2			2	3
BAWW	Black-and-white warbler	*Mniotilta varia*	-	-	S5B	3			1, 2	6
BCCH	Black-capped chickadee	*Poecile atricapilla*	-	-	S5	8			1, 2	6
BTNW	Black-throated green warbler	*Setophaga virens*	-	-	S5B	6			1, 2	6
BLJA	Blue jay	*Cyanocitta cristata*	-	-	S5	26			1, 2	6
BHVI	Blue-headed vireo	*Vireo solitarius*	-	-	S5B	11			1, 2	6
BWHA	Broad-winged hawk	*Buteo platypterus*	-	-	S5B	2			1, 2	4
CSWA	Chestnut-sided warbler	*Setophaga pensylvanica*	-	-	S5B	3			1, 2	6
CHSP	Chipping sparrow	*Spizella passerina*	-	-	S4B, S5M	2			2	6
COGR	Common grackle	*Quiscalus quiscula*	-	-	S5B	7			1, 2	6
CORA	Common raven	*Corvus corax*	-	-	S5	26			1, 2	6
COYE	Common yellowthroat	*Geothlypis trichas*	-	-	S5B	10			1, 2	6
DEJU	Dark-eyed junco	*Junco hyemalis*	-	-	S4S5	26			1, 2	6
GCKI	Golden-crowned kinglet	*Regulus satrapa*	-	-	S5	2			1	6
HETH	Hermit thrush	*Catharus guttatus*	-	-	S5B	13			1, 2	6

Code	Common Name	Scientific Name	*SARA*	*ESA*	SRank	#	Age	Sex	DWC Observations	Group
HERG	Herring gull	*Larus argentatus*	-	-	S5	1			2	2
LEFL	Least flycatcher	*Empidonax minimus*	-	-	S4S5B, S5M	3			1, 2	6
MAWA	Magnolia warbler	*Dendroica magnolia*	-	-	S5B	12			1, 2	6
MERL	Merlin	*Falco columbarius*	-	-	S5B	1			1	4
MOWO	Mourning warbler	*Geothlypis philadelphia*	-	-	S4B, S5M	6			1	6
NAWA	Nashville warbler	*Vermivora ruficapilla*	-	-	S4B, S5M	3			2	6
NOFL	Northern flicker	*Colaptes auratus*	-	-	S5B	14			1, 2	7
NOHA	Northern harrier	*Circus hudsonius*	-	-	S4B, S4S5M	2			2	4
NOPA	Northern parula	*Parula americana*	-	-	S5B	5			1, 2	6
OVEN	Ovenbird	*Seiurus aurocapilla*	-	-	S5B	10			1, 2	6
PAWA	Palm warbler	*Dendroica palmarum*	-	-	S5B	2			1, 2	6
PUFI	Purple finch	*Carpodacus purpureus*	-	-	S4S5B, S3S4N, S5M	16			1, 2	6
REVI	Red-eyed vireo	*Vireo olivaceus*	-	-	S5B	8			1, 2	6
RCKI	Ruby-crowned kinglet	*Regulus calendula*	-	-	S4B, S5M	11			1, 2	6
RUGR	Ruffed grouse	*Bonasa umbellus*	-	-	S5	10			1	7
SAVS	Savannah sparrow	*Passerculus sandwichensis*	-	-	S4S5B, S5M	3			1, 2	6
SOSP	Song sparrow	*Melospiza melodia*	-	-	S5B	20			1, 2	6
WTSP	White-throated sparrow	*Zonotrichia albicollis*	-	-	S4S5B, S5M	24			1, 2	6
WIWR	Winter wren	*Troglodytes troglodytes*	-	-	S5B	9			1, 2	6
YWAR	Yellow warbler	*Dendroica petechia*	-	-	S5B	1			2	6
YBSA	Yellow-bellied sapsucker	*Sphyrapicus varius*	-	-	S5B	8			1	7
YRWA	Yellow-rumped warbler	*Dendroica coronata*	-	-	S5B	26			1, 2	6
Total Number of Individuals				**625**	**Total Number of Species (does not include unknowns)**					**50**

***Notes**: Incidental observations not included (those observed outside of point count locations). A=Adult; J=Juvenile. Bird group is coded as: 1 = waterfowl; 2 = shorebirds; 3 = other waterbirds (i.e., that are not waterfowl or shorebirds); 4 = diurnal raptors; 5 = nocturnal raptors; 6 = passerines (excluding dippers), and 7 = other landbirds. **Bolded species** are priority species. **Bolded and underlined species** are SAR. ACCDC rankings retrieved from: http://accdc.com/webranks/NSall.htm (June 2024). "-" represents no federal or provincial designation*

3.2.2 Breeding Bird Surveys

During breeding bird PC surveys, a total of 807 individuals representing 59 species were observed during dedicated surveys.

Five avian SOCI were observed: (bay-breasted warbler [*Setophaga castanea*], boreal chickadee, Canada jay, cape may warbler [*Setophaga tigrina*], and rose-breasted grosbeak [*Pheucticus ludovicianus*]; Table 3.5; Drawing 5, Appendix A).

Three avian SAR were observed: Canada warbler, eastern wood-pewee, and olive-sided flycatcher.

Passerines comprised 96.1% of the species observed, followed by other landbirds (2.2%), other waterbirds (0.62%), waterfowl (0.49%), shorebirds (0.25%), and diurnal raptors (0.25%). Ovenbird (n=74) was the most abundant species observed, followed by white-throated sparrow (n=73), and black-throated green warbler (*Setophaga virens*) (n=68). All the species identified are native species in this region of Nova Scotia and the province in general. Typical and common habitat to support these species is present within the Project Area and surrounding landscape.

PC 33 and PC 1 (Drawing 4, Appendix A) were tied with the largest number of individuals observed (n=27). PC 33 is located at an existing logging road and adjacent to recent clearcuts/forestry activity (appears to be selective cutting) and mixedwood forest. This PC also borders the Gully Lake Wilderness Area. PC 1 is located at an existing snowmobile/ATV trail and a watercourse crossing near a riparian wetland and surrounded by young regenerative mixed wood forest. PC 30 had the highest species diversity recorded, with 18 species observed at this location. PC 30 is located at an old forestry road and adjacent to a small watercourse with a bridge crossing. The second highest PCs for species diversity were PC 6 and PC 1 with 16 species. PC 33 is ranked lower in terms of species diversity, with nine species total, even though it had the highest number of individuals.

Breeding evidence is listed in Table 3.4 based on observations in the field (refer to Drawing 4, Appendix A for PC references). All species, their abundance, and observed PC locations, are listed in Table 3.5. All avian SAR and SOCI are discussed in Section 3.3.

Table 3.5: Breeding Evidence During Breeding Bird Surveys

Survey Round	Species		Location	Evidence	Breeding Status
2	Purple finch	*Carpodacus purpureus*	50 m west of PC 11	A nest cavity with young	Confirmed
2	White-throated sparrow	*Zonotrichia albicollis*		One male and female pair	Probable
2	Boreal chickadee	*Poecile hudsonica*		One male and female pair	Probable

No breeding evidence was observed during any other seasons/survey types.

Table 3.6: Individual Abundance and Species of Birds Observed During Breeding Bird Surveys

Code	Common Name	Scientific Name	SARA	NSESA	SRank	#	Age	Sex	PC Observations	Group	Breeding Status
CAWA	**Canada warbler**	***Cardellina canadensis***	**T**	**SC**	**S3B**	**8**			**3, 30, 36,** Area Search	6	
EAWP	**Eastern wood-pewee**	***Contopus virens***	**SC**	**SC**	**S3S4B**	**3**			**5,** Area Search	6	
OSFL	**Olive-sided flycatcher**	***Contopus cooperi***	**SC**	**SC**	**S3B**	**4**			**1, 3, 24**	6	
BBWA	**Bay-breasted warbler**	***Setophaga castanea***	**-**	**-**	**S3S4B, S4S5M**	**14**	**A**	**1 M, 1 F**	**14, 15, 21, 22, 24, 29, 38, 21,** Area Search	6	**Possible**
BOCH	**Boreal chickadee**	***Poecile hudsonica***	**-**	**-**	**S3**	**2**			Area Search	6	
CAJA	**Canada jay**	***Perisoreus canadensis***	**-**	**-**	**S3**	**1**			**38**	6	
CMWA	**Cape may warbler**	***Setophaga tigrina***	**-**	**-**	**S3B, SUM**	**4**			**15, 21, 23, Between 20 and 21**	6	
RBGR	**Rose-breasted grosbeak**	***Pheucticus ludovicianus***	**-**	**-**	**S3B**	**3**			**5, 6, 7**	6	
ALFL	Alder flycatcher	*Empidonax alnorum*	-	-	S5B	28			1, 3, 4, 5, 8, 9, 10, 11, 12, 19, 24, 27, 34, Area Search	6	
ABDU	American black duck	*Anas rubripes*	-	-	S5B, S5N	1			32	1	
AMCR	American crow	*Corvus brachyrhynchos*	-	-	S5	4			1, 10, 11, 31	6	
AMGO	American goldfinch	*Carduelis tristis*	-	-	S5	2			9, Area Search	6	
AMRE	American redstart	*Setophaga ruticilla*	-	-	S5B	45			1, 2, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 18, 19, 20, 24, 25, 26, 27, 28, 29, 31, 32, 33, 34, Area Search	6	
AMRO	American robin	*Turdus migratorius*	-	-	S5B, S3N	41			1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 18, 19, 20, 22, 26, 27, 28, 30, 31, 34, 36, 37, Area Search	6	
AMWO	American Woodcock	*Scolopax minor*	-	-	S5B	2			27, CONI 5	2	
BAWW	Black-and-white warbler	*Mniotilta varia*	-	-	S5B	32			1, 5, 7, 10, 12, 17, 19, 22, 24, 26, 28, 29, 30, 31, 32, 33, 34, 35, 36, Area Search	6	
BLBW	Blackburnian warbler	*Setophaga fusca*	-	-	S4B,S5M	6			33, 34, 38, Area Search	6	
BCCH	Black-capped chickadee	*Poecile atricapilla*	-	-	S5	12			1, 2, 4, 6, 12, 18, 19, 37, Area Search	6	
BTBW	Black-throated blue warbler	*Setophaga caerulescens*	-	-	S5B	6			6, 25, 31, Area Search	6	
BTNW	Black-throated green warbler	*Setophaga virens*	-	-	S5B	68			2, 4, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 18, 19, 20, 22, 24, 25, 26, 27, 29, 30, 31, 32, 33, 34, 35, 37, 38, Area Search	6	
BLJA	Blue jay	*Cyanocitta cristata*	-	-	S5	3			7, 8, 29	6	
BHVI	Blue-headed vireo	*Vireo solitarius*	-	-	S5B	8			3, 29, 30, 31, 33, Area Search	6	
BWHA	Broad-winged hawk	*Buteo platypterus*	-	-	S5B	1			Area Search	4	
CEDW	Cedar waxwing	*Bombycilla cedrorum*	-	-	S5B	12			12, 22, 36, Area Search	6	
CSWA	Chestnut-sided warbler	*Setophaga pensylvanica*	-	-	S5B	6			8, 19, 28	6	
COME	Common merganser	*Mergus merganser*	-	-	S5B, S4N	1			32	1	
CORA	Common raven	*Corvus corax*	-	-	S5	3			28, 38, Area Search	6	
COYE	Common yellowthroat	*Geothlypis trichas*	-	-	S5B	28			1, 3, 5, 6, 8, 9, 12, 13, 17, 19, 22, 23, 27, 30, 32, 33, 36, Area Search	6	
DDUK	Dabbling Duck spp.	*Unknown*	-	-	NA	2			5, 30	1	
DEJU	Dark-eyed Junco	*Junco hyemalis*	-	-	S4S5	16			9, 14, 22, 26, 29, 30, 32, 35, 36, Area Search	6	
DOWO	Downy woodpecker	*Dryobates pubescens*	-	-	S5	1			6	7	
GCKI	Golden-crowned kinglet	*Regulus satrapa*	-	-	S5	23			1, 2, 4, 9, 14, 18, 22, 26, 29, 30, 31, 33, 35, 36, 38, Area Search	6	
GUUK	Gull spp.	*Unknown*	-	-	NA	5			22	3	

Code	Common Name	Scientific Name	SARA	NSESA	SRank	#	Age	Sex	PC Observations	Group	Breeding Status
HAWO	Hairy woodpecker	*Dryobates villosus*	-	-	S5	3			6, 29, 33	7	
HETH	Hermit thrush	*Catharus guttatus*	-	-	S5B	25			2, 6, 8, 9, 11, 12, 13, 17, 18, 19, 20, 26, 31, 33, 34, 35, Area Search	6	
LEFL	Least flycatcher	*Empidonax minimus*	-	-	S4S5B, S5M	16			1, 5, 11, 32, 33, Area Search	6	
MAWA	Magnolia warbler	*Dendroica magnolia*	-	-	S5B	32			1, 2, 4, 8, 9, 10, 13, 14, 15, 18, 19, 21, 22, 23, 24, 26, 30, 32, 33, 35, 36, Area Search	6	
MODO	Mourning dove	*Zenaida macroura*	-	-	S5	1			10	7	
MOWO	Mourning warbler	*Geothlypis philadelphia*	-	-	S4B, S5M	9			5, 10, 13, 16, 20, 31, 32, 33	6	
NAWA	Nashville warbler	*Leiothlypis ruficapilla*	-	-	S4B, S5M	1			22	6	
NOFL	Northern Flicker	*Colaptes auratus*	-	-	S5B	5			9, 11, 25, 29	7	
NOPA	Northern parula	*Parula americana*	-	-	S5B	20			1, 2, 3, 4, 5, 6, 10, 22, 26, 27, Area Search	6	
NOWA	Northern waterthrush	*Parkesia noveboracensis*	-	-	S4B, S5M	4			1, 3, Area Search	6	
OVEN	Ovenbird	*Seiurus aurocapilla*	-	-	S5B	74			2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 16, 17, 18, 22, 23, 25, 26, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, Area Search	6	
PUFI	Purple finch	*Carpodacus purpureus*	-	-	S4S5B, S3S4N, S5M	3	J		9, 19, 24	6	Confirmed
RBNU	Red-breasted nuthatch	*Sitta canadensis*	-	-	S4S5	5			3, 6, 8, 30, 32	6	
REVI	Red-eyed vireo	*Vireo olivaceus*	-	-	S5B	55			3, 5, 6, 7, 10, 11, 12, 13, 16, 18, 19, 20, 23, 24, 25, 27, 28, 29, 31, 32, 33, 35, 37, 38, Area Search	6	
RTHA	Red-tailed hawk	*Buteo jamaicensis*	-	-	S5	1			24	4	
RCKI	Ruby-crowned kinglet	*Regulus calendula*	-	-	S4B, S5M	3			38, Area Search	6	
RTHU	Ruby-throated hummingbird	*Archilochus colubris*	-	-	S5B	1			Area Search	6	
RUGR	Ruffed grouse	*Bonasa umbellus*	-	-	S5	6			6, 10, 20, 28, Area Search	7	
SOSP	Song sparrow	*Melospiza melodia*	-	-	S5B	7			4, 9, 13, 27	6	
SWTH	Swainson's thrush	*Catharus ustulatus*	-	-	S4B, S5M	23			1, 2, 4, 8, 9, 10, 12, 14, 15, 19, 23, 27, 29, 30, 33, 34, Area Search	6	
SWSP	Swamp sparrow	*Melospiza georgiana*	-	-	S5B	5			1, 30, 32	6	
WTSP	White-throated sparrow	*Zonotrichia albicollis*	-	-	S4S5B, S5M	73	A	1 M, 1 F	1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 29, 30, 31, 32, 33, 34, 35, 36, Area Search	6	Possible
WIWR	Winter wren	*Troglodytes troglodytes*	-	-	S5B	19			5, 6, 11, 15, 18, 30, 31, 32, 33, 34, 37, 38, Area Search	6	
YBFL	Yellow-bellied flycatcher	*Empidonax flaviventris*	-	-	S4B, S5M	5			30, 33, 35, 36, 38	6	
YBSA	Yellow-bellied sapsucker	*Sphyrapicus varius*	-	-	S5B	2			38, Area Search	7	
YRWA	Yellow-rumped warbler	*Dendroica coronata*	-	-	S5B	12			8, 15, 16, 19, 23, 29, 33, 35, 36, 38	6	
Total Number of Individuals				**807**	**Total Number of Species (does not include unknowns)**						**59**

Notes: Incidental observations not included (those observed outside of point count locations). A=Adult; J=Juvenile. Bird group is coded as: 1 = waterfowl; 2 = shorebirds; 3 = other waterbirds (i.e., that are not waterfowl or shorebirds); 4 = diurnal raptors; 5 = nocturnal raptors; 6 = passerines (excluding dippers), and 7 = other landbirds. **Bolded s**pecies are priority species. **Bolded and underlined species** are SAR. ACCDC rankings retrieved from: http://accdc.com/webranks/NSall.htm (June 2024). "-"represents no federal or provincial designation. Breeding status qualifiers are defined in the Maritime Breeding Bird Atlas (http://www.mba-aom.ca/jsp/codes.jsp?lang=en&pg=breeding). Where multiple observations of breeding evidence were observed, the highest breeding evidence is presented in the table

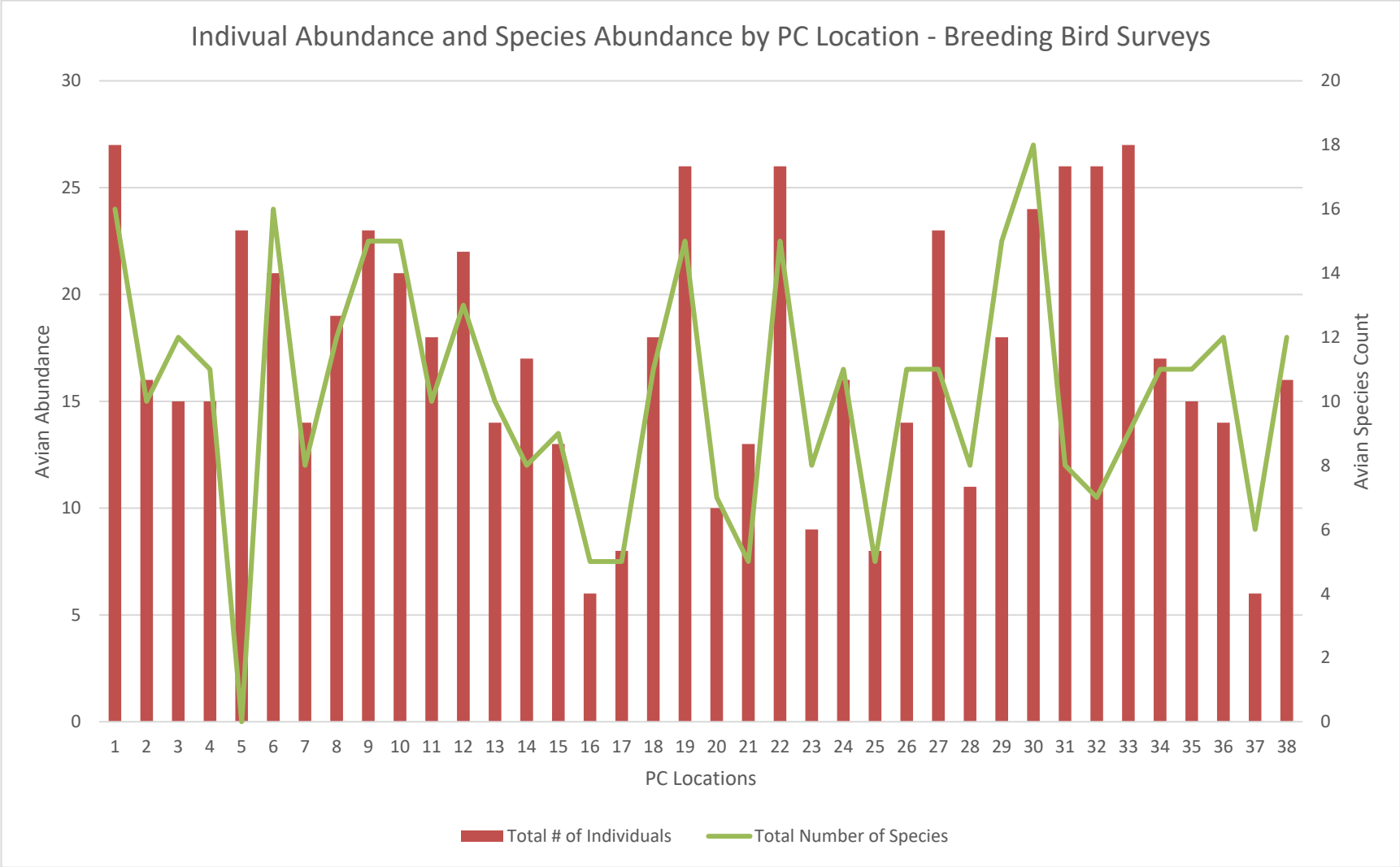

Figure 3.2: Individual Avian abundance and Species Diversity by PC Location during Breeding Bird Surveys

3.2.3 Nightjar Surveys

No common nighthawks or Eastern whip-poor-will were observed during the targeted surveys. Other birds observed will be included in the incidentals section (Section 3.2.5).

The Project Area does not have an abundance of suitable habitat for the common nighthawk and does have suitable habitat for the Eastern whip-poor-will. Examples of suitable habitat for common nighthawk include open bogs, grasslands, barren areas with low shrub cover, clear-cut areas, or other disturbed areas (COSEWIC, 2018). Examples of suitable habitat for Easter whip-poor-will include shrubbed wetlands, clearcuts, agricultural fields rock or sand barrens with scattered trees, savannahs, burned areas, conifer plantations, and various types of forests at early stages of succession or edges of dense forests with similar ground-level structure. This species is found in habitat with moderate tree, shrub, and herbaceous cover (ECCC, 2018b).

3.2.4 Fall Migration Surveys

3.2.4.1 Point Count Results

During fall migration PC surveys, a total of 2,160 individuals representing 86 species were observed.

Nine avian SOCI (Drawing 5, Appendix A) and three avian SAR were observed (evening grosbeak, red crossbill, and olive-sided flycatcher). Note that American kestrel (S4S5M) and turkey vulture (*Cathartes aura*) (S4S5M) were identified but are not considered priority species due to their ACCDC SRank during the migration season. All species, their abundance, and observed PC locations are listed in Table 3.7 and Table 3.8. All avian SAR and SOCI are discussed in Section 3.3.

Passerines were the most abundant bird group and comprised 91.3% of the species observed. Other landbirds were the second most abundant bird group and comprised 6.06% of the species observed, followed by waterfowl (0.9%), diurnal raptors (0.85%). Other waterbirds and shorebirds make up less than 1% combined. Unknown species that were able to be identified to a bird group are included in these percentages. American robin (n=199) was the most abundant species observed, followed by American goldfinch (n=197), and golden-crowned kinglet (*Regulus satrapa*) (n=181). All the species identified are native species in this region of Nova Scotia and the province in general. Typical and common habitat to support these species is present within the Project Area and surrounding landscape.

PC 37 has the highest number of individuals recorded (n=114) and PC 14 came in second with 100. PC 37 also had the highest species diversity with 40 species observed and PC 27 came in second with 34 species. (Drawing 2a and 2b, Appendix A). PC 37 is located at an existing logging road adjacent to a lake, a riparian wetland, surrounded by mixed wood forest and close to watercourse and old clear-cut forest. PC 27 is located at an existing logging

road next to recent and old clear-cut activity, also adjacent to softwood dominant forests and shrubby roadsides. PC 27 had the third highest individual count (n=98) and is located within mixed wood forest and recent clear-cut activity (selective cutting). This diversity of habitat would attract a variety of passerines, other landbirds, raptors, and more.

Breeding evidence observed during fall migration surveys is shown in Table 3.6.

All species observed, their abundance, and observed PC locations, are listed in Table 3.7 and Table 3.8. All avian SAR and SOCI are discussed in Section 3.3.

Table 3.7: Breeding Evidence During Fall Migration Surveys

Survey Round	Species		Location	Evidence	Breeding Status
1	Blackburnian warbler	*Setophaga fusca*	PC 10	Three male and female pairs	Probable
1	Black-throated green warbler	*Setophaga virens*	PC 10	One female and a juvenile	Confirmed
1	Yellow-rumped warbler	*Dendroica coronata*	PC 10	One juvenile	Confirmed
1	Common yellowthroat	*Geothlypis trichas*	PC 10	One male and female pair	Probable
1	American redstart	*Setophaga ruticilla*	PC 10	One juvenile	Confirmed
1	American redstart	*Setophaga ruticilla*	PC 8	One juvenile	Confirmed
1	Red-eyed vireo	*Vireo olivaceus*	PC 5	Two adults and a juvenile	Confirmed
1	Golden-crowned kinglet	*Regulus satrapa*	PC 3	Two juveniles	Confirmed
1	Common merganser	*Mergus merganser*	PC 37	Two females, one male and a juvenile	Confirmed
2	Nashville warbler	*Vermivora ruficapilla*	PC 38	One pair	Possible
2	American kestrel	*Falco sparverius*	DWC 2	One pair	Possible
2	Merlin	*Falco columbarius*	DWC 2	One pair	Possible
3	Magnolia warbler	*Dendroica magnolia*	PC 42	One female and one juvenile	Confirmed
3	Black-throated green warbler	*Setophaga virens*	PC 42	One female and one juvenile	Confirmed
3	Yellow-rumped warbler	*Dendroica coronata*	PC 42	One juvenile	Confirmed
4	Ruby-crowned kinglet	*Regulus calendula*	PC 8	One female and one juvenile	Confirmed
4	Black-throated green warbler	*Setophaga virens*	PC 2	One male and female pair	Probable

3.2.4.2 Diurnal Watch Count Results

DWC surveys that occurred during the fall migration season, a total of 378 individuals representing 42 species were observed.

Three avian SOCI (boreal chickadee, Canada jay, and pine siskin; Table 3.7; Drawing 5, Appendix A) were observed during these surveys. No avian SAR were identified. All species, their abundance, and observed DWC locations are listed in Table 3.6 (below). All avian SAR and SOCI are discussed in Section 3.3.

Surveyors observed 39 species at DWC 1 (285 individuals) and 15 species (does not include the unknowns) at DWC 2 (93 individuals). DWC 1 was located on an existing logging road adjacent to clear-cut from the past and low growing mixed wood forest. DWC 2 is located near an open clear-cut area with regenerative mixed wood. Higher species diversity was observed at DWC 1 to a variety of habitat, including forested habitat and clearcut regenerative forest, open lakes, and riparian areas. Refer to Drawing 3, Appendix A for PC references.

Passerines comprised 84.48% of the species observed, followed by other landbirds (10.32%), and diurnal raptors (2.11%). Other waterbirds and waterfowl make up less than 1% combined. Unknown species that were able to be identified to a bird group are included in these percentages. Blue jay (n=68) was the most abundant species observed, followed by American robin (n=35), common raven (n=28), and American goldfinch (n=25). All the species identified, except for the European starling, are native species in this region of Nova Scotia and the province in general. Typical and common habitat to support these species are present within the Project Area and surrounding landscape.

No breeding evidence was observed during the fall DWC migration surveys.

3.2.4.3 Fall Migration Summary

Throughout the PC and DWC fall migration surveys, surveyors recorded similar observations to spring migration surveys. No migration patterns were recorded within the Project Area. No colonies were observed during fall migration in the Project Area. Pileated woodpecker were observed during the fall migration surveys without any breeding evidence or nest cavities were observed. Nest sweeps will be conducted prior to construction, including nest cavities.

Table 3.8: Individual Abundance and Species of Birds Observed During Fall Migration Surveys

Code	Common Name	Scientific Name	SARA	ESA	SRank	#	Age	Sex	PC Observations	Group
EVGR	**Evening grosbeak**	***Coccothraustes vespertinus***	**SC**	**SC**	**S3B, S3N, S3M**	**1**			**14**	**6**
OSFL	**Olive-sided flycatcher**	***Contopus cooperi***	**SC**	**SC**	**S3B**	**1**			**1**	**7**
RECR	**Red crossbill**	***Loxia curvirostra***	**T**	**T**	**S3S4**	**1**			**27**	**6**
BLPW	**Blackpoll warbler**	***Setophaga striata***	**-**	**-**	**S3B, S5M**	**6**			**2, 5, 6, 8, 12**	**6**
BOCH	**Boreal chickadee**	***Poecile hudsonica***	**-**	**-**	**S3**	**22**			**5, 8, 9, 10, 14, 21, 24, 27, 36, 37, 41**	**6**
CAJA	**Canada jay**	***Perisoreus canadensis***	**-**	**-**	**S3**	**7**			**9, 34, 37, 38**	**6**
CMWA	**Cape may warbler**	***Setophaga tigrina***	**-**	**-**	**S3B, SUM**	**1**			**42**	**6**
NOPI	**Northern pintail**	***Anas acuta***	**-**	**-**	**S1B,SUM**	**1**			**37**	**1**
PHVI	**Philadelphia vireo**	***Vireo philadelphicus***	**-**	**-**	**S2?B,SUM**	**2**			**42**	**6**
PISI	**Pine siskin**	***Spinus pinus***	**-**	**-**	**S3**	**84**			**13, 14, 24, 37**	**6**
PIWA	**Pine warbler**	***Setophaga pinus***	**-**	**-**	**S2S3B,S4S5M**	**6**			**3, 10, 22, 27, 38**	**6**
RBME	**Red-breasted merganser**	***Mergus serrator***	**-**	**-**	**S3B, S4S5N, S5M**	**1**	**A**	**1 F**	**37**	**1**
ALFL	Alder flycatcher	*Empidonax alnorum*	-	-	S5B	6			1, 6, 38, 39	6
ABDU	American black duck	*Anas rubripes*	-	-	S5B, S5N	3			37	1
AMCR	American crow	*Corvus brachyrhynchos*	-	-	S5	65			All PC Locations, except 6, 7, 24, 31, 34, 41	6
AMGO	American goldfinch	*Carduelis tristis*	-	-	S5	197			All PC Locations, except 2, 7, 10, 17, 18, 20, 21, 23, 36	6
AMKE	American kestrel	*Falco sparverius*	-	-	S3B, S4S5M	2			2	4
AMRE	American redstart	*Setophaga ruticilla*	-	-	S5B	25	J	1 F	3, 8, 10, 11, 19, 23, 24, 27, 30, 32, 35, 36, 37, 38, 41, 42	6
AMRO	American robin	*Turdus migratorius*	-	-	S5B, S3N	200			All PC Locations, except 16, 23, 26, 28	6
BAEA	Bald eagle	*Haliaeetus leucocephalus*	-	-	S5	3			37, 40	4
BEKI	Belted kingfisher	*Megaceryle alcyon*	-	-	S4S5B	5			3, 34, 36	3
BAWW	Black-and-white warbler	*Mniotilta varia*	-	-	S5B	10	A	1 F	12, 16, 24, 33, 34, 38, 41, 42	6
BLBW	Blackburnian warbler	*Setophaga fusca*	-	-	S4B,S5M	8	A, J	1 F	6, 8, 10, 27, 42	6
BCCH	Black-capped chickadee	*Poecile atricapilla*	-	-	S5	169			All PC Locations, except 11, 22, 25, 30, 36, 38	6
BTNW	Black-throated green warbler	*Setophaga virens*	-	-	S5B	36	A, J	1 M, 3 F	2, 4, 5, 6, 8, 10, 13, 14, 20, 22, 24, 25, 27, 30, 32, 33, 38, 41, 42	6
BLJA	Blue jay	*Cyanocitta cristata*	-	-	S5	162			All PC Locations, except 7, 20	6
BHVI	Blue-headed vireo	*Vireo solitarius*	-	-	S5B	39			5, 8, 9, 10, 11, 14, 21, 25, 27, 30, 31, 32, 33, 34, 35, 38, 41, 42	6
BWWA	Blue-winged warbler	*Vermivora cyanoptera*	-	-	SNA	5			2, 6, 29, 34, 37	
BRCR	Brown creeper	*Certhia americana*	-	-	S5	9			3, 25, 26, 27, 30, 33, 34, 40	6
CAGO	Canada goose	*Branta canadensis*	-	-	SUB, S4N, S5M	2			36	1
CEDW	Cedar waxwing	*Bombycilla cedrorum*	-	-	S5B	67			1, 3, 4, 5, 6, 8, 10, 12, 14, 17, 18, 19, 23, 24, 25, 27, 30, 34, 36, 37, 38, 39, 40, 41, 42	6
COGR	Common grackle	*Quiscalus quiscula*	-	-	S5B	3			36, 41	6
COLO	Common loon	*Gavia immer*	-	-	S4B	1			36	3

Code	Common Name	Scientific Name	SARA	ESA	SRank	#	Age	Sex	PC Observations	Group
COME	Common merganser	*Mergus merganser*	-	-	S5B, S4N	4	A, J	1 M, 2 F	37	1
CORA	Common raven	*Corvus corax*	-	-	S5	28			3, 6, 7, 8, 13, 14, 15, 19, 20, 21, 24, 28, 31, 32, 36, 37, 38, 40, 41, 42	6
COYE	Common yellowthroat	*Geothlypis trichas*	-	-	S5B	29			4, 9, 10, 20, 23, 24, 25, 27, 29, 34, 36, 37, 38, 39, 41, 42	6
DEJU	Dark-eyed Junco	*Junco hyemalis*	-	-	S4S5	107			All PC Locations, except 6, 7, 11, 23, 26, 32	6
DOWO	Downy woodpecker	*Dryobates pubescens*	-	-	S5	2			10, 37	7
EAPH	Eastern phoebe	*Sayornis phoebe*	-	-	S4S5B,S4M	1			34	6
EUST	European starling	*Sturnus vulgaris*	-	-	SNA	6			36	6
GCKI	Golden-crowned kinglet	*Regulus satrapa*	-	-	S5	181	J		All PC Locations, except 37	6
GRCA	Gray catbird	*Dumetella carolinensis*	-	-	S4B	1			27	6
GBHE	Great blue heron	*Ardea herodias*	-	-	S4B, S4S5M	2			34, 37	3
GWTE	Green-winged teal	*Anas crecca*	-	-	S4S5B, S5M	1	A	1 M	37	1
HAWO	Hairy woodpecker	*Picoides villosus*	-	-	S5	13	A	2 F	1, 3, 14, 25, 29, 33, 35, 36, 37	7
HETH	Hermit thrush	*Catharus guttatus*	-	-	S5B	53			All PC Locations, except 11, 16, 18, 19, 20, 22, 23, 25, 26, 28, 31, 32, 33, 34, 40	6
LEFL	Least flycatcher	*Empidonax minimus*	-	-	S4S5B, S5M	3			1, 3, 20	7
LISP	Lincoln's Sparrow	*Melospiza lincolnii*	-	-	S4B,S5M	1			1	6
MAWA	Magnolia warbler	*Dendroica magnolia*	-	-	S5B	8	A, J	1 F	8, 10, 27, 38, 42	6
MALL	Mallard	*Anas platyrhynchos*	-	-	S5B, S5N	6	A	2 F	37	1
MERL	Merlin	*Falco columbarius*	-	-	S5B	4			14, 27, 30, 39	4
MODO	Mourning dove	*Zenaida macroura*	-	-	S5	6			13, 17, 19, 20, 24, 36	7
MOWO	Mourning warbler	*Geothlypis philadelphia*	-	-	S4B, S5M	2			14, 37	6
NAWA	Nashville warbler	*Vermivora ruficapilla*	-	-	S4B, S5M	8			20, 22, 27, 38, 39, 41	6
NOCA	Northern cardinal	*Cardinalis cardinalis*	-	-	S4	3			3, 33	6
NOFL	Northern flicker	*Colaptes auratus*	-	-	S5B	82			All PC Locations, except 7, 8, 20, 22, 33, 34	7
NOPA	Northern parula	*Parula americana*	-	-	S5B	1			27	6
OVEN	Ovenbird	*Seiurus aurocapilla*	-	-	S5B	10			2, 5, 6, 7, 10, 12, 17	6
PAWA	Palm warbler	*Dendroica palmarum*	-	-	S5B	3			23, 27, 29	6
PIWO	Pileated Woodpecker	*Dryocopus pileatus*	-	-	S5	2			14, 24	7
PUFI	Purple finch	*Carpodacus purpureus*	-	-	S4S5B, S3S4N, S5M	15			1, 4, 7, 8, 12, 13, 24, 36, 37	6
RBNU	Red-breasted nuthatch	*Sitta canadensis*	-	-	S4S5	28			1, 2, 5, 6, 8, 10, 12, 13, 14, 15, 19, 25, 27, 30, 31, 35, 37, 41, 42	6
REVI	Red-eyed vireo	*Vireo olivaceus*	-	-	S5B	131	A, J		All PC Locations, except 15, 18, 28, 29, 40	6
RSHA	Red-shouldered Hawk	*Buteo lineatus*	-	-	SNA	1			37	
RTHA	Red-tailed hawk	*Buteo jamaicensis*	-	-	S5	3			27, 36, 39	4
RNDU	Ring-necked duck	*Aythya collaris*	-	-	S5B	1			37	1
RTHU	Ruby-throated hummingbird	*Archilochus colubris*	-	-	S5B	5			34, 36, 37, 38	6
RCKI	Ruby-crowned kinglet	*Regulus calendula*	-	-	S4B, S5M	13	A, J	1 F	3, 6, 8, 10, 14, 24, 27, 41, 42	6
RUGR	Ruffed grouse	*Bonasa umbellus*	-	-	S5	17			1, 2, 5, 7, 14, 16, 17, 18, 21, 25, 28, 37, 38	7

Code	Common Name	Scientific Name	SARA	ESA	SRank	#	Age	Sex	PC Observations	Group
SSHA	Sharp-shinned hawk	*Accipiter striatus*	-	-	S5	2			36	4
SOSP	Song sparrow	*Melospiza melodia*	-	-	S5B	64			1, 2, 4, 7, 8, 9, 10, 12, 13, 14, 16, 17, 20, 22, 23, 24, 27, 28, 30, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41	6
SPGR	Spruce grouse	*Falcipennis canadensis*	-	-	S4	3			10, 19, 25	7
SWTH	Swainson's thrush	*Catharus ustulatus*	-	-	S4B, S5M	1			8	6
SWSP	Swamp sparrow	*Melospiza georgiana*	-	-	S5B	17			1, 4, 21, 29, 30, 34, 35, 36, 37	6
TUVU	Turkey vulture	*Cathartes aura*	-	-	S2S3B, S4S5M	2			37, 40	4
VEER	Veery	*Catharus fuscescens*	-	-	S4B	1			4	6
WBNU	White-breasted nuthatch	*Sitta carolinensis*	-	-	S4	3			14, 30	6
WCSP	White-crowned sparrow	*Zonotrichia leucophrys*	-	-	SUM	1			14	6
WTSP	White-throated sparrow	*Zonotrichia albicollis*	-	-	S4S5B, S5M	52			2, 8, 9, 10, 13, 14, 15, 16, 19, 20, 21, 22, 23, 24, 27, 29, 30, 31, 32, 34, 35, 36, 37, 38, 39, 40, 41	6
WWCR	White-winged crossbill	*Loxia leucoptera*	-	-	S4S5	29			8, 10, 14 ,15, 27, 28, 35, 37	6
WIWR	Winter wren	*Troglodytes troglodytes*	-	-	S5B	1			11	6
WODU	Wood duck	*Aix sponsa*	-	-	S5B	3	A	1 F	37	1
YWAR	Yellow warbler	*Dendroica petechia*	-	-	S5B	8			8, 22, 24, 31, 34, 38, 41	6
YBFL	Yellow-bellied flycatcher	*Empidonax flaviventris*	-	-	S4B, S5M	1			1	7
YBSA	Yellow-bellied sapsucker	*Sphyrapicus varius*	-	-	S5B	3			3, 29, 36	7
YRWA	Yellow-rumped warbler	*Dendroica coronata*	-	-	S5B	38	J		3, 8, 10, 12, 13, 14, 15, 16, 17, 18, 20, 21, 22, 24, 26, 27, 28, 29, 35, 36, 38, 39, 41, 42	6
Total Number of Individuals				**2, 160**	**Total Number of Species (does not include unknowns)**					**86**

Notes: Incidental observations not included (those observed outside of point count locations). A=Adult; J=Juvenile. Bird group is coded as: 1 = waterfowl; 2 = shorebirds; 3 = other waterbirds (i.e., that are not waterfowl or shorebirds); 4 = diurnal raptors; 5 = nocturnal raptors; 6 = passerines (excluding dippers), and 7 = other landbirds. **Bolded** species are priority species**. Bolded and underlined** species are SAR. ACCDC rankings retrieved from: http://accdc.com/webranks/NSall.htm (June 2024). "-" represents no federal or provincial designation.

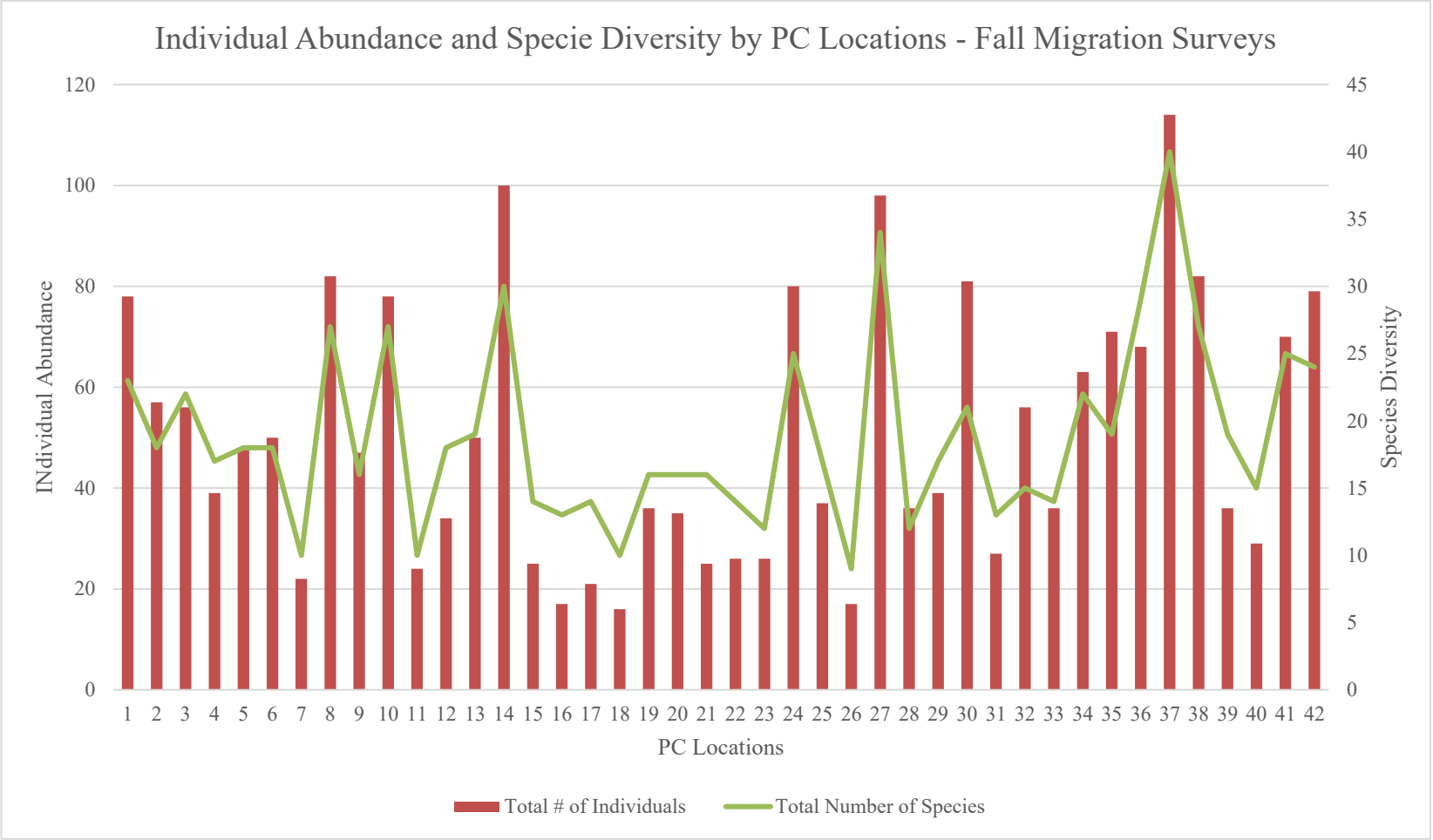

Figure 3.3: Individual Avian Abundance and Species Diversity by PC Location during Breeding Bird Surveys

Table 3.9: Individual Abundance and Species of Birds Observed During DWC Surveys (Fall Migration)

Code	Common Name	Scientific Name	SARA	ESA	SRank	#	Age	Sex	DWC Observations	Group
BOCH	**Boreal chickadee**	***Poecile hudsonica***	**-**	**-**	**S3**	**1**			**1**	**6**
CAJA	**Canada jay**	***Perisoreus canadensis***	**-**	**-**	**S3**	**2**			**2**	**6**
PISI	**Pine siskin**	***Spinus pinus***	**-**	**-**	**S3**	**11**			**1**	**6**
AMCR	American crow	*Corvus brachyrhynchos*	-	-	S5	20			1, 2	6
AMGO	American goldfinch	*Carduelis tristis*	-	-	S5	25			1, 2	6
AMRE	American redstart	*Setophaga ruticilla*	-	-	S5B	1			1	6
AMRO	American robin	*Turdus migratorius*	-	-	S5B, S3N	35			1, 2	6
BAEA	Bald eagle	*Haliaeetus leucocephalus*	-	-	S5	2			1, 2	4
BEKI	Belted kingfisher	*Megaceryle alcyon*	-	-	S4S5B	1			2	3
BAWW	Black-and-white warbler	*Mniotilta varia*	-	-	S5B	2			1	6
BCCH	Black-capped chickadee	*Poecile atricapilla*	-	-	S5	8			1, 2	6
BTNW	Black-throated green warbler	*Setophaga virens*		-	S5B	6			1	6
BLJA	Blue jay	*Cyanocitta cristata*	-	-	S5	68			1, 2	6
BHVI	Blue headed vireo	*Vireo solitarius*			S5B	6			1	6
CAGO	Canada goose	*Branta canadensis*	-	-	SUB, S4N, S5M	2			1	1
CEDW	Cedar waxwing	*Bombycilla cedrorum*	-	-	S5B	5			1, 2	6
CHSP	Chipping sparrow	*Spizella passerina*	-	-	S4B, S5M	2			2	6
COLO	Common loon	*Gavia immer*	-	-	S4B	2			1	3
CORA	Common raven	*Corvus corax*	-	-	S5	28			1, 2	6
COYE	Common yellowthroat	*Geothlypis trichas*	-	-	S5B	2			1	6
DEJU	Dark-eyed Junco	*Junco hyemalis*	-	-	S4S5	8			1, 2	6
DOWO	Downy woodpecker	*Dryobates pubescens*	-	-	S5	10			1	7
EUST	European starling	*Sturnus vulgaris*	-	-	SNA	1			1	6
GCKI	Golden-crowned kinglet	*Regulus satrapa*	-	-	S5	18			1	6
HAWO	Hairy woodpecker	*Picoides villosus*	-	-	S5	7			1	7

Code	Common Name	Scientific Name	SARA	ESA	SRank	#	Age	Sex	DWC Observations	Group
HETH	Hermit thrush	*Catharus guttatus*	-	-	S5B	3			2	6
MERL	Merlin	*Falco columbarius*	-	-	S5B	4			2	6
MOWO	Mourning warbler	*Geothlypis philadelphia*	-	-	S4B, S5M	1			1	7
NOFL	Northern Flicker	*Colaptes auratus*	-	-	S5B	18			1, 2	7
PUFI	Purple finch	*Carpodacus purpureus*	-	-	S4S5B, S3S4N, S5M	10			1	6
RBNU	Red-breasted nuthatch	*Sitta canadensis*	-	-	S4S5	4			1	6
REVI	Red-eyed vireo	*Vireo olivaceus*	-	-	S5B	14			1, 2	6
RCKI	Ruby-crowned kinglet	*Regulus calendula*	-	-	S4B, S5M	2			1	6
RUGR	Ruffed grouse	*Bonasa umbellus*	-	-	S5	4			1	7
SSHA	Sharp-shinned hawk	*Accipiter striatus*	-	-	S5	2			1	4
SOSP	Song sparrow	*Melospiza melodia*	-	-	S5B	13			1, 2	6
Total Number of Individuals				**348**	**Total Number of Species (does not include unknowns)**					**33**

Notes: Incidental observations not included (those observed outside of point count locations). A=Adult; J=Juvenile. Bird group is coded as: 1 = waterfowl; 2 = shorebirds; 3 = other waterbirds (i.e., that are not waterfowl or shorebirds); 4 = diurnal raptors; 5 = nocturnal raptors; 6 = passerines (excluding dippers), and 7 = other landbirds. **Bolded** species are priority species. **Bolded and underlined** species are SAR. ACCDC rankings retrieved from: http://accdc.com/webranks/NSall.htm (June 2024). "-"represents no federal or provincial designation.

3.2.5 Incidental Observations

Incidental observations include those made during dedicated bird surveys (i.e., observation outside of point count time or survey location) and those made during non-bird related surveys (e.g., wetland delineation).

No incidental species observed during both spring and fall migration surveys. A total of 11 species and 17 individuals were observed incidentally during breeding bird surveys and nightjar surveys across the Project Area. Two avian SOCI (bay-breasted warbler (n=3) and cape may warbler (n=2)), and one avian SAR, (Canada warbler (n=1)) were observed incidentally during the breeding bird and nightjar surveys. With approximately 24 hours of survey effort, a total of 39 individuals and seven confirmed species were observed during the winter moose transect surveys (January 31 and February 16, 2024). One avian SOCI, boreal chickadee (n=2), was observed during the winter moose transect surveys from January to March 2024. No avian SAR were observed incidentally during winter surveys.

In total, 58 individuals and 11 species were observed incidentally during the Project's biophysical surveys. All avian SAR and SOCI are discussed in Section 3.3.

No other incidental species were recorded during any avian surveys or any other biophysical Project-related studies. No breeding behaviour or migratory activity was observed incidentally. None of the incidentally observed SAR species are associated with field verified wetlands.

Passerines were the most abundant bird group with 47 individuals (81.0% of individuals), followed by other landbirds (17.2%), and other waterbirds (1.7%). No novel species (e.g., not observed during any other surveys) were observed incidentally during any of the Project's biophysical surveys.

3.3 Priority Species

ACCDC breeding bird status qualifiers were used to determine whether a species is a priority species, based on the time of year in which the species was observed. If a species has only one seasonal ranking, such as S3B, it was considered a SOCI regardless of the time of year it was observed. However, if the species had an alternate ranking, such as a S-Rank of S2S3B, S5N, the species was considered a priority species if observed during the breeding season. Outside of breeding season, this species was not considered a priority species.

3.3.1 Species at Risk

Six avian SAR were observed during surveys throughout the dedicated survey period in 2023 and 2024. The SAR species, their habitat requirements, and the habitat present within the Project Area, are described below.

3.3.1.1 Canada Warbler

Canada warbler (listed as Threatened by *SARA*, Special Concern by COSEWIC, Endangered by *ESA*, and ranked by ACCDC as S3B) is a small-sized bird belonging to the passerine group. There is suitable foraging and breeding habitat for this species within the Project Area. The Canada warbler prefers wet, coniferous, and mixed wood forests with a thick shrub layer. Canada warblers are typically found in treed and shrub swamps (COSEWIC 2008). This species can also be found in woody thickets and shrubby riparian areas within forests on the edges of watercourses and ravines, and in regenerative growth within natural and anthropogenic disturbed areas. Nests are built on or close to the ground for cover. The most significant threat to this species is the loss and/or degradation of habitat (COSWIC 2008).

Eight Canada warbler were observed during breeding bird and nightjar surveys. One was found at PC 3 and PC 36 each, two were observed at PC 30, and four were observed during the breeding bird area searches. One Canada warbler was observed incidentally during the breeding bird surveys, heard approximately 100 m SW of PC 36. PC 36 borders the Gully Lake Wilderness Area, PC 3 and PC 30 are adjacent to a watercourse and a riparian wetland.

3.3.1.2 Eastern Wood-pewee

Eastern wood-pewee (listed as Special Concern by *SARA*/COSEWIC, Vulnerable by *ESA*, and ranked by ACCDC as S3S4B) is a small-sized bird belonging to the passerine group. There is suitable foraging and breeding habitat for this species within the Project Area. The species is known to nest and forage at high canopy level in areas associated with clearings and forest edges. Eastern wood-pewees are mostly associated with mid-canopy layer of forest clearings and edges of wetlands and deciduous and mixed forests. They are most abundant in intermediate age and mature forest stands (COSEWIC, 2012). Preferred habitats include riparian areas by rivers, open/semi-open mature forest, treed swamps, bogs, meadows, cut blocks, quarries, transmission lines, barrens, and burned forests. The preference of edge habitat is strongly associated with their foraging needs and behaviour. The most significant threat to this species is the loss and/or degradation of habitat (COSEWIC, 2012).

Three eastern wood-pewee were observed during the breeding bird and nightjar surveys. One was observed at PC 5 and two were observed during the breeding bird area searches. PC 5 is on a snowmobile/ATV trail by a steep hill dropping towards a watercourse within a hardwood dominant forest.

3.3.1.3 Evening Grosbeak

Evening grosbeak is listed as Special Concern by COSEWIC and *SARA*, is listed as Vulnerable by *ESA*, and is ranked by ACCDC as S3B, S3N, S3M. The Evening grosbeak is generally associated with older coniferous and mixed forests, partial cutting of mature stands also maintains habitat for this species (MBBA, 2008). Evening grosbeak are documented by

ACCDC and the MBBA as present in the vicinity of the Study Area, and suitable habitat may be available for this species within the Study Area based on desktop review (i.e., mixed wood forests, clear cut edges, roadside clearings).

One evening grosbeak was observed at PC 14 during the fall migration surveys. Three evening grosbeak were observed during the spring migration surveys, including one at PC 3, one at PC 41, and one at DWC 2 during the spring diurnal watch count surveys. PC 4 and 14 are adjacent to recent clear-cut activity surrounded by mixed wood forest and an existing logging road. PC 3 has watercourse and riparian areas but is also next to a snowmobile/ATV trail and a field with mixed wood forest surroundings.

3.3.1.4 Olive-sided Flycatcher

Olive-sided flycatcher (listed as Special Concern by *SARA*/COSEWIC, Threatened by *ESA*, and ranked by ACCDC as S3B) is small to medium-sized bird belonging to the passerine group. There is suitable foraging and breeding habitat for this species within the Project Area. The olive-sided flycatcher is typically found in edge habitat within softwood and mixedwood forests for breeding habitat. This species inhabits open forest, often near water or wetlands that contain tall snags or trees (COSEWIC, 2007). This species prefers areas with tall trees or snags adjacent to or within open areas to perch on for foraging. Preferred habitats include riparian areas by rivers, open/semi-open mature forest, treed swamps, bogs, cut blocks, barrens, meadows, and burned forests. The most significant threat to this species is the loss and/or degradation of habitat (COSEWIC, 2007).

Four olive-sided flycatcher were observed during the breeding bird and nightjar surveys. One was observed at PC 3 and PC 24 each and two were observed at PC 1. One olive-sided flycatcher was observed at PC 1 during the fall migration surveys. Two olive-sided flycatcher were observed during the spring migration surveys, one at PC 1 and one at PC 3. PC 3 has watercourse and riparian areas but is also next to a snowmobile/ATV trail and a field with mixed wood forest surroundings. PC 1 is located at an existing snowmobile/ATV trail and a watercourse crossing near a riparian wetland and surrounded by young regenerative mixed wood forest. PC 24 is located next to recent clear-cut activity (selective harvesting methods) and mixed wood forest.

3.3.1.5 Red Crossbill

Red crossbill (ACCDC: S3S4, *SARA*: Threatened, *ESA*: Threatened) is a medium-sized finch specialized in seed eating, equipped with curved and crossed mandibles, strong jaws, and robust feet for prying open conifer cones. Males are dull red, females are greyish-olive, and juveniles are grey to brown with heavy streaks (COSEWIC, 2016). The red crossbill requires conifer forests for roosting and nesting.

One red crossbill was observed at PC 27 during the fall migration surveys. One red crossbill was observed at PC 40 during the spring migration surveys. PC 40 is next to a road, a watercourse, and a riparian wetland surrounded by mixed wood forest. PC 27 is surrounded by mixed wood forest and recent clearcut activities.

3.3.1.6 Rusty Blackbird

Rusty blackbird (listed as Special Concern by *SARA*/COSEWIC, Endangered by *ESA*, and ranked by ACCDC as S2B) is small to medium-sized bird belonging to the passerine group. The rusty blackbird breeds mainly in Canada's boreal forests, favouring coniferous forests near wetlands like streams, bogs, meadows, marshes, swamps, and beaver ponds (COSEWIC, 2017). During migration, it relies on wooded wetlands. In winter, it inhabits lowland forested wetlands, cultivated fields, and pecan groves (COSEWIC, 2017).

One rusty blackbird was observed at PC 6 during the spring migration surveys. PC 6 which is adjacent to an existing logging road, recent clear-cut activity, snowmobile/ATV trail, and mixed wood forest.

3.3.2 Species of Conservation Interest Observed

Across all survey seasons, a total of 18 avian SOCI were observed (Drawing 5, Appendix A). Note that certain bird species are considered SOCI during certain seasons due to their ACCDC S-Rank, as explained throughout field results in Section 3.2 (e.g., turkey vulture). The SOCI species observed are as follows:

- American kestrel (*Falco sparverius*)
- Baltimore oriole (*Icterus galbula*)
- Bay-breasted warbler (*Setophaga castanea*)
- Blackpoll warbler (*Setophaga striata*)
- Boreal chickadee (*Poecile hudsonica*)
- Canada jay (*Perisoreus canadensis*)
- Cape May warbler (*Setophaga tigrina*)
- Killdeer (*Charadrius vociferus*)
- Northern Pintail (*Anas acuta*)
- Philadelphia vireo (*Vireo philadelphicus*)
- Pine grosbeak (*Pinicola enucleator*)
- Pine siskin (*Spinus pinus*)
- Pine warbler (*Setophaga pinus*)
- Red-breasted Merganser (*Mergus serrator*)
- Rose-breasted grosbeak (*Pheucticus ludovicianus*)
- Turkey vulture (*Cathartes aura*)
- Wilson’s warbler (*Cardellina pusilla*)

Philadelphia vireo (*Vireo philadelphicus*) was only observed during the fall migration surveys at PC 42. PC 42 is located next to an existing quarry with a logging road, shrubby roadside, and mixed wood forest with slightly more hardwood trees. Baltimore oriole (*Icterus galbula*) was found at PC 40, located near a large pond/open water wetland with marsh and treed swamp edges, which is the favourable habitat for this species. All other SOCI species were expected given the habitat within the Project Area.

4.0 AVIFAUNA SUMMARY

Baseline avifauna surveys were completed from June 2023 to June 2024 and 2024 by Strum biologists. A total of 109 hours of dedicated avifauna surveys were completed. Biophysical surveys resulted in the observation of 7,683 individuals, representing 117 bird species within the Project Area

Based on other data sources (e.g., ACCDC, MBBA, eBird, Christmas Bird Count, etc.), and experience of the avian biologists who completed the surveys, the bird species observed during the biophysical studies for this EARD were normal for this area throughout the spring migration, breeding, and fall migration seasons.

The most abundant bird group observed (by total number of individuals) was passerines accounting for 81.1% total individuals, followed by other landbirds (4.8%), and waterfowl (1.4%). Nocturnal raptors, diurnal raptors, other waterfowl and shorebirds make up 1% when combined.

Passerines had the highest species diversity with 72 species observed, followed by diurnal raptors (10 species), waterfowl (eight species) other landbirds, (nine species), other waterbirds (three species), diurnal raptors (10 species), and nocturnal raptors (one species). American robin was the most observed species during all avian surveys (n=1, 042).

There were no common nighthawk observed during the dedicated surveys. This was expected due to the lack of suitable breeding habitat for the common nighthawk (e.g., not many clear cuts, ROW clearings, etc.). Additionally, no eastern whip-poor-will observed during nightjar surveys.

Six avian SAR were observed within the Project Area during biophysical assessments. Across all survey seasons, a total of 18 avian SOCI were observed. The Canada warbler was the most common SAR species observed (n=8). The boreal chickadee (n=53) and pine siskin (n=35) were the most observed SOCI throughout the field surveys.

Throughout the avifauna baseline surveys, no SAR and several SOCI was observed within or close to wetlands within the Project Area. There were avian SOCI observed in other wetlands outside and bordering the Project Area as well. These wetlands will not be impacted by the Project footprint. Canada jay (n=1), blackpoll warbler (n=3), pine siskin (n=2), boreal chickadee (n=1), bay-breasted warbler(n=1) are SOCI that were observed in or near field verified wetlands within the Project Area.

During avifauna baseline surveys, most bird groups were observed flying under 100 m in height. There were minimal observations of gulls and raptors flying above 100 m. Survey locations along the small bodies of open water, mixed wood forest, and existing logging roads generally had the highest species abundance and diversity as well. The most common fly-over height recorded during all seasons, was between 50-100 m across all bird groups.

Through desktop analysis and field observations, it is apparent that the general area supports various life stages for migratory birds due to the variety of habitats (e.g., dirt/gravel roads, recently clear-cut area, riparian wetlands, ATV trails, shrubby roadsides, swamps, small bodies of water, and forested areas, etc.). Open habitat such as existing logging roads, recently clear-cut areas, and small bodies of water provided suitable foraging habitat for various types of warblers, sparrows, and predatory birds such as northern harrier, turkey vultures, and various buteo species, as well as an array of waterfowl. Open, recently clear-cut habitats are woven around mature mixedwood forests within the Project Area, intermixed with riparian wetlands, open small bodies of water, existing logging roads, and shrubby roadside, all providing habitat for various species of passerines, other landbirds, waterfowl and raptors.

The Project Area comprises a variety of habitats including all ages of mixedwood forest including young regenerative shrub, low laying canopy, as well as older, more mature stands. The Project Area has pockets of open canopy small bodies of water, ATV trails and existing logging roads, and recently clear-cut forest. Stand heterogeneity (i.e., stands with different height classes) and diversity of landscapes observed within the Project Area provide a range of habitats suitable for a variety of bird species with different habitat requirements. Forests and shrub-covered areas with stand heterogeneity provide suitable habitat for foraging and breeding activities for many passerine species. During the spring, fall, and breeding bird surveys, PC locations associated with open water wetlands, mixedwood forest, and existing logging roads had some of the highest species' richness and abundance.

5.0 LIMITATIONS

Limitations incurred at the time of the assessment include:

- Strum has relied in good faith upon the evaluation and conclusions in all third-party assessments. Strum relies upon these representations and information provided but can make no warranty of its accuracy.
- Strum has relied in good faith upon regulators in the various regulatory agencies and methodologies used in the design of this assessment may have been based upon regulatory guidance.
- There are a potentially infinite number of methods in which human activity can influence wildlife behaviours and populations and merely demonstrating that one factor is not operative does not negate the influence of the remainder of possible factors.
- A limitation with field surveys is that if no migration patterns are observed, it does not mean they do not exist in the area. Radar and acoustic monitoring have a higher likelihood of observing migration behaviour, and migration conversations are qualitative in nature.

- Lack of access within the Project Area and difficult terrain was a constraint for field surveyors and survey design had to be readjusted during round 1 of spring migration surveys.
- Surveys protocols followed appropriate methods and were adjusted, when possible, in response to correspondence from CWS.
- All reasonable assessment programs will involve an inherent risk that some conditions will not be detected and all reports summarizing such investigations will be based on assumptions of what characteristics may exist between the sample points.
- Bird detectability depends on (i) species biology and behaviour (abundance, activity, species body size and conspicuousness, and ecological traits), (ii) individual characteristics within the species (sex and age), (iii) environmental factors (habitat, weather, phase of season, and time of day), and (iv) methodology of counts and skills of observers.
- An essential assumption of distance sampling methods is that distances to individuals are accurately estimated, which can be challenging under normal field conditions. Additionally, these estimates are dependent on the observer's perspective.

6.0 CLOSING

This Report has considered relevant factors and influences pertinent within the scope of the assessment and has completed and provided relevant information in accordance with the methodologies described.

The authors have considered relevant factors and influences pertinent within the scope of the assessment and written and combined and referenced the report accordingly.

7.0 STATEMENT OF QUALIFICATIONS AND LIMITATIONS

This Report (the "Report") has been prepared by Strum Consulting ("Consultant") for the benefit of Clydesdale Holdings Ltd. (Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations, and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to Consultant which has not been independently verified
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

- as agreed in writing by Consultant and Client
- as required by law
- for use by governmental reviewing agencies

Consultant accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss, or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of Consultant to use and rely upon the Report and the Information. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations forms part of the Report and any use of the Report is subject to the terms hereof.

Should additional information become available, Strum requests that this information be brought to our attention immediately so that we can re-assess the conclusions presented in this report. This report was prepared by Samantha Stegen, MREM, P.Biol. and was reviewed by Melanie Juurlink, MREM, Senior Environmental Scientist.

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APPENDIX A
DRAWINGS

Clydesdale Ridge Wind Project

Project Development Area

N

Balmoral Mills
Balmoral Mills Provincial Park
East Earltown
Plainfield
Elmfield
Diamond
MacKay Brook Nature Reserve
Millsville
Four Mile Brook
Loganville
West Earltown
Earltown
Six Mile Brook
Gully Lake Wilderness Area Addition (Pending)
Dalhousie Mountain Nature Reserve
Gully Lake Wilderness Area Addition (Pending)
Upper Kemptown
Gully Lake Wilderness Area
Salt Springs
Salt Springs Provincial Park
Mount Thom
Watervale

0 1 2 3 4 km

- Project Area
- Crown Land
- Property Boundaries
- Cobequid Bay IBA (NS019)

Type of Existing Protection

- Nature Reserve
- Wilderness Area
- Provincial Park

Type of Pending or Proposed Protection

- Wilderness Area
- Provincial Park

Utilities (line)

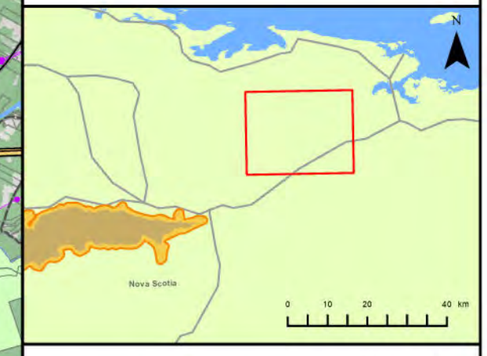
- Existing Transmission Lines

Transportation

- Trans-Canada Highway
- Road
- Unpaved Road

Water Features

- NSTDB Mapped Watercourses
- Mapped Lakes and Rivers
- Mapped Wet Areas



Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:80,000	Drawing #: 1A
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Project Area and Desktop Review

Boreal Owl
Barn Swallow
Olive-sided Flycatcher
Diamond
Millsville
Loganville
Four Mile Brook
Six Mile Brook
Canada Jay
Wood Thrush
Earltown
Evening Grosbeak
Rusty Blackbird
Eastern Wood-Pewee
Squashberry
Black-backed Woodpecker
Black-backed Woodpecker
Rose-breasted Grosbeak
Spotted Sandpiper
Canada Jay
Eastern Wood-Pewee
Boreal Chickadee
Barn Swallow
Pine Siskin
Barn Swallow
Barn Swallow
Eastern Wood-Pewee
Blackpoll Warbler
Pine Siskin
Bobolink
Bobolink
Eastern Wood-Pewee
Upper Kemptown
Boreal Chickadee
Salt Springs
Pine Grosbeak
Boreal Chickadee
Boreal Chickadee
Mount Thom
Bay-breasted Warbler
Canada Warbler
Cape May Warbler
Canada Warbler
Canada Warbler
Olive-sided Flycatcher
Canada Warbler
Canada Jay
Watervale

0 1 2 3 4 km

N

Project Area
ACCDC Avian Fauna
Abandoned Mine Openings
Crown land
PIDs on the Project Development Area

NSNRR Significant Species and Habitats

Deer Wintering

Utilities (line)

Existing Transmission Lines

Transportation

Trans-Canada Highway
Road
Unpaved Road

Water Features

NSTDB Mapped Watercourses
Mapped Lakes and Rivers
Mapped Wet Areas

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10049
Scale: 1:70,000	Drawing #: 1B
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Spring & Fall Migration Avian Point Count (PC) Locations

N

PC 1
PC 2
PC 3
PC 4
PC 5
PC 6
PC 7
PC 8
PC 9
PC 10
PC 11
PC 12
PC 13
PC 14
PC 15
PC 16
PC 17
PC 18
PC 19
PC 20
PC 21
PC 22
PC 23
PC 24
PC 25
PC 26
PC 27
PC 28
PC 29

Earltown

0 400 800 1,200 1,600 m

Project Area

Spring & Fall Migration Survey Location

Field Delineated Watercourses within PDA

NSTDB Mapped Watercourses

Field Delineated Wetlands within PDA

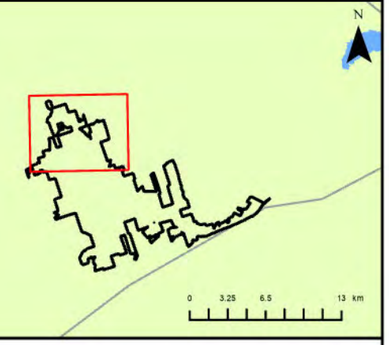
Mapped Wetlands Outside PDA

Field Delineated Open Water

Transportation

Road

Unpaved Road



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Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:25,000	Drawing #: 2A
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Spring & Fall Migration Avian Point Count (PC) Locations

PC 28
PC 29
PC 30
PC 31
PC 32
PC 33
PC 34
PC 35
PC 36
PC 37
PC 38
PC 39
PC 40
PC 41
PC 42
Gully Lake
Mount Thom

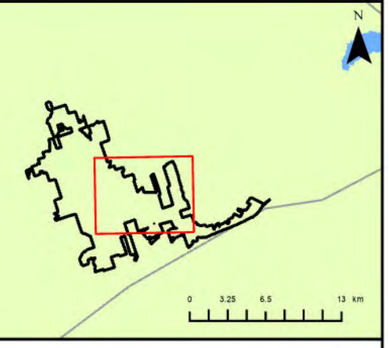
N

0 400 800 1,200 1,600 m

Project Area
Spring & Fall Migration Survey Location
Field Delineated Watercourses within PDA
NSTDB Mapped Watercourses
Field Delineated Wetlands within PDA
Mapped Wetlands Outside PDA
Field Delineated Open Water

Transportation

Road
Unpaved Road



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Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:25,000	Drawing #: 2B
Drawn By: K. Wallace	
Checked By: S. Stegen	

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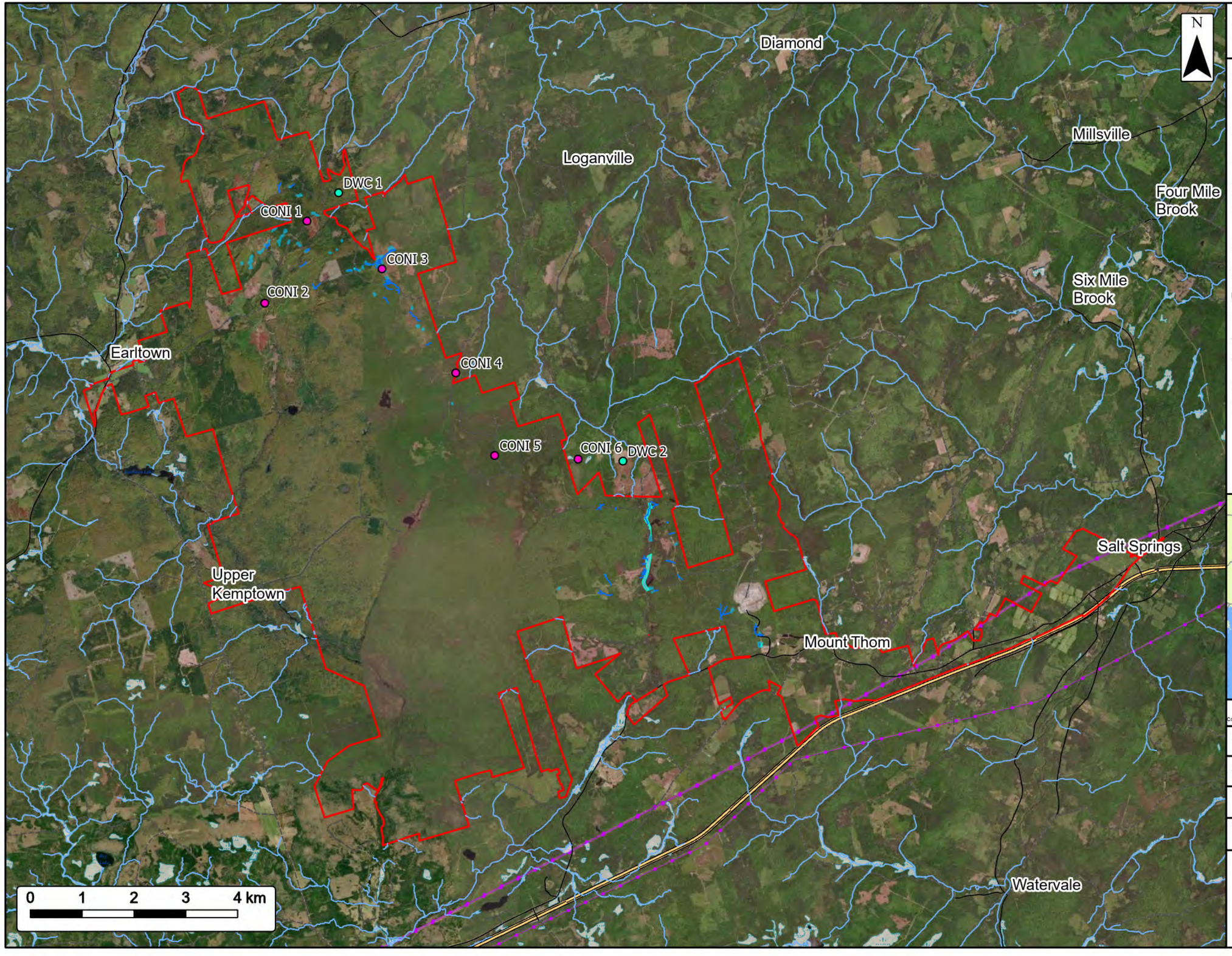
Clydesdale Ridge Wind Project

DWC and Nightjar CONI PC Locations



- Project Area
- Diurnal Watch Count (DWC) Locations
- Nightjar CONI Locations
- Field Delineated Watercourses within PDA
- NSTDB Mapped Watercourses
- Field Delineated Wetlands within PDA
- Mapped Wetlands Outside PDA
- Field Delineated Open Water

Utilities (line)

- Existing Transmission Lines

Transportation

- Trans-Canada Highway
- Road
- Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:70,000	Drawing #: 3
Drawn By: K. Wallace	
Checked By: S. Stegen	

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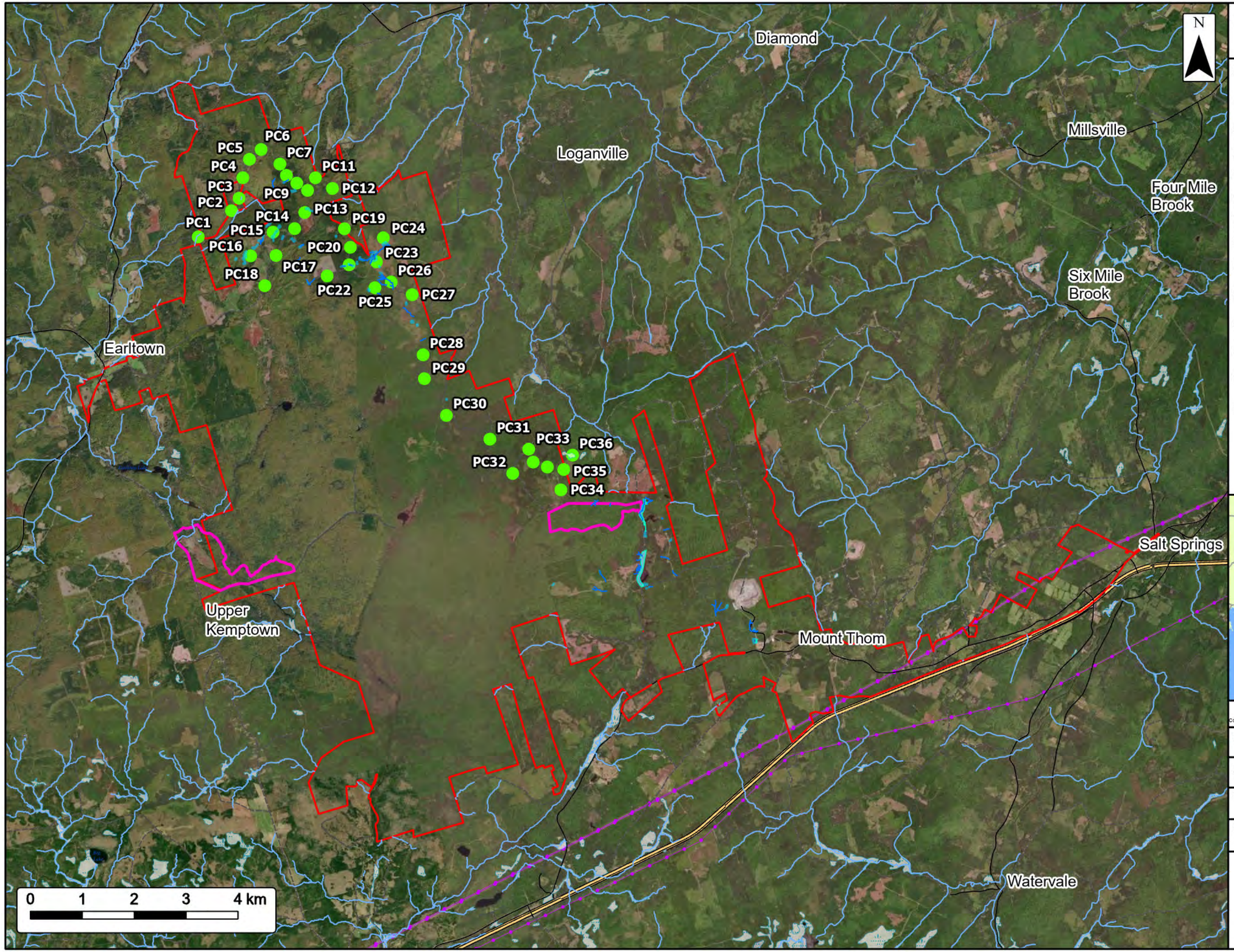
Clydesdale Ridge Wind Project

Breeding Bird Surveys



Project Area

Avian PC Locations

Gully Lakes Area Search

Utilities (line)

Existing Transmission Lines

Transportation

Trans-Canada Highway

Road

Unpaved Road

Field Delineated Watercourses within PDA

NSTDB Mapped Watercourses

Field Delineated Wetlands within PDA

Mapped Wetlands Outside PDA

Field Delineated Open Water

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:70,000	Drawing #: 4
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 6

PC 5

PC 7

PC 4

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Blackpoll Warbler

Boreal Chickadee

Pine Siskin

Rose-breasted Grosbeak

Field Delineated Watercourses within PDA

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

PC 7

PC 8

PC 9

PC 10

PC 11

N

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Blackpoll Warbler

Boreal Chickadee

Canada Jay

Killdeer

Pine Siskin

Pine Warbler

Rose-breasted Grosbeak

Field Delineated Watercourses within PDA

NSTDB Mapped Watercourses

Field Delineated Wetlands within PDA

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 9

PC 10

PC 11

PC 12

PC 13

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Bay-breasted Warbler

Blackpoll Warbler

Boreal Chickadee

Canada Jay

Pine Siskin

Pine Warbler

Field Delineated Watercourses within PDA

NSTDB Mapped Watercourses

Field Delineated Wetlands within PDA

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 2

PC 1

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

American Kestrel

Bay-breasted Warbler

Blackpoll Warbler

Boreal Chickadee

Pine Warbler

NSTDB Mapped Watercourses

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 13

PC 14

PC 15

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Bay-breasted Warbler

Blackpoll Warbler

Boreal Chickadee

Canada Jay

Cape May Warbler

Pine Siskin

Field Delineated Watercourses within PDA

NSTDB Mapped Watercourses

Field Delineated Wetlands within PDA

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 19

PC 20

PC 24

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Bay-breasted Warbler

Black-backed Woodpecker

Boreal Chickadee

Canada Jay

Cape May Warbler

Pine Siskin

Wilson's Warbler

Field Delineated Watercourses within PDA

NSTDB Mapped Watercourses

Field Delineated Wetlands within PDA

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 16

PC 17

PC 18

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

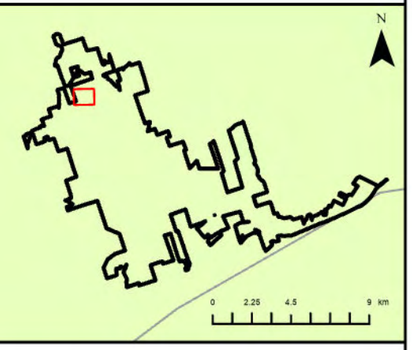
Bay-breasted Warbler

Boreal Chickadee

Field Delineated Wetlands within PDA

Transportation

Unpaved Road



Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 20

PC 21

PC 22

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Bay-breasted Warbler

Blackpoll Warbler

Boreal Chickadee

Canada Jay

Cape May Warbler

Pine Siskin

Pine Warbler

Field Delineated Watercourses within PDA

Field Delineated Wetlands within PDA

Field Delineated Open Water

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date:	Jun 2024	Project #:	24-10018
Scale:	1:3,500	Drawing #:	5
Drawn By:	K. Wallace		
Checked By:	S. Stegen		

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 23

PC 25

PC 26

PC 27

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Bay-breasted Warbler

Boreal Chickadee

Canada Jay

Cape May Warbler

Pine Siskin

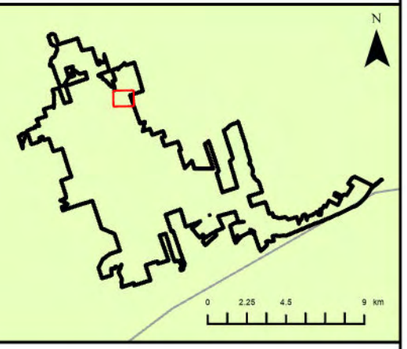
Pine Warbler

Field Delineated Watercourses within PDA

Field Delineated Wetlands within PDA

Transportation

Unpaved Road



Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, GNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 28

PC 29

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

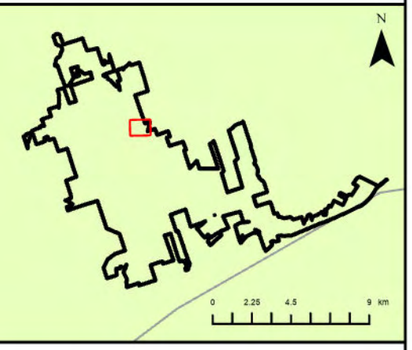
Bay-breasted Warbler

Canada Jay

Pine Grosbeak

Transportation

Unpaved Road



Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
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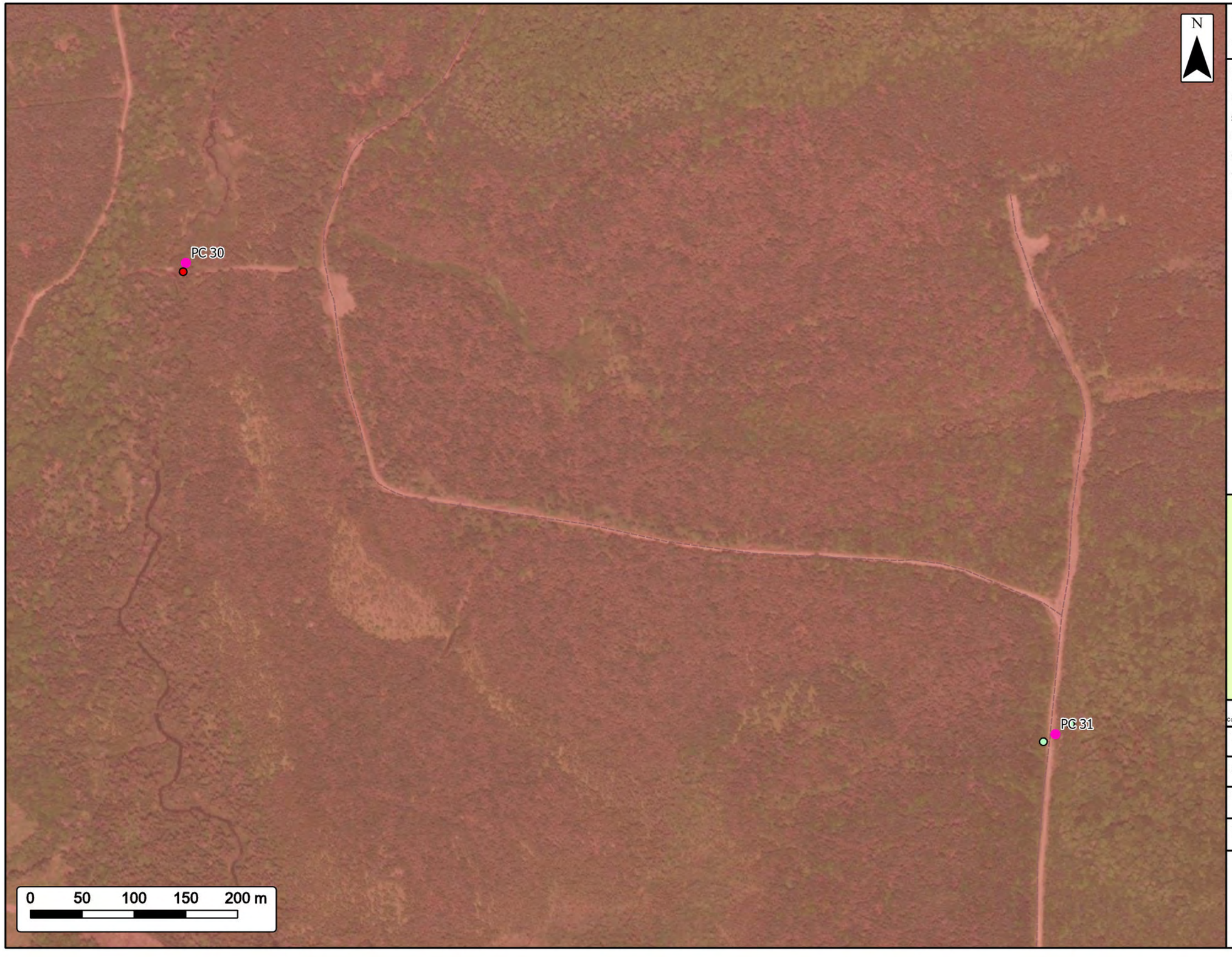

Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Blackpoll Warbler

Canada Jay

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 32

PC 33

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Bay-breasted Warbler

Blackpoll Warbler

Boreal Chickadee

Canada Jay

Pine Siskin

Pine Warbler

Red-breasted Merganser

Turkey Vulture

Mapped Wetlands Outside PDA

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

Project Area

Species of Conservation Interest

- Bay-breasted Warbler
- Boreal Chickadee
- Canada Jay
- Pine Siskin
- Red-breasted Merganser
- Turkey Vulture

NSTDB Mapped Watercourses

Mapped Wetlands Outside PDA

Transportation

Unpaved Road

0 50 100 150 200 m

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIG, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

Project Area

Species of Conservation Interest

Canada Jay

Pine Siskin

NSTDB Mapped Watercourses

Transportation

Unpaved Road

0 50 100 150 200 m

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIG, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

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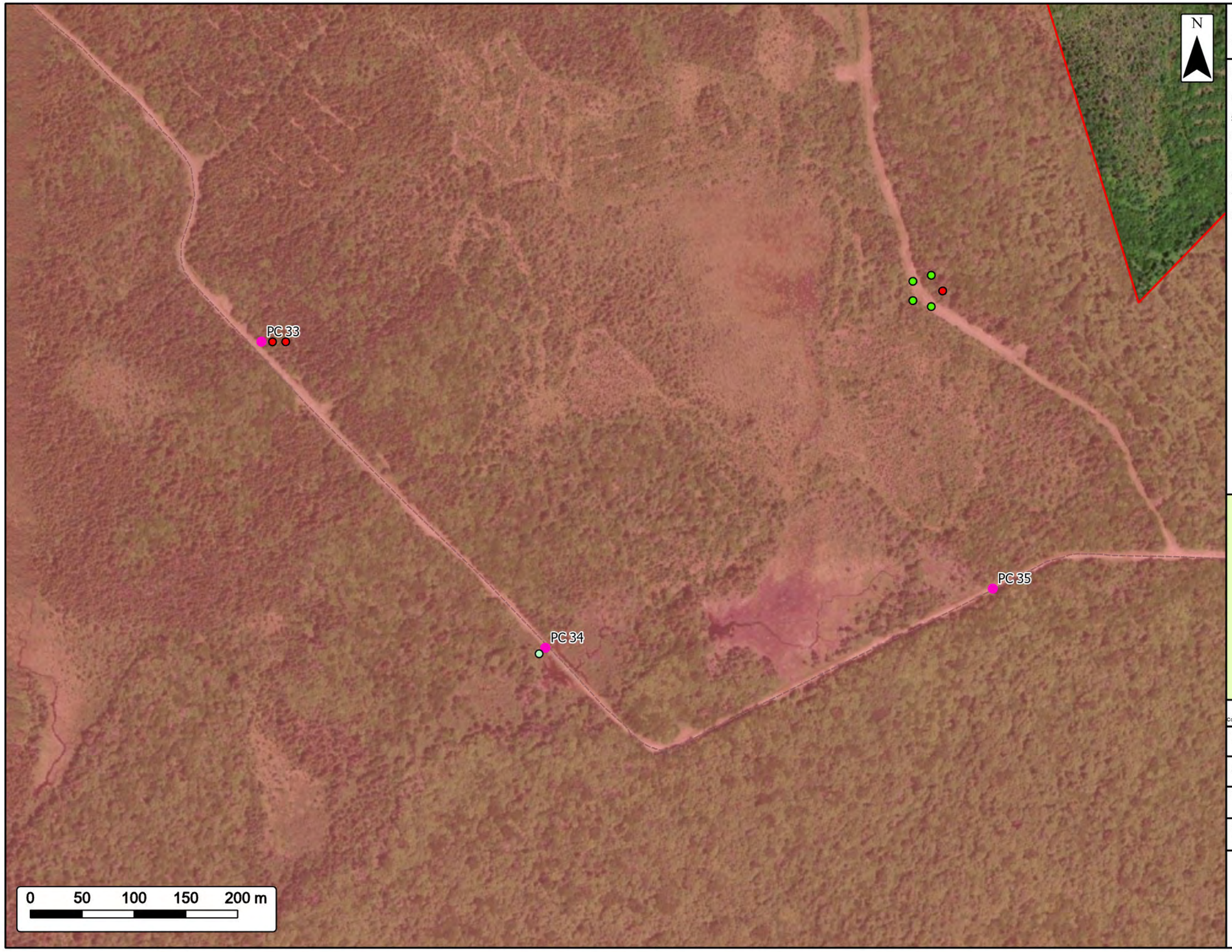

Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Blackpoll Warbler

Boreal Chickadee

Canada Jay

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations

N

PC 36

PC 41

0 50 100 150 200 m

Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Bay-breasted Warbler

Blackpoll Warbler

Boreal Chickadee

Field Delineated Watercourses within PDA

Field Delineated Wetlands within PDA

Field Delineated Open Water

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

Date: Jun 2024	Project #: 24-10018
Scale: 1:3,500	Drawing #: 5
Drawn By: K. Wallace	
Checked By: S. Stegen	

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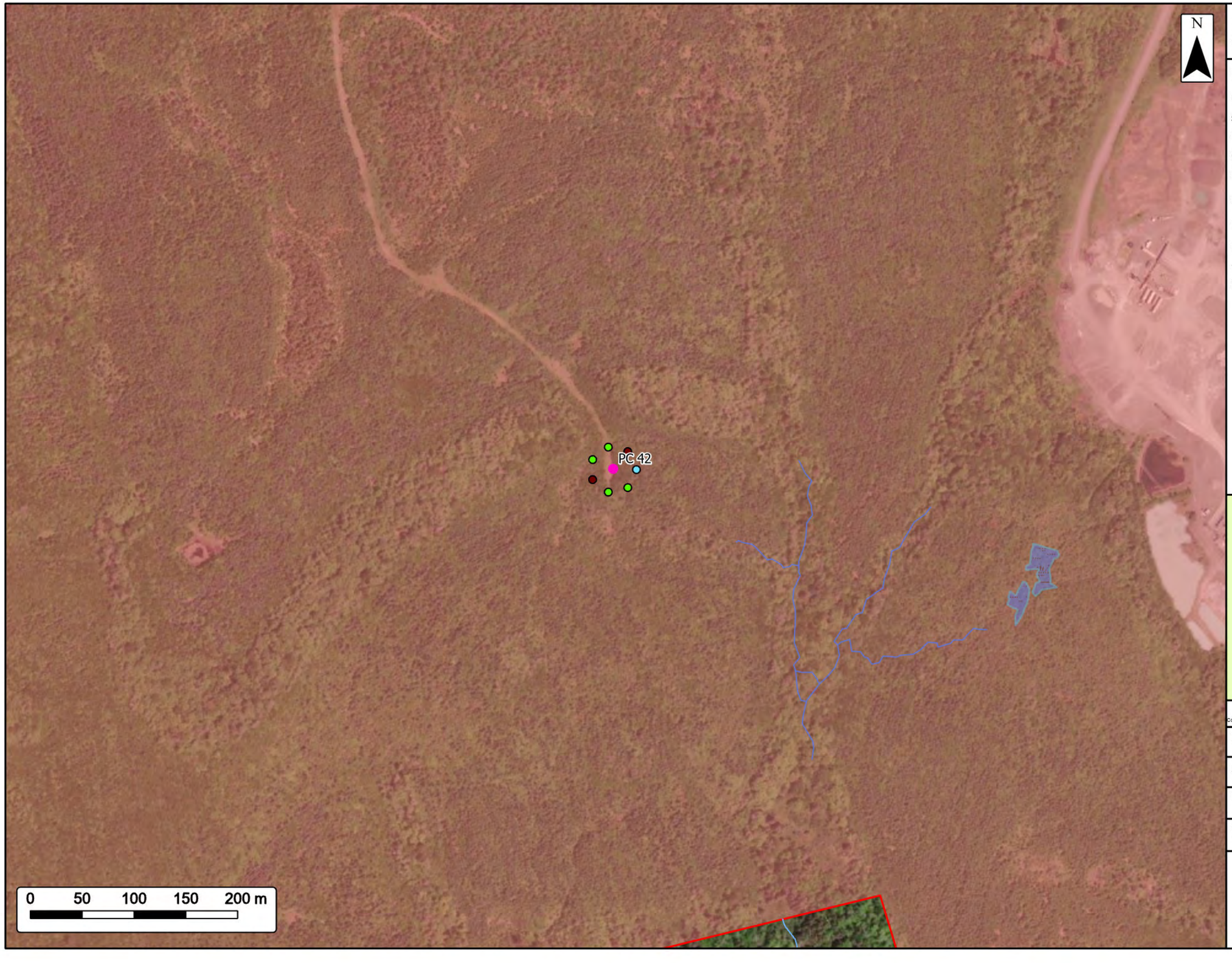
Clydesdale Ridge Wind Project

Avian Species of Conservation Interest (SOCI) Field Observations



Project Area

Spring & Fall Migration Survey Location

Species of Conservation Interest

Boreal Chickadee

Cape May Warbler

Philadelphia Vireo

Field Delineated Watercourses within PDA

NSTDB Mapped Watercourses

Field Delineated Wetlands within PDA

Transportation

Unpaved Road

Coordinate System: NAD83 UTM Zone 20N

Sources: ESRI Basemaps, GeoNOVA, SNSIS, NSNRR, ACCDC, IBA Canada, CNWI, HERE, Garmin, USGS

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