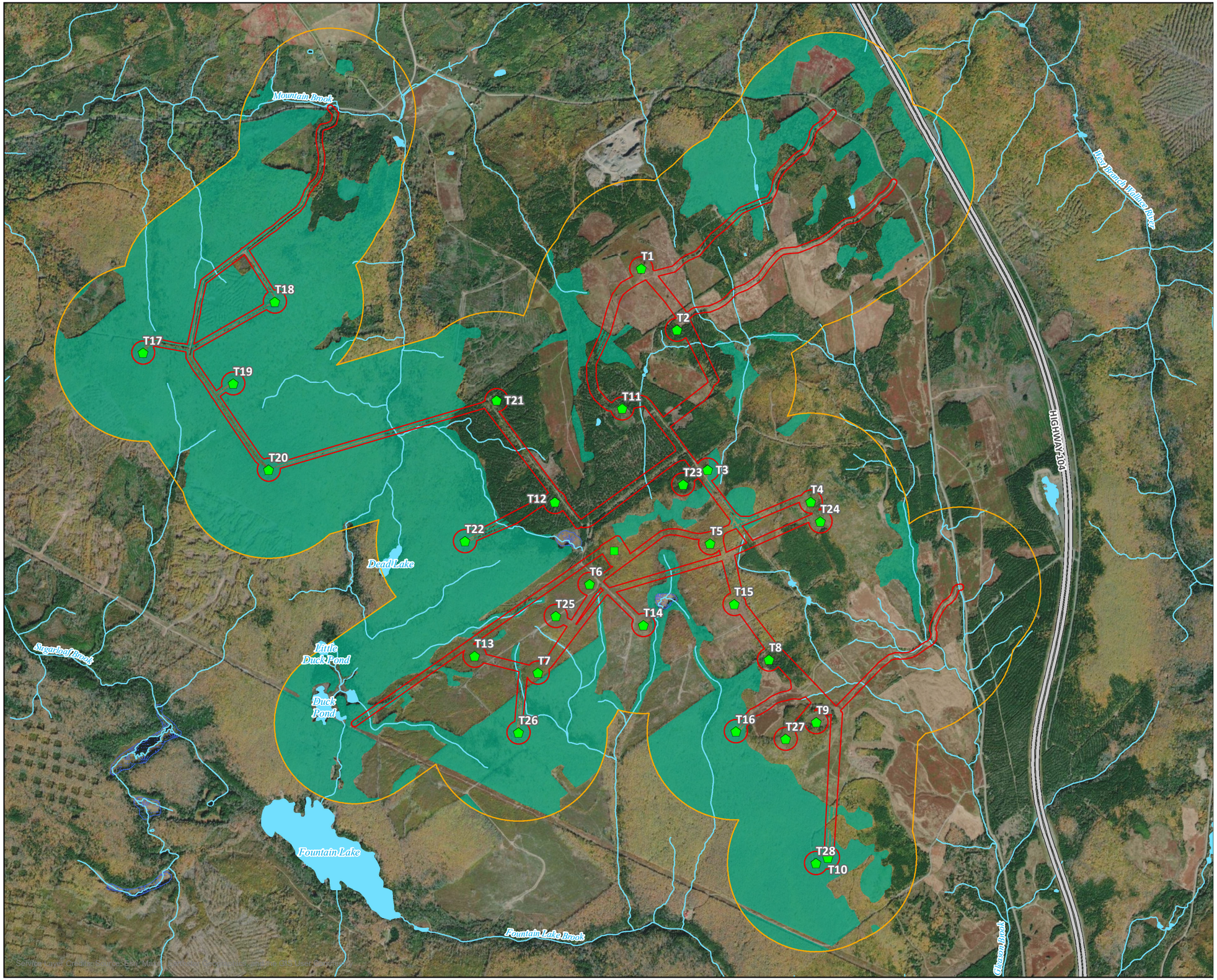


Natural Forces

WESTCHESTER WIND PROJECT

FOREST HABITATS WITHIN THE LAA

FIGURE 16

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

0 0.125 0.25 0.5 km

N W E S

SCALE 1:24,000

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

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

DILLON CONSULTING

PROJECT: 22-4065
STATUS: DRAFT
DATE: 2022-12-08

FILE LOCATION: K:\2021\211329\Product\Client\EA_WC_Sept2022\WC_F04_ForestHabitatswithinLAA.mxd

3.1.5.2 Field Assessments 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 of 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.

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 (Strum Environmental 2013). The general timing, purpose and description of the bird surveys conducted in 2021 and 2022 are described in the sections below. The following sections also present site-specific details of the various bird surveys completed for the bird and bird habitat focused effects assessment for the Project by season.

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 ≤20km/h).

Survey Locations

Two years of bird surveys were undertaken for the Project. The survey locations and routes for the second year of the bird surveys were refined based on the results of the first year's surveys and updates to the PDA, aiming to increase coverage over more representative habitat types and assess areas not represented in 2021. The surveys were scheduled so that data was collected across seasonal periods for birds (i.e. spring and fall migration and peak breeding early in the summer) during the two year study period between 2021 and 2022. Specific surveys were conducted in 2021 for confirmation of winter residents, nocturnal owls and nocturnal breeding nightjars (including Common Nighthawks). 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.

In 2021, sixteen Point Count stations were established over two survey routes and eight of these locations were repeated during the 2022 spring and fall migration surveys and breeding bird survey. In addition to the eight stations that were surveyed for both years of the study, twelve additional Point Count stations were selected at representative locations in 2022 to increase surveyed coverage of the revised PDA for the aforementioned surveys. The Point Count locations, survey years and representative habitat at each location are summarized in **Table 15**.

Diurnal Watch Counts (DWC) were conducted during the 2021 and 2022 survey seasons. The locations for the DWC are shown on **Figure 15**. In 2022, DWC were conducted from PC2, as it provided the best vantage over the PDA. The Point Count locations were grouped into survey routes based on the area that can feasibly be surveyed per day. The survey routes and the Point Count locations that they include are described below in **Table 16** and shown on **Figure 17.**

TABLE 15: HABITAT DESCRIPTIONS AND SURVEY YEARS FOR THE POINT COUNT SURVEY LOCATIONS

Point Count Location	Survey Years	Primary Habitat	Secondary Habitat (if applicable)	Tertiary Habitat (if applicable)
PC 'A'	2021	Conifer plantation	Mixed-wood Forest	n/a
PC 'B'	2021	Conifer plantation	Mixed-wood Forest	Wetland (Fen)
PC 'C'	2021	Wetland	Conifer plantation	n/a
PC 'D'	2021	Hardwood Forest	Mixedwood Forest	n/a
PC 'E'	2021	Hardwood Forest	Mixedwood Forest	n/a
PC 'F'	2021	Hardwood Forest	n/a	n/a
PC 'G'	2021	Wetland	Blueberry Field	Softwood Forest
PC 'H'	2021	Mixedwood Forest	Hardwood Forest	n/a
*PC1	2021 and 2022	Wetland	Blueberry field	Conifer plantation
*PC2	2021 and 2022	Wetland	Conifer plantation	Mixedwood forest
*PC3	2021 and 2022	Open/cleared	Mixedwood forest	n/a
PC4	2022	Hardwood forest	Open/cleared	n/a
*PC5	2021 and 2022	Hardwood forest	Conifer plantation	
*PC6	2021 and 2022	Conifer plantation	n/a	n/a
*PC7	2021 and 2022	Wetland	Conifer plantation	Hardwood forest
PC8	2022	Hardwood forest	Mixedwood forest	n/a
PC9	2022	Conifer plantation	Wetland	n/a
*PC10	2021 and 2022	Conifer plantation	Wetland	Blueberry field
*PC11	2021 and 2022	Blueberry field	n/a	n/a
PC12	2022	Mixedwood forest	n/a	n/a
PC13	2022	Hardwood forest	n/a	n/a
PC14	2022	Hardwood forest	n/a	n/a
PC15	2022	Hardwood forest	n/a	n/a
PC16	2022	Hardwood forest	Mixedwood forest	n/a
PC17	2022	Hardwood forest	n/a	n/a

Point Count Location	Survey Years	Primary Habitat	Secondary Habitat (if applicable)	Tertiary Habitat (if applicable)
PC18	2022	Hardwood forest	n/a	n/a
PC19	2022	Hardwood forest	Mixedwood forest	n/a
PC20	2022	Hardwood forest	Mixedwood forest	n/a

*indicates a PC location surveyed during both the 2021 and 2022 field seasons.

TABLE 16: SURVEY ROUTES

Survey Route	PC Locations
Survey Route #1 - 2021	#1, #2 ,# 3 , 'A', 'B', #7, #6 ,#5 (8 total point counts)
Survey Route #2 - 2021	'H', #11, #10, 'G,' 'F', 'E', 'D', 'C' (8 total point counts)
Survey Route #1 -2022	#1 to #11 (11 total point counts)
Survey Route #2 - 2022	#12 to #20 (9 total point counts)

Throughout the biophysical environmental surveys conducted as part of the environmental assessment of the Project, 90 bird species and approximately 7000 individual bird observations were recorded during the 2021 and 2022 seasons. A list of species observed throughout the surveys is presented in **Appendix G**. The following sections provide the approach, methodologies and results of the bird surveys conducted by season.

3.1.5.2.1 Winter Program

Approach and Methodology

Targeted Timing: January 1 to March 31

Occurred: February 25 - 26 and March 12 - 13, 2021.

Purpose: To assess and determine which species are resident in the area and can be anticipated to occur in the Project area year-round.

The Winter Resident Survey was completed for the Project in 2021. General area searches were conducted along four unique transects through the LAA in which all birds seen or heard were recorded and counted. The location of general area searches are shown below on **Figure 15**.

Results

A total of 92 individual birds comprised of 13 species were recorded during the Winter Survey program, which consisted of 4 transect-based area searches (Winter Resident Survey), as summarized in Table 9. One bird SoCC, a Boreal Chickadee, was observed during the winter surveys conducted in 2021. The remaining bird species detected within the LAA during the winter 2021 resident surveys are ranked S4 or S5 by the AC CDC, indicating that they have populations in Nova Scotia considered 'Apparently Secure' or 'Secure', respectively.

TABLE 17: BIRDS DETECTED DURING THE 2021 WINTER RESIDENCY SURVEY

Common Name	Scientific Name	S-rank	Number Detected
Black-capped Chickadee	*Poecile atricapillus*	S5	32
Golden-crowned Kinglet	*Regulus satrapa*	S5	15
American Crow	*Corvus brachyrhynchos*	S5	12
*Boreal Chickadee	*Poecile hudsonicus*	S3	9
Dark-eyed Junco	*Junco hyemalis*	S4S5	5
Blue Jay	*Cyanocitta cristata*	S5	4
White-winged Crossbill	*Loxia leucoptera*	S4S5	4
Red-breasted Nuthatch	*Sitta canadensis*	S4S5	3
Snow Bunting	*Plectrophenax nivalis*	S5N	3
Common Raven	*Corvus corax*	S5	2
Bald Eagle	*Haliaeetus leucocephalus*	S5	1
Pileated Woodpecker	*Dryocopus pileatus*	S5	1
Red-tailed Hawk	*Buteo jamaicensis*	S5	1
		Total Number of Birds Detected	**92**

* indicates a species is considered a SoCC

The results of winter bird surveys conducted for a former iteration of the Project during the winter months of 2012, which are presented in Strum (2013) were reviewed. The 2013 report concluded that no significant staging or wintering area for waterfowl, shorebirds or any other water associated birds, and no evidence was found to suggest significant areas for birds of prey or any other bird concentrations (Strum 2013). Similarly, the results of the 2021 winter resident surveys for birds and observations of available habitat support the conclusion that the PDA provides limited habitat for winter resident bird species. Overall, a relatively low number of birds appear to reside near the PDA during the winter months. This is anticipated to be the result of high winds that the PDA is exposed to and it is likely that resident bird species would favour habitat present within the surrounding river valleys.

3.1.5.2.2 Spring Programs

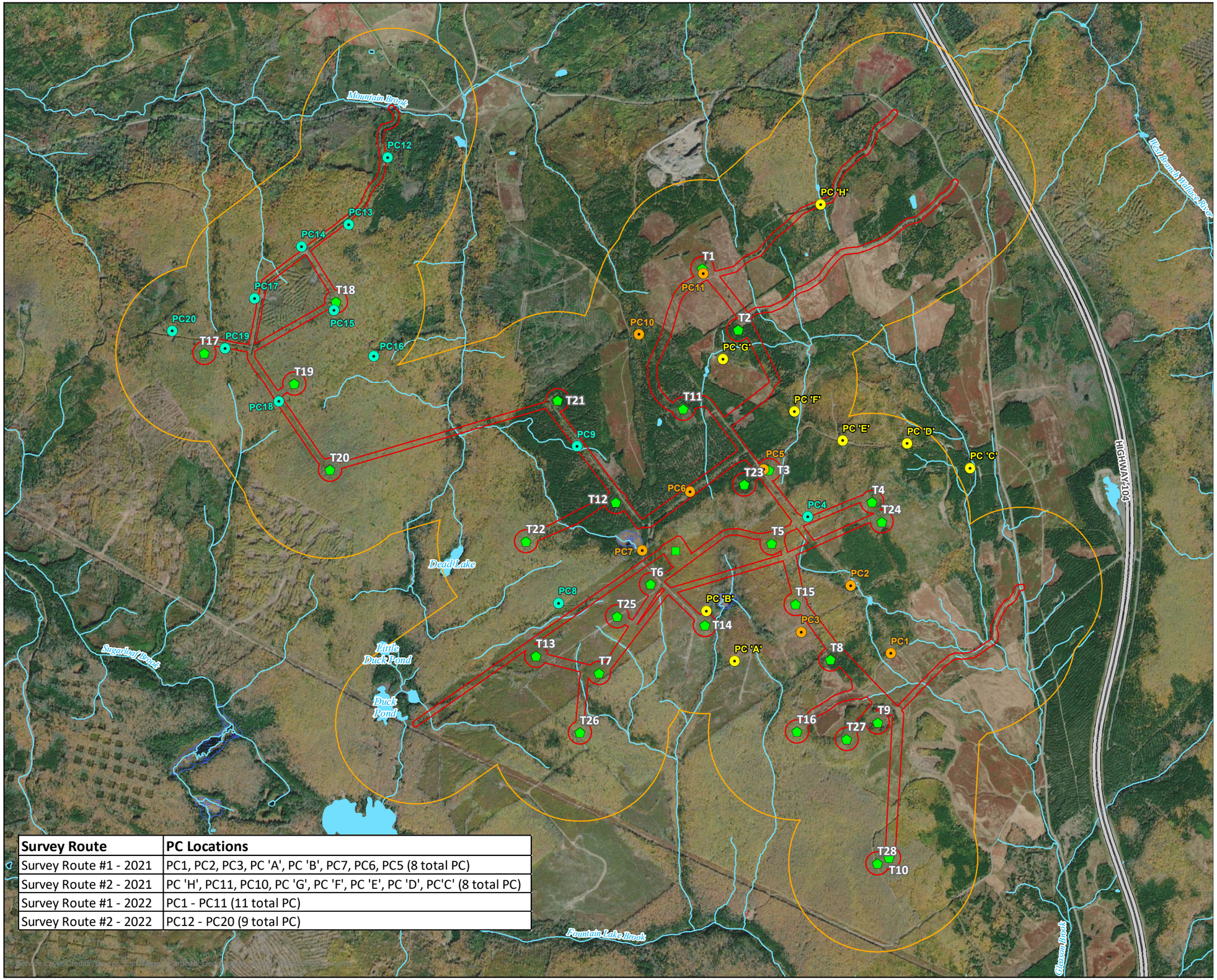
Approach and Methodology

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 in the sections below.

Spring Migration Stop-Over Point Count Surveys

Targeted Timing: April 15 to May 31

Occurred: between April 28 and May 26, 2021 & between April 29 and May 31, 2022



Survey Route	PC Locations
Survey Route #1 - 2021	PC1, PC2, PC3, PC 'A', PC 'B', PC7, PC6, PC5 (8 total PC)
Survey Route #2 - 2021	PC 'H', PC11, PC10, PC 'G', PC 'F', PC 'E', PC 'D', PC'C' (8 total PC)
Survey Route #1 - 2022	PC1 - PC11 (11 total PC)
Survey Route #2 - 2022	PC12 - PC20 (9 total PC)

Natural Forces

WESTCHESTER WIND PROJECT

STUDY AND LOCAL ASSESSMENT AREAS FOR BIRDS (POINT COUNT LOCATIONS AND SURVEY ROUTES)

FIGURE 17

- 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

0 0.125 0.25 0.5 km

N W E S

SCALE 1:24,000

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

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

DILLON CONSULTING

PROJECT: 22-4065
STATUS: DRAFT
DATE: 2022-12-10

FILE LOCATION: K:\2021\211329\Product\Client\EA_WC_Sept2022\WC_F03_StudyArea_PCSurveyRoutes.mxd

Purpose: To determine the abundance and species of birds that may land and 'stop-over' within the LAA during the spring migratory period.

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. 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.

For the spring surveys, the Point Count locations were surveyed five times within the targeted migration window in 2021 and four times in 2022. **Table 18** summarizes the dates the surveys were conducted in the spring of 2021 and 2022. Eight-point counts were conducted along each of the four survey routes completed in 2021, and 12-point counts were conducted along each of the two survey routes completed in 2022. The locations of point counts and the survey route groupings are shown on **Figure 17**.

TABLE 18: TIMING OF THE SPRING MIGRATORY STOP-OVER SURVEYS

Point Count Location	Spring Surveyed Dates
Survey Route 1 – 2021	April 28, May 3, May 14, May 21, and May 26, 2021
Survey Route 2 – 2021	April 28, May 7, May 15, May 20, and May 26, 2021
Survey Route 1 – 2022	May 11, May 19, May 24, and May 31, 2022
Survey Route 4 – 2022	May 11, May 19, May 24, and May 30, 2022
Diurnal Watch Count Location 1	May 14 and May 21, 2021
Diurnal Watch Count Location 2	May 7, May 15, and May 20, 2021 May 11 and May 19, 2022

Spring Migration Diurnal Watch Counts

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

Occurred: between May 7 and May 21, 2021 and May 11 and May 19, 2022.

Purpose: To estimate the abundance, species, approximate altitude and behaviour of birds flying over the study area during the daytime.

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° view of the air space over the LAA and was in close proximity to the proposed site for the placement of the WTGs (**Figure 15**). 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.

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. **Table 18** above summarizes the dates the surveys were conducted in the spring of 2021 and 2022.

Spring Radar and Acoustic Monitoring

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

Occurred: between May 4 and June 6, 2021 and April 5 and June 6, 2022.

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 1,500 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 9 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 H.**

Results

More than 80 bird species were identified during spring period of 2021 and 2022 through incidental observation and focused Spring Surveys.

Spring Migration Stop-Over Point Count Surveys

Spring migration surveys provide information on the diversity of bird species that migrate through the LAA as well as; an estimate of the abundance of bird species present. Raw data collected from Point Count surveys and a summary of the weather and site observations is provided in **Appendix G**.

Between 2021 and 2022, a total of 72 bird species were identified during the spring migration Point Count surveys. Sixty one species of the sixty three species were identified in 2021,

noting that 55 of these species observed 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 19**.

TABLE 19: TOTAL ABUNDANCE OF BIRDS DETECTED DURING SPRING MIGRATION POINT COUNTS

Number Detected (2021)	Number Detected (2022)	Common Name	Scientific Name	S-rank and Conservation Status
140	136	White-throated Sparrow	*Zonotrichia albicollis*	S4S5B, S5M
125	154	*American Robin	*Turdus migratorius*	S5B,S3N
92	96	Black-throated Green Warbler	*Setophaga virens*	S5B
73	144	Ovenbird	*Seiurus aurocapilla*	S5B
70	73	Hermit Thrush	*Catharus guttatus*	S5B
65	59	Yellow-rumped Warbler	*Setophaga coronata*	S5B
49	46	Dark-eyed Junco	*Junco hyemalis*	S4S5
48	52	Magnolia Warbler	*Setophaga magnolia*	S5B
44	15	Ruby-crowned Kinglet	*Regulus calendula*	S4B, S5M
39	41	Common Yellowthroat	*Geothlypis trichas*	S5B
39	20	Song Sparrow	*Melospiza melodia*	S5B
38	41	Black-and-White Warbler	*Mniotilta varia*	S5B
37	20	Northern Flicker	*Colaptes auratus*	S5B
37	37	*Purple Finch	*Haemorhous purpureus*	S4S5B, S3S4N, S5M
36	97	Black-capped Chickadee	*Poecile atricapillus*	S5
32	35	Blue Jay	*Cyanocitta cristata*	S5
30	43	Blue-headed Vireo	*Vireo solitarius*	S5B
24	17	Savannah Sparrow	*Passerculus sandwichensis*	S4S5B,S5M
22	10	Golden-crowned Kinglet	*Regulus satrapa*	S5
21	25	American Crow	*Corvus brachyrhynchos*	S5
19	48	American Goldfinch	*Spinus tristis*	S5
19	93	American Redstart	*Setophaga ruticilla*	S5B
17	1	Palm Warbler	*Setophaga palmarum*	S5B
17	21	Ruffed Grouse	*Bonasa umbellus*	S5
16	9	*Boreal Chickadee	*Poecile hudsonicus*	S3
14	19	Winter Wren	*Troglodytes hiemalis*	S5B
13	11	Lincoln's Sparrow	*Melospiza lincolnii*	S4B, S5M
11	25	Chestnut-sided Warbler	*Setophaga pensylvanica*	S5B

Number Detected (2021)	Number Detected (2022)	Common Name	Scientific Name	S-rank and Conservation Status
11	14	Swainson's Thrush	*Catharus ustulatus*	S4B,S5M
9	4	*Bay-breasted Warbler	*Setophaga castanea*	S3S4B,S4S5M
8	5	Hairy Woodpecker	*Dryobates villosus*	S5
7	33	Red-eyed Vireo	*Vireo olivaceus*	S5B
7	0	Ring-necked Pheasant	*Phasianus colchicus*	SNA
5	9	Alder Flycatcher	*Empidonax alnorum*	S5B
5	1	*American Kestrel	*Falco sparverius*	S3B, S4S5M
5	7	Black-throated Blue Warbler	*Setophaga caerulescens*	S5B
5	0	Common Grackle	*Quiscalus quiscula*	S5B
5	**2**	**Evening Grosbreak**	***Coccothraustes vespertinus***	**S3B, S3N, S3M SARA: SC NSESA: V**
5	11	Northern Parula	*Setophaga americana*	S5B
5	6	Swamp Sparrow	*Melospiza georgiana*	S5B
4	0	American Black Duck	*Anas rubripes*	S5B,S5N
4	1	*Cape May Warbler	*Setophaga tigrina*	S3B,SUM
4	8	Common Raven	*Corvus corax*	S5
4	13	Downy Woodpecker	*Dryobates pubescens*	S5
4	2	Nashville Warbler	*Oreothlypis ruficapilla*	S4B, S5M
4	33	Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5B
3	4	Blackburnian Warbler	*Setophaga fusca*	S4B, S5M
3	32	Least Flycatcher	*Empidonax minimus*	S4S5B, S5M
3	2	Mourning Dove	*Zenaida macroura*	S5
3	0	Northern Waterthrush	*Parkesia noveboracensis*	S4B, S5M
3	6	Pileated Woodpecker	*Dryocopus pileatus*	S5
2	0	*Blackpoll Warbler	*Setophaga striata*	S3B, S5M
2	0	Brown Creeper	*Certhia americana*	S5
2	3	Canada Goose	*Branta canadensis*	SUB,S4N,S5M Exotic Breeding
2	**0**	**Canada Warbler**	***Cardellina canadensis***	**S3B SARA: T NSESA: E**
2	4	Mourning Warbler	*Geothlypis philadelphia*	S4B, S5M
2	1	*Northern Harrier	*Circus hudsonius*	S3S4B
2	12	Red-breasted Nuthatch	*Sitta canadensis*	S4S5

Number Detected (2021)	Number Detected (2022)	Common Name	Scientific Name	S-rank and Conservation Status
2	0	Yellow Warbler	*Setophaga petechia*	S5B
1	6	*Canada Jay	*Perisoreus canadensis*	S3
1	0	Merlin	*Falco columbarius*	S5B
0	3	American Woodcock	*Scolopax minor*	S5B
0	3	Cedar Waxwing	*Bombycilla cedrorum*	S5B
0	**1**	**Eastern Wood-Pewee**	***Contopus virens***	**S3S4B SARA: SC NSESA: V**
0	42	*Pine Siskin	*Spinus pinus*	S3
0	35	White-winged Crossbill	*Loxia leucoptera*	S4S5
0	6	*Red Crossbill	*Loxia curvirostra*	S3S4
0	5	*Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S3B
0	3	White-breasted Nuthatch	*Sitta carolinensis*	S4
0	1	Ruby-throated Hummingbird	*Archilochus colubris*	S5B
0	1	Sharp-shinned Hawk	*Accipiter striatus*	S5
0	1	Belted Kingfisher	*Megaceryle alcyon*	S4S5B
1321	**1708**	**Total Number of Birds Detected**		

Bold indicates a species is considered a SAR
* indicates a species is considered a SoCC

The most frequently observed birds were the White-throated Sparrow, American Robin in 2021 and 2022 and the Ovenbird in 2022. There were three SAR and 12 SoCC detected during the Spring Migration Point Counts (including American Robin and Purple Finch which have non-breeding populations in Nova Scotia that are considered vulnerable by the AC CDC) over the two year survey. SAR detected included Evening Grosbreak in 2021 and 2022; Canada Warbler in 2021 and Eastern Wood-peewee in 2022.

Overall, most birds detected within the assessment area during the Spring Migration Point Counts are ranked S4 or S5 by the AC CDC, indicating that their populations within Nova Scotia are considered 'Apparently Secure' or 'Secure', respectively. A discussion of detected SoCC and SAR is available in **Section 3.1.7.5**.

Spring Migration Diurnal Watch Counts

Spring Diurnal Watch Counts provide information on the species and behaviour of birds flying over the study area during daylight hours. Raw data collected from Point Count surveys and a summary of the weather and site observations is provided in **Appendix G**.

A summary of the behaviours and estimated pass heights of the 29 bird species that were observed during the Spring Diurnal Watch Counts is presented in **Table 20**.

TABLE 20: SUMMARY OF DIURNAL SPECIES OBSERVED DURING THE SPRING SURVEYS (2021-2022)

Common name	Scientific Name	S-Rank	Pass Height (m)	Observed Behaviours
American Goldfinch	*Spinus tristis*	S5	50-250	Passing by, calling
*American Kestrel	*Falco sparverius*	S3B, S4S5M	<50	Parching, hunting, passing by, perched in pairs
*American Robin	*Turdus migratorius*	S5B,S3N	<50-100	Passing by, resident bird, foraging
Bald Eagle	*Haliaeetus leucocephalus*	S5	50->1000	Flying over, circling, soaring/gaining altitude, most were adults and two juvenile birds
Barn Swallow	*Hirundo rustica*	S3B	20	Foraging over field
Belted Kingfisher	*Megaceryle alcyon*	S4S5B	50-100	Agitated, calling
Blue Jay	*Cyanocitta cristata*	S5	<50-250	Resident birds, passing by, flying above canopy, calling
Broad-winged Hawk	*Buteo platypterus*	S5B	100-250	Perching, passing by
Canada Goose	*Branta canadensis*	SUB,S4N,S5M	100-250	Passing by
*Canada Jay	*Perisoreus canadensis*	S3	-	Flying over fields
Common Grackle	*Quiscalus quiscula*	S5B	50-100	Passing by, calling
Common Raven	*Corvus corax*	S5	50->250	Perching, flying over canopy, harassed by a small falcon, flying sub canopy, soaring, local resident birds
Common Yellowthroat	*Geothlypis trichas*	S5B	n/a	Passing by
Hairy Woodpecker	*Dryobates villosus*	S5	<50	Just staying above canopy level
Northern Flicker	*Colaptes auratus*	S5B	<50	Resident bird, moving over cut area
*Northern Goshawk	*Accipiter gentilis*	S3S4	<100	Juvenile. Just above trees and before entering canopy

Common name	Scientific Name	S-Rank	Pass Height (m)	Observed Behaviours
Northern Harrier	*Circus hudsonius*	S4B, S4S5M	<50-250	Hunting, foraging, passing by
Osprey	*Pandion haliaetus*	S4S5B, S5M	100-250	Passing by
*Purple Finch	*Haemorhous purpureus*	S4S5B, S3S4N, S5M	50-100	Passing by
Red-tailed Hawk	*Buteo jamaicensis*	S5	20-800	Adults, kettling, soaring, gaining altitude flying low over field, calling/ screeching, hunting, circling, calling, passing by
Sharp-shinned Hawk	*Accipiter striatus*	S5	50-250	Riding updrafts, gradually moving east, passing by
*Turkey Vulture	*Cathartes aura*	S2S3B, S4S5M	50-250	Gained altitude, foraging, passing by
White-throated Sparrow	*Zonotrichia albicollis*	S4S5B, S5M	n/a	Resident birds, singing
White-winged Crossbill	*Loxia leucoptera*	S4S5	-	Passing by
Yellow-rumped Warbler	*Setophaga coronata*	S5B	50-100	Resident bird, flying sub-canopy, flying over a field, passing by

Bold indicates a species is considered a SAR
* indicates a species is considered a SoCC

Many of the bird species that were observed during the day appeared to be resident species or passing by the site. Birds of prey were observed hunting and scavenging within the LAA during the day-light hours. Several SoCC were identified during the diurnal watch surveys including American Kestrel and Turkey Vulture, which are considered to be SoCC (i.e., they have breeding populations in Nova Scotia that are considered to be and vulnerable and vulnerable to imperilled, respectively, by the AC CDC).

The locations surveyed during the Spring Migration Stop-Over Point Count surveys are the same locations that were surveyed for the Breeding Bird Point Count and the Fall Migration Stop-Over Point Count surveys. This method was selected in order to provide a consistent seasonal depiction of the bird diversity and relative abundance at the representative habitats that were selected for point count placement within the LAA. The locations were selected to both maximize coverage across the LAA and include locations in a diversity of habitats representative of those within the LAA and near the proposed placement of WTGs or their related infrastructure.

For the Spring Migration Stop-Over Point Count Survey, each of the eight PC locations were surveyed on five occasions in 2021 and four occasions in 2022 between April 28 and May 31. A

summary of diversity and abundance of birds observed at the Point Count locations that were surveyed in 2021 and 2022 is provided in **Table 21**.

In general, bird diversity and abundance was observed to increase throughout the spring migratory period until mid-May and remained consistent between 2021 and 2022, which is illustrated in

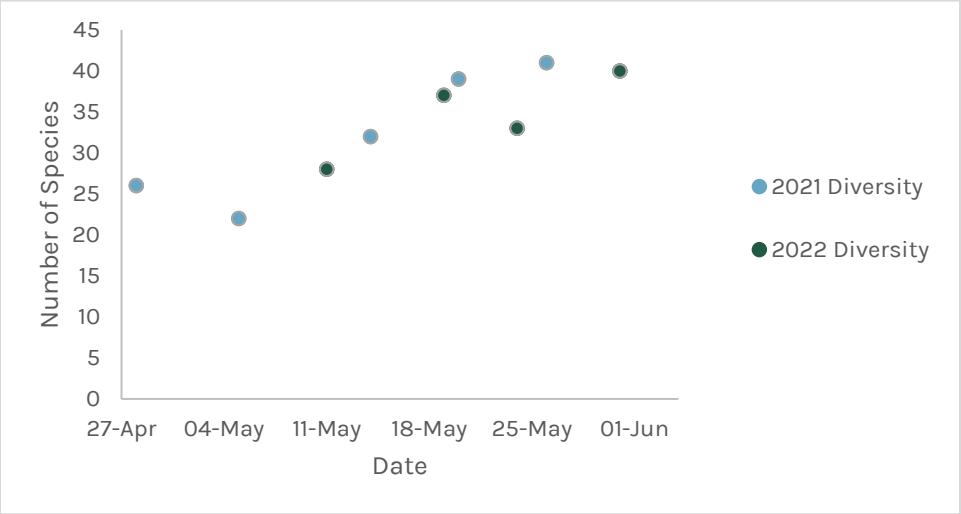
Figure 18. For comparison between years, only data from the Point Count locations that were surveyed over two years are displayed on

Figure 18. As the spring progresses, more bird species return to Nova Scotia from their wintering grounds and remain through their summer breeding season.

TABLE 21: SUMMARY OF SPRING BIRD DIVERSITY AND ABUNDANCE BETWEEN 2021 AND 2022

Point Count Location*	Diversity (# species 2021)	Diversity (# species 2022)	Abundance (# birds 2021)	Abundance (# birds 2021)
1	26	25	81	71
2	27	27	95	101
3	28	24	115	95
4	N/A	22	N/A	65
5	22	21	64	50
6	24	31	85	100
7	33	31	104	87
8	N/A	20	N/A	61
9	N/A	25	N/A	78
10	22	23	73	68
11	27	17	84	61
12	N/A	33	N/A	101
13	N/A	22	N/A	75
14	N/A	26	N/A	105
15	N/A	25	N/A	67
16	N/A	26	N/A	101
17	N/A	30	N/A	89
18	N/A	21	N/A	76
19	N/A	20	N/A	72
20	N/A	29	N/A	83
A	31	N/A	109	N/A
B	29	N/A	86	N/A
C	24	N/A	67	N/A
D	25	N/A	63	N/A
E	23	N/A	70	N/A
F	24	N/A	57	N/A
G	30	N/A	84	N/A
H	26	N/A	82	N/A
Incidentals	10	7	28	10
Total	**61**	**64**	**1347**	**1616**

*Point locations were surveyed on 5 occasions in 2021 and 4 occasions in 2022 between April 28 and May 31.


45
40
35
30
25
20
15
10
5
0
Number of Species
27-Apr
04-May
11-May
18-May
25-May
01-Jun
Date
2021 Diversity
2022 Diversity

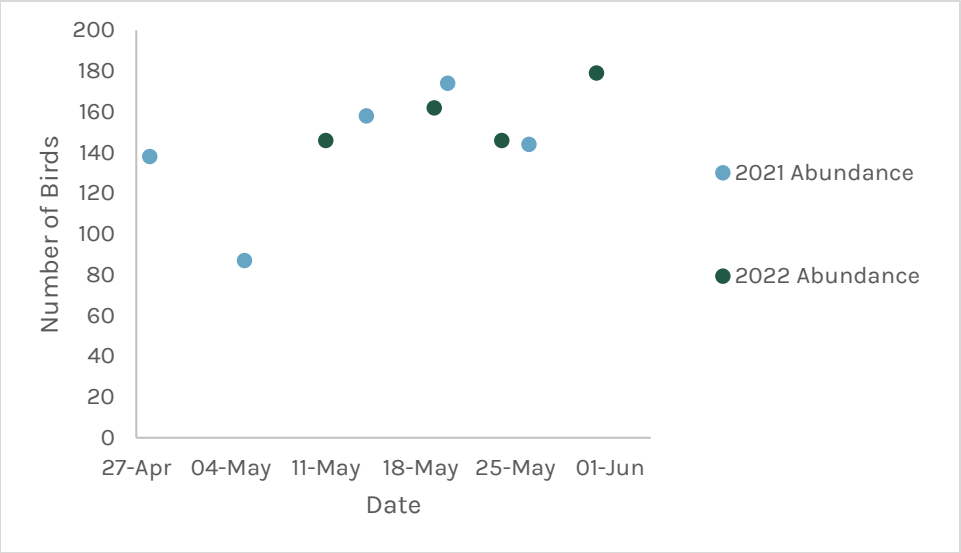

200
180
160
140
120
100
80
60
40
20
0
Number of Birds
27-Apr
04-May
11-May
18-May
25-May
01-Jun
Date
2021 Abundance
2022 Abundance

FIGURE 18: DIVERSITY AND ABUNDANCE OF BIRD SPECIES DETECTED DURING THE 2021 AND 2022 MIGRATORY POINT COUNT SURVEYS

Spring Radar and Acoustic Monitoring

As described in further detail in **Appendix H**, some level of active migration was observed on most nights monitored in 2022. Most of the migration activity was observed across 5 nights (May 4, May 14, May18, May 23, and May 26). The pattern of radar targets by altitude varied across nights. On the nights with the largest movements of migration (May 4, May 14, and May 18) targets were observed to be primarily at higher elevations (e.g., 400 m or greater) On nights when migration was less intense, but still elevated compared to most nights (May 23 and May 26) the peak altitude band was below 200 m, but large numbers of targets were still observed above the Rotor Swept Area (RSA).

Statistical models provided evidence that the total number of birds per hour was related to tailwind assistance (at 'surface'), time of night (sunset, sunrise, and middle of the night) and weather (temperature, surface pressure and relative humidity). The most important differences can be attributed to different behaviours through the night. The radar detected numerous targets immediately after the initiation of migration (take-off after sunset) and during the middle of the night (continued migration), and fewer in the morning. That the period immediately before dawn sees many fewer targets may reflect that birds are either not landing within the Project area following migration or they are consistently ending their migration flights early in the night.

Flight calls were analyzed and grouped into one of 17 species groups with the majority being warblers (63%), followed by sparrows (37%). The most common species / species group observed was ovenbird, followed by white-throated sparrow, which comprised 42% of the total detections.

3.1.5.2.3 Summer Programs

Approach and Methodology

During the 2021 and 2022 peak nesting season (i.e., June 1 – July 15), a breeding bird survey was conducted to estimate the abundance and identify species of birds that breed in the LAA with particular attention paid to their habitat requirements and habitat availability within the LAA. This survey was also supplemented by targeted nocturnal surveys in 2021 for bird species that may breed in the area, but that are typically only detectable at night, or during twilight hours, such as Nightjars (i.e. Common Nighthawk and Eastern Whip-Poor-Will) and nocturnal breeding owls.

Breeding Bird Point Count Surveys

Targeted Timing: June 1 to July 31

Occurred: June 7 and June 29, 2021 & June 7, July 8 and July 14, 2022

Purpose: To estimate the abundance and identify which species of birds are anticipated to breed in the LAA with particular attention paid to their habitat requirements and habitat availability in the study area.

Point Counts were conducted along the survey routes established for the Migratory Point Count surveys. Within the general search area, all birds seen or heard within 10-minute interval surveys were recorded.

Breeding bird surveys were conducted during the summer months following the same survey routes established for the spring and fall Migration Stop-Over Point Counts, which are shown on **Figure 17**. For the breeding bird surveys, each survey route was completed twice each year, once early and once late, within the targeted peak breeding window. Special consideration was given to complete a portion of the survey within the June full moon phase to appropriately assess for the Common Nighthawk. The peak of the full moon phases occurred on June 24, 2021 and June 14, 2022.

The use of targeted playback (i.e. broadcasting recorded bird sounds) was used occasionally at the discretion of the observer during the Breeding Bird Survey to detect possible SAR or SoCC in their vicinity. This would occur to either confirm a possible detection (when there was uncertainty) or to simply elicit a response from particular species when surveying appropriate habitat. The detrimental impact of playback recordings on breeding birds is noted, and, as such, the use of playback recordings was limited and employed sparingly to avoid undue disturbance to breeding birds. **Table 22** below summarizes the survey dates of the Breeding Bird Surveys conducted in 2021 and 2022.

TABLE 22: TIMING OF THE BREEDING BIRD SURVEYS

Point Count Location	Surveyed Dates
Survey Route 1 – 2021	June 7 and June 28, 2021
Survey Route 2 – 2021	June 7 and June 28, 2021
Survey Route 1 – 2022	June 7 and July 8, 2022
Survey Route 2 – 2022	June 7 and July 14, 2022
Breeding Nocturnal Owls	May 10, 2021
Common Nighthawk Survey	June 21, 2021

Targeted Breeding Nocturnal Owl Survey

Targeted Timing: mid-March to mid- May

Occurred: May 10, 2021

Purpose: Nocturnal surveys were conducted to estimate abundance and to identify breeding bird species in the LAA that are not readily detectable during daylight hours.

A breeding nocturnal owl survey was conducted on May 10, 2021 within the recommended survey window of mid-March to mid-May (Takats et al. 2001; Birds Canada 2019). This survey was conducted from pre-determined Nocturnal Survey Locations (NSL) within the study area, which are shown on **Figure 15**. The methods employed for the breeding nocturnal owl survey was heavily based on the protocols described in Guidelines for Nocturnal Owl Monitoring in North America (Takats et al. 2001), as well as the Nova Scotia Nocturnal Owl Survey: Guide for

Volunteers (Birds Canada 2019) and consists of periods of silent listening and multi-species playback.

A nocturnal survey was conducted for breeding bird species not readily detectable during daylight hours that targeted owls during the spring of 2021. Special consideration was given to complete a portion of the survey within seven days of the June full moon phase to appropriately assess for the Common Nighthawk. The peak of the full moon phases occurred on June 24, 2021 and June 14, 2022.

This survey was conducted from pre-determined locations within the study area, which are shown on **Figure 15**. The breeding nocturnal owl survey methodology was based on the 'Guidelines for Nocturnal Owl Monitoring in North America' (Takats et al. 2001), as well as the 'Nova Scotia Nocturnal Owl Survey: Guide for Volunteers' (BC 2019).

Targeted Breeding Nightjar Survey

Targeted Timing: June 1 to June 31

Occurred: June 21, 2021

Purpose: Nocturnal surveys were conducted to estimate abundance and to identify breeding bird species in the LAA that are not readily detectable during daylight hours.

A targeted Breeding Nightjar Survey was conducted on June 21, 2021, with special consideration given to completing this survey within seven days of the June full moon phase when nighthawks are most active and readily detectable. The full moon phase occurred on the night of June 24, 2021. This survey was conducted from the same pre-determined Nocturnal Survey Locations (NSL) and these are shown on **Figure 15**. The methodology employed for the breeding common nighthawk survey was heavily based on the protocols described in the Canadian Nightjar Survey Protocol (Bird Studies Canada 2019) and consists of periods of silent listening and targeted playback.

Eastern Whip-poor-wills are most vocal during clear nights in June when the moon is at least half full, and can repeat their characteristic "whip-poor-will" call up to 100 times without stopping. They begin calling about 30 minutes after sunset, and call for about 90 minutes each night. Common Nighthawks become active approximately 30 minutes before sunset, and remain active until 60 or 90 minutes after sunset.

Results

Including bird observations that were reported incidentally, 62 bird species (totaling 1389 bird observations) were recorded during summer period of 2021 and 2022. Raw data collected from breeding bird Point Count surveys and a summary of the weather and site observations is provided in **Appendix G**.

Breeding Bird Point Count Surveys

Breeding bird surveys within the LAA were completed over 2 years to assess abundance of each species, as well as to briefly examine the seasonality of bird diversity during the earlier and later portion of the peak breeding period. Throughout 2021 and 2022 breeding bird

surveys, 1352 bird observations were made. Of these, 562 individual birds comprised of 54 species were recorded during 2021 and 789 individual birds comprised of 57 species were recorded during 2022. The bird species recorded and their abundance in both years from breeding bird point counts is summarized in **Table 23**, which only includes data collected during the summer Point Count surveys.

TABLE 23: TOTAL ABUNDANCE OF BIRDS DETECTED DURING THE SUMMER BREEDING BIRD SURVEYS

Number Detected in 2021	Number Detected in 2022	Common Name	Scientific Name	S-rank and Conservation Status
51	60	White-throated Sparrow	*Zonotrichia albicollis*	S4S5B, S5M
49	48	Black-throated Green Warbler	*Setophaga virens*	S5B
38	32	Common Yellowthroat	*Geothlypis trichas*	S5B
32	30	Magnolia Warbler	*Setophaga magnolia*	S5B
30	64	Ovenbird	*Seiurus aurocapilla*	S5B
28	57	Red-eyed Vireo	*Vireo olivaceus*	S5B
27	12	Alder Flycatcher	*Empidonax alnorum*	S5B
23	66	American Redstart	*Setophaga ruticilla*	S5B
21	56	*American Robin	*Turdus migratorius*	S5B,S3N
19	29	Black-and-White Warbler	*Mniotilta varia*	S5B
19	16	Swainson's Thrush	*Catharus ustulatus*	S4B,S5M
18	44	Hermit Thrush	*Catharus guttatus*	S5B
14	7	Lincoln's Sparrow	*Melospiza lincolnii*	S4B, S5M
13	5	Blue Jay	*Cyanocitta cristata*	S5
12	10	Yellow-rumped Warbler	*Setophaga coronata*	S5B
11	24	Dark-eyed Junco	*Junco hyemalis*	S4S5
11	2	Savannah Sparrow	*Passerculus sandwichensis*	S4S5B,S5M
10	17	Blue-headed Vireo	*Vireo solitarius*	S5B
9	1	*Boreal Chickadee	*Poecile hudsonicus*	S3
9	10	Song Sparrow	*Melospiza melodia*	S5B
8	3	Golden-crowned Kinglet	*Regulus satrapa*	S5
7	3	*Bay-breasted Warbler	*Setophaga castanea*	S3S4B,S4S5M
6	0	American Black Duck	*Anas rubripes*	S5B,S5N
6	10	Cedar Waxwing	*Bombycilla cedrorum*	S5B
6	20	Chestnut-sided Warbler	*Setophaga pensylvanica*	S5B
6	8	Mourning Warbler	*Geothlypis philadelphia*	S4B, S5M
6	5	Northern Flicker	*Colaptes auratus*	S5B
6	9	*Purple Finch	*Haemorhous purpureus*	S4S5B, S3S4N, S5M

Number Detected in 2021	Number Detected in 2022	Common Name	Scientific Name	S-rank and Conservation Status
5	22	Black-capped Chickadee	*Poecile atricapillus*	S5
5	2	*Canada Jay	*Perisoreus canadensis*	S3
5	5	Ruby-crowned Kinglet	*Regulus calendula*	S4B, S5M
4	9	American Crow	*Corvus brachyrhynchos*	S5
4	0	*American Kestrel	*Falco sparverius*	S3B, S4S5M
4	2	Common Raven	*Corvus corax*	S5
3	13	American Goldfinch	*Spinus tristis*	S5
3	1	*Cape May Warbler	*Setophaga tigrina*	S3B,SUM
3	1	Nashville Warbler	*Oreothlypis ruficapilla*	S4B, S5M
3	0	Palm Warbler	*Setophaga palmarum*	S5B
3	1	*Red Crossbill	*Loxia curvirostra*	S3S4
3	0	Ring-necked Pheasant	*Phasianus colchicus*	SNA
3	6	Winter Wren	*Troglodytes hiemalis*	S5B
2	1	Blackburnian Warbler	*Setophaga fusca*	S4B, S5M
2	2	Black-throated Blue Warbler	*Setophaga caerulescens*	S5B
2	**0**	**Evening Grosbreak**	***Coccothraustes vespertinus***	**S3S4B,S3N SARA: SC NSESA: V**
2	3	Hairy Woodpecker	*Dryobates villosus*	S5
2	2	Northern Parula	*Setophaga americana*	S5B
2	7	Red-breasted Nuthatch	*Sitta canadensis*	S4S5
1	2	Common Grackle	*Quiscalus quiscula*	S5B
1	5	Downy Woodpecker	*Dryobates pubescens*	S5
1	20	Least Flycatcher	*Empidonax minimus*	S4S5B, S5M
1	1	*Northern Harrier	*Circus hudsonius*	S3S4B
1	1	Ruffed Grouse	*Bonasa umbellus*	S5
1	2	Swamp Sparrow	*Melospiza georgiana*	S5B
1	6	Yellow-bellied Sapsucker	*Sphyrapicus varius*	S5B
0	15	*Pine Siskin	*Spinus pinus*	S3
0	3	White-breasted Nuthatch	*Sitta carolinensis*	S4
0	**2**	**Eastern Wood-Pewee**	***Contopus virens***	**S3S4B SARA:SC COSWIC: SC NSESA:V**
0	2	Mourning Dove	*Zenaida macroura*	S5
0	2	White-winged Crossbill	*Loxia leucoptera*	S4S5
0	1	Common Loon	*Gavia immer*	S4B

Number Detected in 2021	Number Detected in 2022	Common Name	Scientific Name	S-rank and Conservation Status
0	**1**	**Olive-sided Flycatcher**	***Contopus cooperi***	**S3B SARA: T NSESA: T**
0	1	Pileated Woodpecker	*Dryocopus pileatus*	S5
562	**789**	**Total Number of Birds Detected**		

Bold indicates a species is considered a SAR
* indicates a species is considered a SoCC

White-throated Sparrow and Black-throated Green Warbler were the most abundantly observed birds during the breeding surveys conducted in 2021 and 2021. Three bird SAR species were recorded during the breeding surveys: two Evening Grosbeaks in 2021, and two Eastern Wood-pewees and one Olive-sided Flycatcher in 2022. During the breeding bird surveys, ten birds considered to be SoCC were recorded over the two year study. Eight species of SoCC birds were observed over both years. American Kestrels were only observed in 2021 and Pine Siskin were only observed in the 2022 surveys. Overall, the remainder of the birds detected within the assessment area during the Summer Breeding Bird Surveys are ranked S4 or S5 by the AC CDC indicating that they are considered 'Apparently Secure' or 'Secure', respectively. A detailed discussion of detected SoCC and SAR is presented in **Section 3.1.7.5**.

Breeding bird surveys were conducted in early and late June to compare the bird diversity between the 'early' and 'late' breeding season. Bird species diversity is shown below for the early and late breeding bird surveys conducted in 2021 and 2022 below in **Figure 19**. Overall the number of bird species detected during breeding bird surveys remained similar throughout breeding periods, ranging from 40-50 species detected during each period.

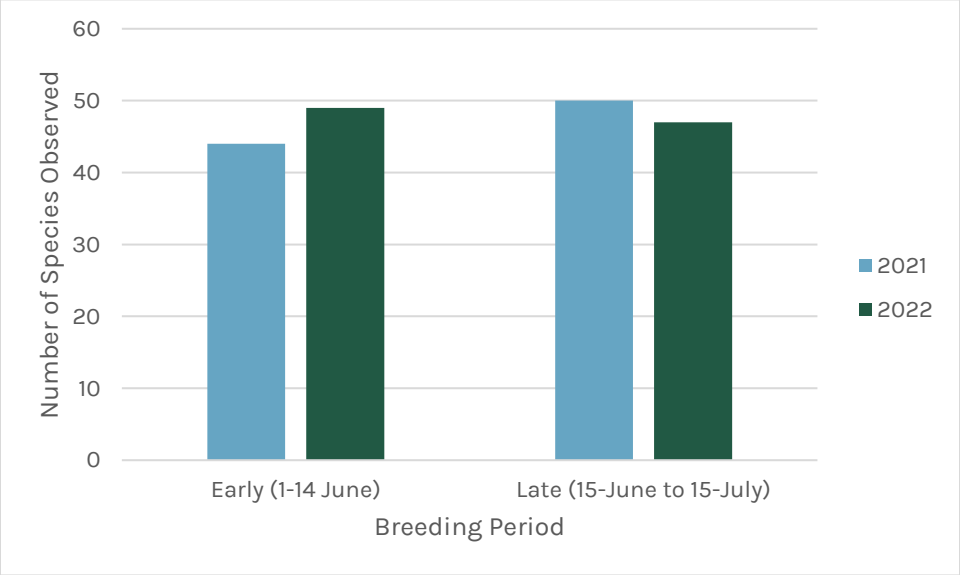


FIGURE 19: BIRD SPECIES DIVERSITY DETECTED DURING THE EARLY AND LATE BREEDING BIRD SURVEYS IN 2021-2022

Targeted Breeding Nocturnal Owl Survey

During the breeding nocturnal owl survey in 2021, one species of nocturnal owl was detected, a single Barred Owl (Strix varia). No SAR or SoCC owl species were detected during the 2022 breeding nocturnal owl surveys. The results of the 2021 breeding nocturnal owl surveys are presented in **Table 24**.

TABLE 24: RESULTS OF THE 2021 BREEDING NOCTURNAL OWL SURVEY

Survey Location	Number Detected	Common Name	Scientific Name	Estimated Distance (m)	Estimated Direction	S-rank
#1	2	American Woodcock	*Scolopax minor*	100-250	North	S5B
#2	1	American Woodcock	*Scolopax minor*	200	South	S5B
#3	nil	n/a	n/a	n/a	n/a	n/a
#4	1	Barred Owl	*Strix varia*	400	SW	S5
#5	nil	n/a	n/a	n/a	n/a	n/a
#6	2	American Woodcock	*Scolopax minor*	100-250	North	S5B

Targeted Breeding Nightjar Survey

There were three Common Nighthawk individuals detected during the Breeding Nightjar Survey. This survey took place under a mostly clear sky on the evening of June 21, 2021 (the June 2021 full moon was on June 24, 2021). The results of the survey are summarized below in **Table 25**.

TABLE 25: RESULTS OF THE BREEDING COMMON NIGHTHAWK SURVEY

Survey Location	Number detected	Common Name	Scientific Name	Estimated Distance (m)	Estimated Direction	SARA	NS ESA	S-rank
#1	nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a
#2	1	Common Nighthawk	*Chordeiles minor*	500	NW	SC	T	S2B
#3	2	Common Nighthawk	*Chordeiles minor*	100-200	NW	SC	T	S2B
#4	nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a
#5	nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a
#6	nil	n/a	n/a	n/a	n/a	n/a	n/a	n/a

3.1.5.2.4 Fall Programs

Approach and Methodology

During the fall migration period, the same survey methods and locations were used a were used as during the Spring Migration Surveys; 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 the fall 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.

Fall Migration Stop-Over Point Count Surveys

Targeted Timing: August 15 to October 31

Occurred: between August 25 and Oct. 8, 2021 & between August 29 and October 13, 2022

Purpose: To determine the abundance and species of birds that may land and ‘stop-over’ within the LAA during the fall migratory period.

Same as during the 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 17**.

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.

A summary of the habitat at each Point Count location in 2022 and 2021 are described in **Table 15**. During the 2021 and 2022 fall migration peak periods, each survey route was surveyed 5 and 4 times, respectively. **Table 26** summarizes the dates the surveys were conducted in the spring of 2021 and 2022, respectively.

TABLE 26: FALL MIGRATION SURVEY DATES

Point Count Location	Surveyed Dates
Survey Route 1 – 2021	August 25, Sept. 7, Sept. 15, Sept. 27, and Oct. 8, 2021
Survey Route 2 – 2021	August 25, Sept. 7, Sept. 15, Sept. 27, and Oct. 8, 2021
Survey Route 1 – 2022	August 29, Sept. 12, Sept. 29, and Oct. 13, 2022
Survey Route 2 - 2022	August 31, Sept. 12, Sept. 29, and Oct. 13, 2022
Diurnal Watch Count Location 1	Sept. 27 and Oct. 8, 2021

Diurnal Watch Count Location 2	Sept. 21 and Oct. 8, 2021 Sept. 12 and 29, 2022

Fall Migration Diurnal Watch Counts

Targeted Timing: Fall migration period (August 15 to October 30)

Occurred: Sept. 7 and Oct. 8, 2022, as well as on Sept. 12 and 29, 2022.

Purpose: To identify species, number, approximate altitude and behaviour of birds flying over the Study Area during the daytime to determine abundance.

As with the spring migration surveys, Diurnal Watch Counts were also conducted as a part of the fall migration surveys and from the same Diurnal Watch Count location shown in **Figure 15**. These counts were conducted in order to identify species, approximate altitude and the behaviour of birds flying over the Study Area during the daytime to determine species abundance

Similar to the Spring Diurnal Watch Counts these surveys were often conducted following the completion of Migration Stop-Over Point Counts and therefore typically began during the mid-morning and continued into the early afternoon. However, in contrast to the spring surveys, some of the Fall Diurnal Watch Counts were scheduled for the morning and evening hours of the day.

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

Fall Radar and Acoustic Monitoring

Targeted Timing: Fall migration period (July to November)

Occurred: between August 10 and October 31, 2021 and July 8 and November 30, 2022.

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 1,500 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 9 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 H.**

Results

Fall Migration Stop-Over Point Count Surveys

Fall migration surveys provide information the diversity of bird species that migrate through the LAA as well as an estimate of the abundance of bird species. Raw data collected from Point Count surveys and a summary of the weather and site observations is provided in **Appendix G**.

Between 2021 and 2022 fall migration seasons, a total of 72 bird species were identified during the migration Point Count surveys. During the fall of 2021, 1167 birds comprised of 63 species were recorded compared to 787 birds comprised of 58 species in fall 2022. It is noted that 49 species were recorded in both 2021 and 2022 fall migration surveys. A summary of bird species and their abundance recorded during the fall migration surveys conducted in both 2021 and 2022 summarized in **Table 27**.

TABLE 27: TOTAL ABUNDANCE OF BIRDS DETECTED DURING SPRING MIGRATION POINT COUNTS.

Number Detected (2021)	Number Detected (2022)	Common Name	Scientific Name	S-rank and Conservation Status
69	88	Black-capped Chickadee	*Poecile atricapillus*	S5
63	55	White-throated Sparrow	*Zonotrichia albicollis*	S4S5B, S5M
70	49	Yellow-rumped Warbler	*Setophaga coronata*	S5B
7	46	*Blackpoll Warbler	*Setophaga striata*	S3B, S5M
69	44	Golden-crowned Kinglet	*Regulus satrapa*	S5
39	40	Black-throated Green Warbler	*Setophaga virens*	S5B
104	38	Blue Jay	*Cyanocitta cristata*	S5
56	38	Dark-eyed Junco	*Junco hyemalis*	S4S5
31	37	Red-eyed Vireo	*Vireo olivaceus*	S5B
20	35	Song Sparrow	*Melospiza melodia*	S5B
43	33	*American Robin	*Turdus migratorius*	S5B,S3N
12	22	Hermit Thrush	*Catharus guttatus*	S5B
13	21	*Purple Finch	*Haemorhous purpureus*	S4S5B, S3S4N, S5M

Number Detected (2021)	Number Detected (2022)	Common Name	Scientific Name	S-rank and Conservation Status
38	20	American Crow	*Corvus brachyrhynchos*	S5
56	18	Common Yellowthroat	*Geothlypis trichas*	S5B
8	15	Swamp Sparrow	*Melospiza georgiana*	S5B
26	13	*Boreal Chickadee	*Poecile hudsonicus*	S3
14	13	Magnolia Warbler	*Setophaga magnolia*	S5B
30	11	Northern Flicker	*Colaptes auratus*	S5B
16	11	Blue-headed Vireo	*Vireo solitarius*	S5B
12	10	Black-and-White Warbler	*Mniotilta varia*	S5B
28	9	American Goldfinch	*Spinus tristis*	S5
17	9	Savannah Sparrow	*Passerculus sandwichensis*	S4S5B,S5M
8	8	Hairy Woodpecker	*Dryobates villosus*	S5
7	8	*Canada Jay	*Perisoreus canadensis*	S3
5	7	Northern Parula	*Setophaga americana*	S5B
13	6	Common Raven	*Corvus corax*	S5
6	6	Downy Woodpecker	*Dryobates pubescens*	S5
3	6	Pileated Woodpecker	*Dryocopus pileatus*	S5
34	5	Palm Warbler	*Setophaga palmarum*	S5B
29	5	Red-breasted Nuthatch	*Sitta canadensis*	S4S5
17	5	Ruby-crowned Kinglet	*Regulus calendula*	S4B, S5M
5	5	Ovenbird	*Seiurus aurocapilla*	S5B
15	4	White-winged Crossbill	*Loxia leucoptera*	S4S5
1	4	*American Kestrel	*Falco sparverius*	S3B, S4S5M
1	4	Lincoln's Sparrow	*Melospiza lincolnii*	S4B, S5M
0	4	*Pine Siskin	*Spinus pinus*	S3
3	3	*Bay-breasted Warbler	*Setophaga castanea*	S3S4B,S4S5M
3	3	Ruffed Grouse	*Bonasa umbellus*	S5
43	2	Cedar Waxwing	*Bombycilla cedrorum*	S5B
5	2	Brown Creeper	*Certhia americana*	S5
5	2	Sharp-shinned Hawk	*Accipiter striatus*	S5
3	2	Winter Wren	*Troglodytes hiemalis*	S5B
2	2	*Northern Harrier	*Circus hudsonius*	S3S4B
1	2	White-breasted Nuthatch	*Sitta carolinensis*	S4
0	2	Black-throated Blue Warbler	*Setophaga caerulescens*	S5B

Number Detected (2021)	Number Detected (2022)	Common Name	Scientific Name	S-rank and Conservation Status
0	2	Chestnut-sided Warbler	*Setophaga pensylvanica*	S5B
61	1	Canada Goose	*Branta canadensis*	SUB,S4N,S5M
11	1	Nashville Warbler	*Oreothlypis ruficapilla*	S4B, S5M
4	1	Red-tailed Hawk	*Buteo jamaicensis*	S5
2	1	Mourning Warbler	*Geothlypis philadelphia*	S4B, S5M
2	1	Blackburnian Warbler	*Setophaga fusca*	S4B, S5M
0	1	*Philadelphia Vireo	*Vireo philadelphicus*	S2?B,SUM
0	1	*Northern Goshawk	*Accipiter gentilis*	S3S4
0	1	Swainson's Thrush	*Catharus ustulatus*	S4B,S5M
0	1	Barred Owl	*Strix varia*	S5
0	1	Mourning Dove	*Zenaida macroura*	S5
0	1	Yellow Warbler	*Setophaga petechia*	S5B
7	0	American Pipit	*Anthus rubescens*	S4M
6	0	*Cape May Warbler	*Setophaga tigrina*	S3B,SUM
4	0	American Redstart	*Setophaga ruticilla*	S5B
4	0	Ruby-throated Hummingbird	*Archilochus colubris*	S5B
3	0	*Red Crossbill	*Loxia curvirostra*	S3S4
3	0	American Woodcock	*Scolopax minor*	S5B
2	0	Spruce Grouse	*Falcipennis canadensis*	S4
2	0	Bald Eagle	*Haliaeetus leucocephalus*	S5
1	**0**	**Canada Warbler**	***Cardellina canadensis***	**S3B SARA: T NSESA: E**
1	0	Belted Kingfisher	*Megaceryle alcyon*	S4S5B
1	0	Least Flycatcher	*Empidonax minimus*	S4S5B, S5M
1	0	Alder Flycatcher	*Empidonax alnorum*	S5B
1	0	Common Grackle	*Quiscalus quiscula*	S5B
1	0	Double-crested Cormorant	*Phalacrocorax auritus*	S5B
1167	**785**	**Total Number of Birds Detected**		

Bold indicates a species is considered a SAR
* indicates a species is considered a SoCC

Overall, many of the birds detected within the assessment area during the Fall Migration Point Counts are ranked S4 or S5 by the AC CDC, indicating that their populations within Nova Scotia are considered 'Apparently Secure' or 'Secure', respectively. During the fall Point Count surveys, one bird SAR was identified in 2021 and 13 SoCC were identified during one or

both years of the surveys (including American Robin and Purple Finch which have non-breeding populations in Nova Scotia that are considered vulnerable by the AC CDC). Cape May Warbler and Red Crossbill were observed only in 2021, whereas Pine Siskin, Philadelphia Vireo and Northern Goshawk bird SoCC were only observed in 2022. A discussion of detected SoCC and SAR is available in **Section 3.1.7.5**.

Fall Migration Diurnal Watch Counts

Fall Diurnal Watch Counts provide information on the abundance, species, and behaviour of birds flying over the study area during daylight hours. Raw data collected from Point Count surveys and a summary of the weather and site observations is provided in **Appendix G**.

A summary of the behaviours and estimated pass heights of the 24 bird species that were observed during the Fall Diurnal Watch Counts is presented in **Table 28**.

TABLE 28: SUMMARY OF DIURNAL SPECIES OBSERVED DURING THE FALL SURVEYS (2021-2022)

Common Name	Scientific Name	S-Rank	Pass Height (m)	Observed Behaviours
American Crow	*Corvus brachyrhynchos*	S5	<50-100	Passing through
American Goldfinch	*Spinus tristis*	S5	<50	Passing through
American Kestrel	*Falco sparverius*	S3B, S4S5M	<50-100	Passing by, perching, female hunting in cutover areas, soaring
American Robin	*Turdus migratorius*	S5B,S3N	<50	Passing through
Bald Eagle	*Haliaeetus leucocephalus*	S5	50>250	Circling, soaring, passing by, gaining altitude, mature and juvenile birds
Blue Jay	*Cyanocitta cristata*	S5	<50	Staying within or just above canopy
Broad-winged Hawk	*Buteo platypterus*	S5B		Passing through
Canada Goose	*Branta canadensis*	SUB,S4N,S5M Exotic Breeding	50-100	Passing through
Common Raven	*Corvus corax*	S5	<50-500	Passing, soaring, agitated, circling, calling
Cooper's Hawk		S1?B,SUN,SUM		Hunting
Double-crested Cormorant	*Phalacrocorax auritus*	S5B	250+	Circling to gain altitude, looked like it eventually headed ne

Common Name	Scientific Name	S-Rank	Pass Height (m)	Observed Behaviours
Herring Gull	*Larus argentatus*	S5	<50-250	Passing by, soaring
Large accipiter species			100+	Soaring
Northern Goshawk	*Circus hudsonius*	S3S4	50+	Soaring
Northern Harrier	*Circus hudsonius*	S3S4B	50>-100	No male, one female, passing by, soaring, hunting
passerine spp.	-	-	50-100	Passing through
Red-tailed Hawk	*Buteo jamaicensis*	S5	<50-500	Passing through, soaring, hunting
Savannah Sparrow	*Passerculus sandwichensis*	S4S5B,S5M	<50	Calling, resident bird
Sharp-shinned Hawk	*Accipiter striatus*	S5	50-100	Stooped into woods, soaring, passing through, hunting
Turkey Vulture	*Cathartes aura*	S2S3B,S4S5M	100	Passing
warbler spp.	-	-	<50	Passing through
Yellow-rumped Warbler	*Setophaga coronata*	S5B	<50	Passing through

Fall point counts survey locations were selected to maximize the survey area coverage and include locations that were representative of habitats through the LAA. To allow comparability of the datasets between both survey years, eight of the Point Count locations were surveyed during both years. In general, bird diversity and abundance was observed to decline throughout the fall migratory period between mid-August and October, which is illustrated in **Figure 20**. A summary of diversity and abundance of birds observed at the Point Count locations that were surveyed in 2021 and 2022 is provided in **Table 29**. For comparison, only data from the Point Count locations that were surveyed over two years are displayed on **Figure 20**. As the fall season progresses, more bird species depart from Nova Scotia for their more southerly wintering grounds and fewer species can be expected to remain in the LAA.

TABLE 29: SUMMARY OF FALL BIRD DIVERSITY AND ABUNDANCE BETWEEN 2021 AND 2022

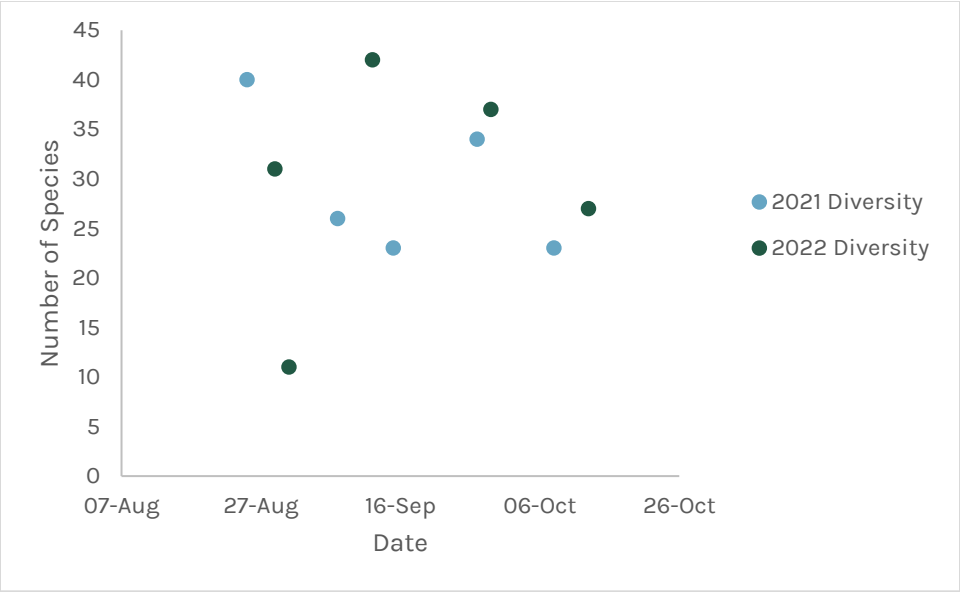
Point Count Location*	Diversity (# species 2021)	Diversity (# species 2022)	Abundance (# birds 2021)	Abundance (# birds 2021)
1	30	22	96	61

Point Count Location*	Diversity (# species 2021)	Diversity (# species 2022)	Abundance (# birds 2021)	Abundance (# birds 2021)
2	24	24	101	75
3	24	23	84	76
4	N/A	16	N/A	45
5	19	22	42	50
6	17	27	70	78
7	28	17	105	34
8	N/A	17	N/A	39
9	N/A	14	N/A	43
10	19	20	41	37
11	27	7	72	16
12	N/A	17	N/A	37
13	N/A	13	N/A	28
14	N/A	11	N/A	18
15	N/A	13	N/A	22
16	N/A	13	N/A	25
17	N/A	12	N/A	28
18	N/A	10	N/A	16
19	N/A	10	N/A	26
20	N/A	18	N/A	33
A	21	N/A	73	N/A
B	20	N/A	74	N/A
C	25	N/A	61	N/A
D	25	N/A	65	N/A
E	20	N/A	105	N/A
F	23	N/A	50	N/A
G	24	N/A	71	N/A
H	19	N/A	39	N/A
Incidentals	6	2	10	3
Total	**63**	**59**	**1159**	**790**

*Point locations were surveyed on 5 occasions in 2021 and 4 occasions in 2022 between August 25 and October 13.

In general, bird diversity and abundance was observed to increase throughout the spring migratory period until mid-May and remained consistent between 2021 and 2022, which is illustrated in **Figure 20.** For comparison between years, only data from the Point Count

locations that were surveyed over two years are displayed on **Figure 20**. As the fall progresses, more bird species return to their wintering grounds from Nova Scotia.



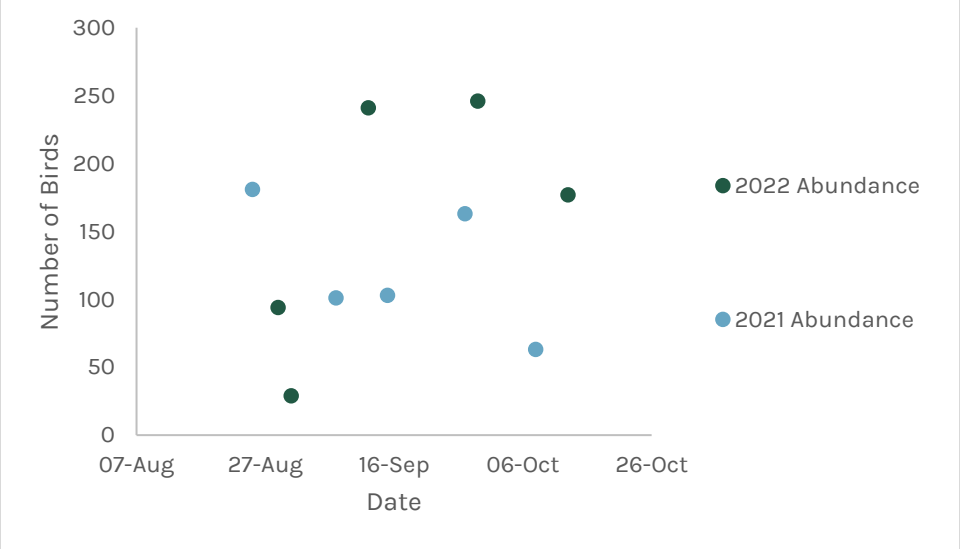


FIGURE 20: DIVERSITY AND ABUNDANCE OF BIRD SPECIES DETECTED DURING THE FALL 2021 AND 2022 MIGRATORY POINT COUNT SURVEYS

Fall Radar and Acoustic Monitoring

As described in further detail in **Appendix H**, some level of active migration was observed on most nights monitored in 2022. Generally, migration intensity increased from the start of monitoring until mid/late September, after which the number of targets detected per night decreased.

When viewing all radar detections combined during the fall season the altitudinal band with the most detections is between 120 and 170 m. Across all nights, a somewhat uniform decline

in targets detected per 50 m altitudinal band between approximately 220 and 800 m (Error! Reference source not found.) is observed. This decline is due in part due to the declining probability of detecting birds at more distant ranges, and potentially, to an actual decrease in the number of birds at increased altitudes. However, it is difficult to separate the effects of these two variables.

The same trends observed during the spring, were seen during the fall, with increased targets detected during increased tailwind assistance and fewer targets detected during increased relative humidity (i.e., increase precipitation). During the middle part of the night (i.e., the bulk of active migration) there is a constant relationship between the two variables. Meaning, that the proportion of targets below 200 m is consistent, irrespective of the total number of targets detected each night. This pattern is different then what was observed during the spring.

Flight calls were analyzed and grouped into one of 18 species groups. Warblers comprised the majority (81%) of NFCs detected during the fall season. The most common species / species group observed were “zeeps” and ovenbirds which comprised 49% of the total detections.

3.1.5.3 Assessment Conclusions

Overall, habitat to support a healthy bird community throughout the year appears to exist within the LAA. It is likely that existing site land uses (e.g., recent forestry activities, blueberry agriculture, trail recreational vehicle use) have influenced the bird community dynamics as a result of vegetation clearing and the generation of noise. There are existing cleared areas within the LAA which limit shelter to high winds and have likely contributed to the lower bird species diversity and abundance observed during the winter months within the LAA.

Point Count survey data indicate that the highest bird diversity within the LAA was observed during the spring migration period (i.e., mid-May to May 31), corresponded with the nesting period (i.e., mid-April to late-August) in the birding zone of the LAA (i.e., Nesting zone C3) (ECCC 2018). The LAA has abundant forest and shrub dominant habitat to support breeding of many forest-nesting bird species. Low bird diversity was observed during the winter field surveys, overall. Habitats within the LAA are exposed to high winds and it is likely that resident bird species would favour habitat present within the surrounding river valleys.

Effects of the Project on birds and bird habitat and the proposed mitigation measures are described in **Section 3.2.6**.

Radar data across both seasons saw most of the targets tend to be at approximately the top of the RSA (i.e., 200 m). Based on experience completing similar studies across the Atlantic region, often during peak nights of migration, the density of targets are generally at a higher altitude, approximately 400 m. The predicted mortality rate of birds due to collision and/or habitat loss cannot be accurately predicted prior to the operational phase. The implementation of a robust post- construction biophysical assessments will improve our understanding of the potential interactions between wind projects and wildlife. The post-construction monitoring programs will aid in the identification of potential interactions and determination of when to implement certain mitigation measures (i.e., reporting to CWS or implementing a temporary shutdown) to reduce further impacts.

When examining differences in detections within nights, most radar and acoustic activity was observed during the middle portion of the night. While some unknown percentage of migrants are likely stopping over at the Project area, given the consistency in distribution of activity within nights the data suggest that a large proportion of migrants are not utilizing the area for staging during migration. However, it should be noted that it is possible that migrants are landing earlier in the night.

Also, most activity was observed when favourable tailwinds were present and with little to no precipitation. These findings are typical to other radar and acoustic studies completed in Nova Scotia (e.g., Peckford and Taylor, 2008; Hemmera 2021). As is typically seen on similar studies in Nova Scotia, the intensity and duration of the spring migration season is much less compared to the fall.

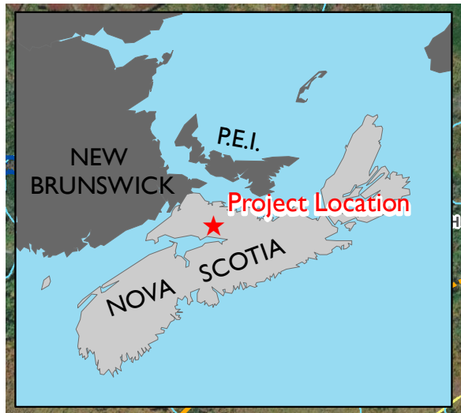
Acoustic monitoring trends pair with the knowledge of what bird communities are using the site and their known habitats.

3.1.6 Bats and Bat Habitat

Scope of VECs

Bats have been identified as one of the biophysical VECs because of their relationship with other biological and physical components addressed as VECs, as well as the potential impacts on bats that the Project can have during all phases of the Project. The Proponent understands that one of the key environmental concerns associated with wind projects is the potential for effects on bats (e.g., barotrauma, collisions, and modifications to flight paths). As such, the Proponent and Dillon consulted with the NSDNRR to develop and undertake a robust bat survey program to identify how PDA is currently utilized by bats.

The LAA for bats and bat habitat included a 120 m buffer area encompassing the access roads and a 1000 m buffer around each proposed WTG location (**Figure 21**). The LAA was defined to align with the OMNR advice to identify bat habitat components that may extend to or within 120 metres of a project location, and in recognition that confirmed habitat can extend as much as 1000 metres beyond an identified point location (OMNR 2011). Bat assessments were conducted in 2021 and 2022, consisting of a background and desktop analysis with a high-level assessment of suitable maternity roosting habitat, and two years of pre-construction surveys including the spring, summer and fall seasons of 2021 and 2022. Details of the survey methodology, analysis and results for both years are presented in **Appendix I**.



NORTH RD
COLLINGWOOD RD
WESTCHESTER RD
HIGHWAY 104
DRYWEATHER
DRE
SILICA RD
WEBB RD
Dead Lake
Little Duck Pond
Duck Pond
Fountain Lake
Bat 2 (2021 and 2022)
Bat 6/Bat 7
Bat 3 (2021)
Bat 5A (2021 and 2022) and 5B
Bat 4 (2021)
Bat 1B (2022)
Bat 1 (2021)
T1
T2
T3
T4
T5
T6
T7
T8
T9
T10
T11
T12
T13
T14
T15
T16
T17
T18
T19
T20
T21
T22
T23
T24
T25
T26
T27
T28

Natural Forces

WESTCHESTER WIND PROJECT

STUDY AREA AND LOCAL ASSESSMENT AREA FOR BATS

FIGURE 21

- Proposed Turbine Location
- Proposed Substation Location
- Bat Meter Locations in 2021 and 2022
- Potential Development Area (PDA)
- Local Assessment Area
- Highway
- Site Parcel
- Watercourse
- Waterbody
- Wetland (Province of Nova Scotia, 2021)

0 0.25 0.5 1 km

N W E S

SCALE 1:25,000

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

MAP CREATED BY: DU
MAP CHECKED BY: KB
MAP PROJECTION: NAD 1983 UTM ZONE 20N

DILLON CONSULTING

PROJECT: 21-1329
STATUS: DRAFT
DATE: 2022-12-09

FILE LOCATION: K:\2021\211329\Product\Internal\Westchester_Figures_2022\Bat Figure 2022\WC_F02_Bat_StudyArea_LAA_2022.mxd

3.1.6.1 Desktop Screening for Priority Species

Approach and Methods

Prior to conducting field work, a high-level desktop screening for priority bat species and habitats within the LAA was completed. The purpose of the screening was to aid in the planning of the field surveys and identify targeted species surveys to include in the bat biophysical assessments. The priority species screening included consultation with NSDNRR wildlife biologists and a desktop analysis, which includes data obtained from a site-specific report provided by the AC CDC.

Readily-available information from reputable sources was reviewed to evaluate the potential for bat SAR and SoCC within the LAA. Dillon completed a review of the following sources and data lists for the purpose of characterizing existing conditions at the Project site:

- AC CDC reports for a list of historical observations of rare fauna and flora within 10 km of the Project centre (AC CDC 2021; 2022; **Appendix K**);
- The Recovery Strategy for the little brown myotis (*Myotis lucifugus*), the northern myotis (*Myotis septentrionalis*), and the tri-coloured bat (*Perimyotis subflavus*) in Canada (ECCC 2018);
- A review of known caves, mines, and other bat hibernacula (i.e., areas where bats hibernate) was conducted (Moseley 2007; NSDNR 2017); and,
- Available mapping was consulted to develop a list of terrestrial habitat types with the potential to be impacted by Project activities and was used to inform the selection of monitoring stations. Approximate extents of different habitat types in the assessment area are presented on **Figure 5**.

Site specific AC CDC reports were generated on May 7, 2021 and September 20, 2022 and include rare and sensitive species historical observations that were reported within 100 km of the Study Area. The AC CDC databases were queried for known observation data of provincial and federal SAR or SoCC within close proximity to the Project site. As of May 2014, the AC CDC was mandated by the Nova Scotia Department of Lands and Forestry (NSDLF) to consider records of certain species as "location-sensitive", including bat hibernacula. This was done in an attempt to reduce the risk that these species will be exploited; as such, the precise locations of these are not openly distributed. The AC CDC does; however, provide information regarding the presence of “location-sensitive” species or features occurring with 5 km of a defined study area.

Results

According to the 2022 AC CDC report, no bat species were historically observed within 10 km of the PDA; however, five bat species were historically recorded within 100 km of the Project centre (AC CDC 2021; 2022):

- Little Brown Myotis (*Myotis lucifugus*);
- Northern Myotis (*Myotis septentrionalis*);

- Tri-coloured Bat (*Perimyotis subflavus*);
- Hoary Bat (*Lasiurus cinereus*); and
- Other bat species (*Vespertilionidae sp*).

Historical observations of these bat SAR and SoCC within 100 km of the PDA as reported by the AC CDC are further described in **Section 3.1.7.6**.

3.1.6.2 Bat Maternity Roost Suitability Assessment

Approach and Methods

To date, only hibernacula sites and not maternity-roosting sites, have been designated critical habitat for bats (ECCC 2018). Hibernacula are used by SAR bats to survive when temperatures decline and insects are unavailable (ECCC 2018) and therefore are necessary for the ongoing survival and eventual recovery of these species. The importance of maternity roosts to the survival and recovery of these three species of bats is evident, however, the locations of the vast majority of maternity roosts are currently either unknown or undocumented, or the data are unavailable to ECCC. The criteria for identifying which maternity roosts would be considered as critical habitat would likely consider species, number of individuals using the roost, whether the roost is within a white nose syndrome (WNS) affected area, and the number of other known maternity roosts in the vicinity (ECCC 2018).

The Bat Maternity Roost Suitability Assessment is a desktop survey based on Phase 1 Bat Habitat Suitability Assessment as identified in the 2017 Ontario Ministry of Natural Resources and Forestry Bat Survey Protocol (OMNRF 2017) for methods for evaluating wildlife habitat significant to bats. Available digital forestry data and Google Earth imagery were used to evaluate the potential for suitable bat maternity within the LAA. According to the OMNRF 2017 Protocol, areas of suitable habitat for maternity roosts can be screened based on the presence of mixed-wood forests or hardwood forests and the presence of snags or cavity trees with ≥25 cm diameter at breast height (dbh). Ecological Land Classification (ELC) mapping was used to identify the locations of forests with ≥25 cm dbh within 1,000 m surrounding the PDA (OMNRF 2017).

Results

Little brown myotis and northern myotis are known to form roosts in forests and swamps with softwood trees (Foster and Kurta 1999). No forest stands with large trees (i.e., ≥25 cm dbh) were identified within the LAA. The locations of mixed-wood or hardwood forest stands and average dbh within the LAA are shown on **Figure 22**, based on available digital forestry data. Although the stand boundaries were reviewed using and Google Earth imagery and observations from the field surveys conducted in 2021 and 2022, there are active forestry practices in the area and the forest stands are expected change.