










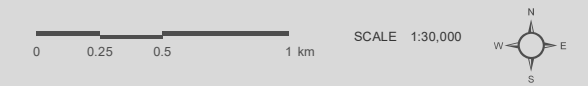


STUDY AREA AND LOCAL ASSESSMENT AREAS FOR BIRDS (POINT COUNT LOCATIONS)
FIGURE 12

-  Point Count (2022)
-  Point Count (2021 & 2022)
-  Point Count (2021)
-  Proposed Turbine Location
-  Proposed Substation Location
-  Local Assessment Area (LAA)
-  Potential Development Area (PDA)
-  Highway
-  Watercourse
-  Waterbody
-  Wetland

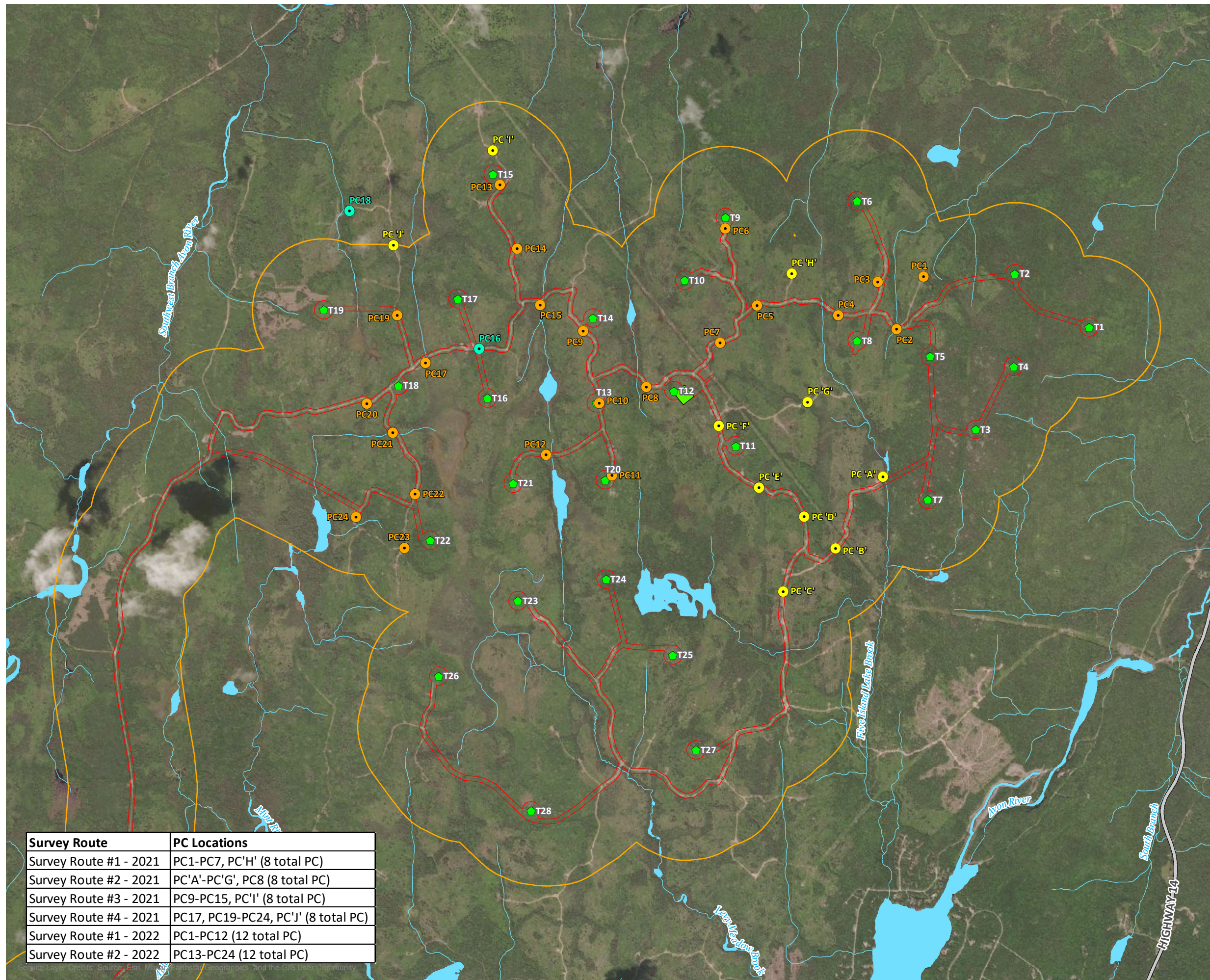


MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING, GEONB, NATURAL FORCES

MAP CREATED BY: GAM
MAP CHECKED BY: KR
MAP PROJECTION: NAD 1983 UTM ZONE 20N



PROJECT: 22-4064
STATUS: DRAFT
DATE: 2022-12-13



Survey Route	PC Locations
Survey Route #1 - 2021	PC1-PC7, PC'H' (8 total PC)
Survey Route #2 - 2021	PC'A'-PC'G', PC8 (8 total PC)
Survey Route #3 - 2021	PC9-PC15, PC'I' (8 total PC)
Survey Route #4 - 2021	PC17, PC19-PC24, PC'J' (8 total PC)
Survey Route #1 - 2022	PC1-PC12 (12 total PC)
Survey Route #2 - 2022	PC13-PC24 (12 total PC)

3.1.5.1 Desktop Analysis: Forest Habitat Assessment

Approach and Methodology

Mature forests typically have larger diameter trees and are effective habitat indicators for birds as they offer nest sites, perches, and provide sources for cavities that enhance the habitat for many forest birds (Treyger 2019). This assessment included a review of available background information sources and mapping to identify forested habitat for birds within the LAA. Information reviewed included the following sources:

- Publicly available GIS map layers (e.g., ecological land classification, forest and non-forest inventory, wetland inventory, Protected Natural Areas, Wildlife Management Zones);
- High-resolution Google Earth imagery, which was available for the site from September 2021, June 2020, November 2019, August 2018, and December 2017;
- Important Bird Areas (IBAs) of Canada mapping;
- Nova Scotia Natural Resources and Renewables Forest Inventory (NSDNRR 2021);
- Provincial Parks and Protected Areas mapping;
- Environmentally Sensitive Areas (ESAs) database;
- Federally-designated Migratory Bird Sanctuaries;
- Second Atlas of Breeding Birds of the Maritime Provinces (Stewart et al. 2015);
- Data Reports from the Atlantic Canada Conservation Data Centre (AC CDC; 2021 and 2022); and
- Identified Protected Natural Areas (PNAs) and Wildlife Management Zones (WMZ).

This assessment used available forestry data from NSDNRR which was verified based on field observations noted during the 2021 and 2022 field surveys. Mature forest stands were determined based on the NSDNRR forest inventory and diameter at breast height (dbh).

Results

In Canada, important bird habitats are recognized by the Important Bird and Biodiversity Areas Program. This program aims to conserve and monitor a network of sites that provide essential habitat for Canada's bird populations (Birds Canada 2022a). The nearest designated Important Bird Area (IBA), Southern Bight, Minas Basin (NS020), is located approximately 3 kilometres (km) north from the nearest proposed WTG location. This IBA is approximately 230 km² and is located within the Minas Basin and includes the Avon River. The area consists of intertidal habitats including mudflats, sandflats and salt marshes that provide foraging opportunities for migrating shorebirds. Between 1 and 2 million shorebirds use the mud flats of the head of the Minas Basin (in this and other adjacent IBAs) in the fall for staging before the southern migration. (Birds Canada 2022b).











The Project is located within the South Mountain eco-district, which is generally dominated by Acadian forest tree species. Locally, the site consists of two eco-elements; the Spruce Hemlock Pine Hummocks and Hills eco-element, and the Red and Black Spruce Hummocks eco-element (NSDLF 2019). The majority of the site is covered by the Spruce Hemlock Pine Hummocks and Hills eco-element, which consists of well drained coarse-grained soils. This

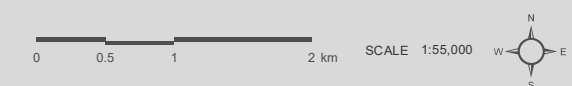
eco-element is dominated by red spruce (*Picea rubens*), eastern hemlock (*Tsuga canadensis*) and eastern white pine (*Pinus strobus*) in areas with slightly moist soils; and by Eastern White Pine, Red Oak (*Quercus rubus*) and Red Pine (*Pinus resinosa*) on the drier hilltops. The remaining portions of the site, which tend to be wetter and consist of imperfectly drained course-grained soils (NSDLF 2019), are characterized by the Red and Black Spruce Hummocks eco-element. This eco-element includes late successional shade-tolerant softwoods, such as Red Spruce and Eastern Hemlock, along with Eastern White Pine (NSDFL 2019).

As part of the desktop review, the locations of mature forest habitat in relation to Project infrastructure were identified within the LAA. Additionally, aligned with the recommendation from Environment and Climate Change Canada's Canadian Wildlife Service (ECCC-CWS), mature forest habitat within the LAA was identified in relation to Project infrastructure. Mature forests typically have larger diameter trees and were chosen as a habitat indicator for birds as they offer nest sites, perches, and provide sources for cavities that enhance the habitat for many forest birds (Treyger 2019). Mature forest stands were determined based on the NSDNRR forest inventory and diameter at breast height (dbh). Mapped polygons of mature coniferous forest, mature deciduous forest and mature mixed forest with an average diameter at breast height (DBH) 15 cm or more within the LAA were included.

Areas identified as habitat for birds within the LAA are presented on **Figure 13**. Within the LAA, 920 ha of forested habitats were identified and they generally consisted of a mixture of mature coniferous forest, mature deciduous forest and mature mixedwood forest.

FORESTS WITHIN THE LAA
FIGURE 13

-  Proposed Turbine Location
-  Proposed Substation Location
-  Local Assessment Area (LAA)
-  Potential Development Area (PDA)
-  Forests with Average Diameter at Breast Height 15-25 cm (1732.2 ha)
-  Forests with Average Diameter at Breast Height >25 cm (29.3 ha)
-  Highway
-  Watercourse
-  Waterbody
-  Wetland

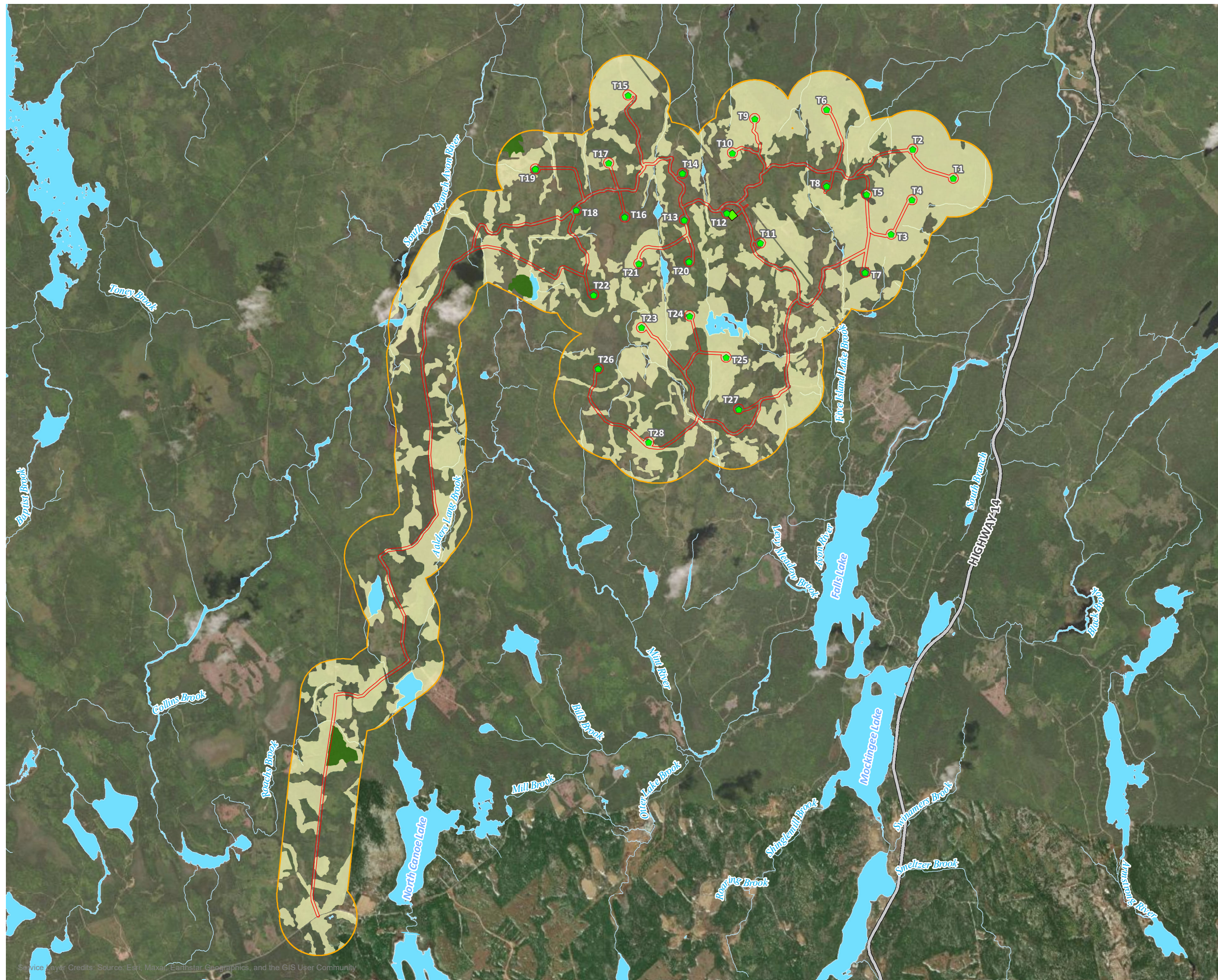


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PROJECT: 22-4064
STATUS: DRAFT
DATE: 2022-12-14



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3.1.5.2 Field Assessment and Radar and Acoustic Monitoring

Based on the desktop review, consultation with NSECC, as well as *Wind Turbines and Birds: A Guidance Document for Environmental Assessment* (EC-CWS 2007a), *Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds - Report by Canadian Wildlife Service and Environment Canada* (EC-CWS 2007b) and *Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia* (NSE 2021), the following approach for the bird surveys was completed with the objective of estimating both the number of bird species using the LAA, and their relative abundance and how bird presence and use of the LAA varies throughout the seasons.

Recommendations described in *A Guide to Addressing Wildlife Species and Habitat in an EA Registration Document* (NSE 2009) were consulted when planning field surveys to include the assessment for potential SAR and SoCC within the LAA.

Two years of field surveys were performed by experienced specialists skilled at identifying birds by song, call and sight. Survey design was informed and developed based on professional experience, knowledge of the Project area, recommended techniques from CWS guidance documents (EC, 2007a; EC, 2007b) and informed based on the results from previously completed bird studies. The general timing, purpose and description of the bird surveys conducted in 2021 and 2022 are described in the sections below.

The surveys were scheduled so that data was collected across important seasonal periods for birds in Nova Scotia (i.e., spring and fall migration periods, peak breeding season and winter residency) during the two-year study period between 2021 and 2022. Additional targeted surveys were conducted in 2021 for breeding nocturnal owls and for breeding Common Nighthawks. Considerable effort was made such that surveys were conducted when weather conditions were appropriate for viewing and listening for birds (i.e., on days or nights with minimal forecasted fog, precipitation and forecasted wind speeds ≤ 20 km/h).

Incidental observations of bird Species at Risk were recorded during the various other environmental studies conducted at the Project site across both study years (2021 and 2022).

Additionally, radar and acoustic monitoring programs were conducted in the spring and fall of both 2021 and 2022 to supplement the results of the survey programs. These programs studied the times from late April to early June, and from early July to mid-November. The radar monitoring consisted of deploying a radar detection system near the Project area. This radar system has been used in the past to assess migratory bird movements at proposed wind energy projects in NS and New Brunswick (NB) (e.g., Burchill Wind Project [Taylor et al. 2020], Westchester Wind Project [Hemmera 2022]) and has been proven to provide an adequate representation of bird passage rates and heights.

The acoustic monitoring program consisted of deploying a network of 6 acoustic sensors throughout the Project area. These sensors were programmed to begin recording approximately one hour before the end of evening civil twilight and finish recording one hour after the beginning of morning civil twilight and placed in open areas with a clear view of the

sky. The full radar and acoustic monitoring report, with more detailed methodology, locations of sensors, and results, is presented in **Appendix G**.

The following sections present site-specific details of the various bird surveys completed for the bird and bird habitat focused effects assessment for the Project by season. More details of survey methodology, analysis and results are presented in **Appendix F**.

Survey Locations

Two years of bird surveys were undertaken for the Project. The survey locations and routes for the second year (2022) of the bird surveys were refined based on the results of the first year’s (2021) surveys and updates to the PDA, aiming to increase coverage over more representative habitat types and assess areas not represented in 2021. Between the 2021 and 2022 field seasons, the proposed layout and design of the Project (i.e., PDA) was revised. As a result, the survey routes and Point Count locations for the Breeding Bird Surveys and Spring and Fall Migration Stop-Over Surveys were selected to collect data over representative habitats within the LAA, as well as provide overlapping locations between both survey years to allow comparability between study years.

The survey locations and routes (shown on **Figure 11** and **Figure 12**) were refined between study years based on initial results and updates to the Project. The survey routes and Point Count locations for the Breeding Bird Surveys and Spring and Fall Migration Stop-Over Surveys were selected to collect data over representative habitats within the LAA, as well as provide overlapping locations between both survey years to allow comparability between study years. **Table 16** summarizes habitats at each of the Point Count locations across survey years.

In 2021, 32 Point Count locations were established over four survey routes and 22 of these locations were repeated during the 2022 spring and fall Migration Surveys and during the Breeding Bird Survey. In addition to the 22 Point Count locations that were surveyed for both years of the study, two additional Point Count locations were selected at representative locations in 2022 to better cover the revised PDA. The Point Count locations, survey years and representative habitat at each location are summarized in **Table 16**.

Diurnal Watch Counts were conducted during the 2021 and 2022 survey seasons. The locations for the Diurnal Watch Counts are shown on **Figure 11**.

TABLE 16: HABITAT DESCRIPTIONS AND SURVEY YEARS FOR POINT COUNT SURVEY LOCATIONS

Point Count Location	Survey Years	Primary Habitat	Secondary Habitat (if applicable)	Tertiary Habitat (if applicable)
PC ‘A’	2021	Mixedwood forest (Riparian buffer zone)	Early successional deciduous regrowth (cutover)	Wetland
PC ‘B’	2021	Mixedwood forest (Riparian buffer	Early successional deciduous	Wetland

Point Count Location	Survey Years	Primary Habitat	Secondary Habitat (if applicable)	Tertiary Habitat (if applicable)
		zone)	regrowth (cutover)	
PC 'C'	2021	Early successional deciduous regrowth (cutover)	Mixedwood forest (Riparian buffer zone)	n/a
PC 'D'	2021	Early successional deciduous regrowth (cutover)	Mixedwood forest (Riparian buffer zone)	n/a
PC 'E'	2021	Mixedwood forest (Riparian buffer zone)	Early successional deciduous regrowth (cutover)	n/a
PC 'F'	2021	Wetland	Coniferous forest (small isolated island)	Early successional deciduous regrowth (cutover)
PC 'G'	2021	Wetland	Mixedwood forest (Riparian buffer zone)	Early successional deciduous regrowth (cutover)
PC 'H'	2021	Early successional deciduous regrowth (cutover)	Wetland	Mixedwood forest
PC 'I'	2021	Wetland	Early successional deciduous regrowth (cutover)	n/a
PC 'J'	2021	Early successional deciduous regrowth (cutover)	Wetland	n/a
PC1	2021 and 2022	Early successional deciduous regrowth (cutover)	Mixedwood forest	n/a
PC2	2021 and 2022	Mixedwood forest (Riparian buffer zone)	Early successional deciduous regrowth (cutover)	n/a
PC3	2021 and 2022	Early successional deciduous regrowth (cutover)	Mixedwood forest (Riparian buffer zone)	Hardwood forest
PC4	2021 and 2022	Treed Wetland (Treed Swamp/bog)	Early successional deciduous regrowth (cutover)	Hardwood forest
PC5	2021 and 2022	Wetland (Treed swamp)	Small pond (large borrow pit)	Mixedwood forest
PC6	2021 and 2022	Early successional deciduous regrowth (cutover)	Mixedwood forest	n/a

Point Count Location	Survey Years	Primary Habitat	Secondary Habitat (if applicable)	Tertiary Habitat (if applicable)
PC7	2021 and 2022	Wetland (Treed bog)	Early successional deciduous regrowth (cutover)	n/a
PC8	2021 and 2022	Conifer plantation (sapling stage)	Mixedwood forest (Riparian buffer zone)	n/a
PC9	2021 and 2022	Wetland (Open bog)	Conifer plantation (sapling stage)	n/a
PC10	2021 and 2022	Wetland (Open bog)	Conifer plantation (sapling stage)	Early successional deciduous regrowth (cutover)
PC11	2021 and 2022	Early successional deciduous regrowth (cutover)	Small pond (large borrow pit)	n/a
PC12	2021 and 2022	Wetland (Treed bog)	Small lake (Bennett Lake)	Early successional deciduous regrowth (cutover)
PC13	2021 and 2022	Early successional deciduous regrowth (cutover)	Mixedwood forest (Riparian buffer zone)	n/a
PC14	2021 and 2022	Wetland (Shrub swamp)	Early successional deciduous regrowth (cutover)	n/a
PC15	2021 and 2022	Wetland (Open fen)	Mixedwood forest	Early successional deciduous regrowth (cutover)
PC16	2022	Early successional deciduous regrowth (cutover)	Wetland (Treed bog)	Small pond (Large borrow pit)
PC17	2021 and 2022	Wetland (Treed swamp/bog)	Mixedwood forest (Riparian buffer zone)	Early successional deciduous regrowth (cutover)
PC18	2022	Wetland (Open fen)	Mixedwood forest (Riparian buffer zone)	Early successional deciduous regrowth (cutover)
PC19	2021 and 2022	Early successional deciduous regrowth (cutover)	Mixedwood forest (Riparian buffer zone)	n/a
PC20	2021 and 2022	Wetland (Treed swamp)	Conifer plantation (sapling stage)	Mixedwood forest (Riparian buffer zone)
PC21	2021 and 2022	Wetland (Treed swamp)	Mixedwood forest (Riparian buffer)	Conifer plantation (sapling stage)

Point Count Location	Survey Years	Primary Habitat	Secondary Habitat (if applicable)	Tertiary Habitat (if applicable)
			zone)	
PC22	2021 and 2022	Mixedwood forest (Riparian buffer zone)	Early successional deciduous regrowth (cutover)	Wetland (Open bog)
PC23	2021 and 2022	Mixedwood forest	Early successional deciduous regrowth (cutover)	Conifer plantation (sapling stage)
PC24	2021 and 2022	Wetland (Treed swamp)	Mixedwood forest	Small lake (Burnt Lake)

The Point Count locations were grouped into survey routes based on the area that can feasibly be surveyed each day. Four Survey Routes, including eight-point counts each were established in 2021, while two Survey Routes including 12-point counts each were established in 2022. The survey routes and the Point Count locations that they include are described below in **Table 3** and are shown on **Figure 12**.

TABLE 17: BIRD SURVEY ROUTES

Survey Route	PC Locations
Survey Route #1 - 2021	PC#1 - PC#7 and PC 'H' (8 total point counts)
Survey Route #2 - 2021	PC 'A' - PC 'G' and PC#8 (8 total point counts)
Survey Route #3 - 2021	PC#9 - PC#15 and PC 'I' (8 total point counts)
Survey Route #4 - 2021	PC#17, PC#19 - PC#24 and PC 'J' (8 total point counts)
Survey Route #1 - 2022	PC#1 - PC#12 (12 total point counts)
Survey Route #2 - 2022	PC#13 - PC#24 (12 total point counts)

3.1.5.2.1 Winter Program

Approach and Methodology

Winter Resident Survey

A Winter Resident Survey was completed for the assessment in 2022. Prior to this a late-winter resident survey was conducted in 2021 (April 7, 9, 13 and 14) and detected some likely migrant species. An additional survey was completed on February 22 and 26, 2022 to assess true winter conditions. General area searches were conducted along six unique transects through the LAA: four in 2021 and two in 2022. All birds seen or heard were recorded and counted. The locations of general area searches are shown on **Figure 11**.

Winter Resident Survey Results

In 2021, a total of 288 individual birds comprised of 29 species were recorded across 4 surveys conducted on April 7, April 9, April 13 and April 14. Based on the available habitat regional characteristics of the LAA, as well as the specific life histories of the bird species

observed, seven of the 29 detected species were considered likely to be early migrants and therefore unlikely to be resident species to the LAA. The most commonly detected resident species within the assessment area during the late winter survey program had secure or apparently secure populations within Nova Scotia (i.e., with an AC CDC provincial ranking of S4 or S5). The most frequently detected species included:

- Dark-eyed Junco (*Junco hyemalis*)
- Black-capped Chickadee (*Poecile atricapillus*)
- Blue Jay (*Cyanocitta cristata*)
- Song Sparrow (*Melospiza melodia*)
- Common Raven (*Corvus corax*)

In 2022, a total of 42 individual birds comprised of 13 species were recorded across two surveys conducted on February 22 and February 26. The most common species detected in 2022 were the Black-capped Chickadee and the Common Raven at 18 and 9 detections, respectively.

Between the late-winter 2021 survey and the winter resident survey conducted in 2022, a total of 34 species and 330 individual birds were detected during the formalized Winter Survey Program and through incidental observations. The results of the Winter Survey Program illustrate that the vast majority of the birds detected within the LAA during the winter months are ranked S4 or S5 by the AC CDC, indicating that they are considered ‘Apparently Secure’ or ‘Secure’, respectively.

Across both years of winter surveys, the only SAR identified was the Evening Grosbeak (*Coccothraustes despartinus*). A detailed discussion of detected SoCC and SAR is available in **Section 3.1.7**.

A summary of all species detected in the 2021 and 2022 Winter Resident Surveys is presented in **Table 18**.

TABLE 18: TOTAL ABUNDANCE OF BIRDS DETECTED DURING WINTER RESIDENT SURVEYS

Number Detected in 2021 (April)	Number Detected in 2022 (February)	Common Name	Scientific Name	S-Rank and Conservation Status
65	0	Dark-eyed Junco	<i>Junco hyemalis</i>	S4S5
37	0	*American Robin	<i>Turdus migratorius</i>	S3N, S5B
37	18	Black-capped Chickadee	<i>Poecile atricapillus</i>	S5
29	0	Blue Jay	<i>Cyanocitta cristata</i>	S5
20	0	Song Sparrow	<i>Melospiza melodia</i>	S5B
18	0	Common Grackle	<i>Quiscalus quiscula</i>	S5B
15	9	Common Raven	<i>Corvus corax</i>	S5
8	0	American Crow	<i>Corvus brachyrhynchos</i>	S5
8	2	American Goldfinch	<i>Spinus tristis</i>	S5
5	0	Golden-crowned	<i>Regulus satrapa</i>	S5

Number Detected in 2021 (April)	Number Detected in 2022 (February)	Common Name	Scientific Name	S-Rank and Conservation Status
		Kinglet		
5	0	Mallard	<i>Anas platyrhynchos</i>	S5B, S5N
5	0	Mourning Dove	<i>Zenaida macroura</i>	S5
5	1	Red-breasted Nuthatch	<i>Sitta canadensis</i>	S4S5
3	0	Bald Eagle	<i>Haliaeetus leucocephalus</i>	S5
3	2	*Canada Jay	<i>Perisoreus canadensis</i>	S3
3	0	Hairy Woodpecker	<i>Dryobates villosus</i>	S5
3	0	Northern Flicker	<i>Colaptes auratus</i>	S5B
3	0	Spruce Grouse	<i>Falciipennis canadensis</i>	S4
3	1	White-winged Crossbill	<i>Loxia leucoptera</i>	S4S5
2	0	Evening Grosbeak	<i>Coccothraustes vespertinus</i>	S3B, S3N, S3M SARA: Special Concern NS ESA: Vulnerable
2	0	Pileated Woodpecker	<i>Dryocopus pileatus</i>	S5
2	0	Red-tailed Hawk	<i>Buteo jamaicensis</i>	S5
1	0	American Black Duck	<i>Anas rubripes</i>	S5B, S5N
1	0	Brown Creeper	<i>Certhia americana</i>	S5
1	0	Hermit Thrush	<i>Catharus guttatus</i>	S5B
1	0	Hooded Merganser	<i>Lophodytes cucullatus</i>	S5B
1	0	Northern Harrier	<i>Circus hudsonius</i>	S4B, S4S5M
1	3	Ruffed Grouse	<i>Bonasa umbellus</i>	S5
1	0	Winter Wren	<i>Troglodytes hiemalis</i>	S5B
0	1	Downy Woodpecker	<i>Dryobates pubescens</i>	S5
0	2	*Pine Siskin	<i>Spinus pinus</i>	S3

Number Detected in 2021 (April)	Number Detected in 2022 (February)	Common Name	Scientific Name	S-Rank and Conservation Status
0	1	Blue Jay	<i>Cyanocitta cristata</i>	S5
0	1	Snow Bunting	<i>Plectrophenax nivalis</i>	S5N
0	1	*Red Crossbill	<i>Loxia curvirostra</i>	S3S4
288	42	Total		

Notes:

Bold indicates Species at Risk.

* indicates Species of Conservation Concern.

Legal protection status refers to the protection status under the *Species at Risk Act* (SARA) and the *Nova Scotia Endangered Species at Risk Act* (NSESA) as of December 2021.

Special Concern (SC), Vulnerable (V), Threatened (T), Endangered (E), Not at Risk (NAR)

*The winter survey occurred outside of the typical window for winter bird surveys (i.e., in April 2021). Additional surveys are planned for January and February 2022. Following their completion an addendum will be provided to NSECC.

**S-Ranks as of December 2022

3.1.5.2.2 Spring Migration Program

Approach and Methodology

During the spring migration period, two different types of survey were employed: Migration Stop-Over Point Counts and Diurnal Watch Counts. The former determines the number and species of birds that land in the Study Area during their period of migration, while the latter examines the number, species, altitude and behaviour of birds flying over the Study Area during the daytime. The general methods for Migration Point Counts and Diurnal Watch Counts are described in the sections below.

Spring Migration Stop-Over Point Count Surveys

Point Counts were conducted at locations that were determined following a preliminary desktop assessment of the habitat types present within the LAA. Locations were selected to both maximize site coverage, as well as to target habitats similar to where WTGs or other infrastructure will be located. To extend coverage of representative habitats across the LAA, the Point Count locations were grouped into established survey routes, which can be surveyed within one morning period, that were selected to maintain consistency across seasonal surveys. The locations of point counts and the survey route groupings are shown on **Figure 11**.

Point counts were ten minutes in length during which all birds seen or heard were recorded. Spring Migration Point Counts typically began 30-60 minutes after sunrise, as many birds become active later in the morning in response to the colder dawn temperatures during this season.

During the 2021 Spring Migration Stop Over Point Count Survey, four survey routes that consisted of eight unique Point Count Locations were completed on five occasions, for a total of 160 Point Counts completed. During the 2022 Spring Migration Stop Over Point Count Survey, two survey routes consisting of 12 unique Point Count locations were completed on

four occasions, for a total of 96 Point Counts completed. **Table 19** summarizes the dates the surveys were conducted in the spring of 2021 and 2022.

TABLE 19: TIMING OF SPRING MIGRATORY STOP-OVER SURVEYS

Point Count Location	Spring Survey Dates
Point Count Survey Route 1 - 2021	April 27, May 4, May 10, May 18, and May 24, 2021
Point Count Survey Route 2 - 2021	April 29, May 4, May 10, May 18, and May 28, 2021
Point Count Survey Route 3 - 2021	April 29, May 5, May 11, May 19, and May 25, 2021
Point Count Survey Route 4 - 2021	May 2, May 5, May 11, May 19, and May 25, 2021
Point Count Survey Route 1 - 2022	May 3, May 12, May 21, and May 26, 2022
Point Count Survey Route 2 - 2022	May 3, May 12, May 20, and May 26, 2022
Diurnal Watch Counts - 2021	May 4, May 7, and May 21
Diurnal Watch Counts - 2022	May 3, May 12, and May 21

Spring Migration Diurnal Watch Counts

Spring Diurnal Watch Counts were conducted at a pre-determined, repeatable observation point within the LAA. The selected location provided as close as possible to an extended 360-degree view of the air space over the LAA and was in close proximity to the proposed site for the placement of the WTGs. These counts were often conducted following the completion of the Spring Migration Stop-over Point Counts and typically began during the mid-morning and continued into the early afternoon. **Table 19** above summarizes the dates the surveys were conducted in the spring of 2021 and 2022.

Diurnal Watch Counts were recorded in 30-minute blocks of observations, and all birds seen or heard were recorded according to their species, number of individuals, location, and altitude relative to the observer (not to the point over which they were flying), and flight direction.

Spring Radar and Acoustic Monitoring

Targeted Timing: Spring migration period (April 15 to May 31)

Occurred: between May 10 and June 3, 2021 and April 23 and June 8, 2022 (2022 delayed due to snow).

Purpose: To gather information regarding the abundance, species, approximate altitude and behaviour of birds flying over the study area during the nighttime.

The location of the radar was chosen based on access to the Project area, site security and clear sight lines. The radar was deployed within the northern portion of the Project area, approximately 1,300 m from the nearest proposed turbine.

A network of acoustic sensors (Audiomoths™) were placed throughout the Project area, with one placed at the radar unit, and 7 throughout the project area. This distribution of sensors allows for sampling of nocturnal migrants throughout the Project area. The sensors were

placed a minimum of approximately 500 m apart to reduce the potential for duplicate sampling of airspace.

The sensors were programmed to begin recording approximately one hour before the end of evening civil twilight and finish recording one hour after the beginning of morning civil twilight and placed in open areas with a clear view of the sky. The detection range of each recording unit is estimated to be up to approximately 100 m for nocturnal flight calls (NFCs) of migratory birds (primarily passerines).

Methodology is further detailed in **Appendix G**.

Results

Migration Stop-Over Point Count Survey

Between 2021 and 2022, a total of 80 bird species were identified during the Spring Migration Point Count surveys. 73 species of the 80 species were identified in 2021, and 62 species were identified in 2022, noting that 55 of these species were recorded in both 2021 and 2022. A summary of bird species and their abundance recorded during the spring migration surveys conducted in both 2021 and 2022 summarized in **Table 20**.

TABLE 20: TOTAL ABUNDANCE OF BIRDS DETECTED DURING SPRING MIGRATION POINT COUNTS

Number Detected in 2021	Number Detected in 2022	Common Name	Scientific Name	S-rank and Conservation Status
388	256	White-throated Sparrow	<i>Zonotrichia albicollis</i>	S5B
273	133	Hermit Thrush	<i>Catharus guttatus</i>	S5B
256	207	Palm Warbler	<i>Setophaga palmarum</i>	S5B
196	119	Common Yellowthroat	<i>Geothlypis trichas</i>	S5B
145	56	Dark-eyed Junco	<i>Junco hyemalis</i>	S4S5
147	113	Yellow-rumped Warbler	<i>Setophaga coronata</i>	S5B
124	56	Blue Jay	<i>Cyanocitta cristata</i>	S5
108	44	Black-capped Chickadee	<i>Poecile atricapillus</i>	S5
106	56	Northern Flicker	<i>Colaptes auratus</i>	S5B
110	58	Mourning Dove	<i>Zenaida macroura</i>	S5
95	86	Ovenbird	<i>Seiurus aurocapilla</i>	S5B
87	69	Black-and-White Warbler	<i>Mniotilta varia</i>	S5B
82	66	American Goldfinch	<i>Spinus tristis</i>	S5
85	58	Magnolia Warbler	<i>Setophaga magnolia</i>	S5B
66	19	Song Sparrow	<i>Melospiza melodia</i>	S5B
59	34	*American Robin	<i>Turdus migratorius</i>	S5B S3N
55	36	Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	S4S5B
44	22	Nashville Warbler	<i>Oreothlypis ruficapilla</i>	S4S5B
41	12	Ruffed Grouse	<i>Bonasa umbellus</i>	S5
39	37	Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	S5B