

APPENDIX N
STANTEC BAT MONITORING PROGRAM



Bat Monitoring Program for
Proposed Wind Project Near
Nuttby, Nova Scotia

Final Report

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BAT MONITORING PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

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1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

Nova Scotia Power Incorporated (NSPI) is the Proponent for the proposed Nuttby Ridge Wind Project, near Nuttby, which is approximately 22 km northeast of Truro, Nova Scotia (the Project). The Project consists of the construction and operation of approximately 16 to 23 wind turbines, in the range of 4 to 6 MW, for a total project capacity of up to 98 MW.

In 2021, Stantec Consulting Ltd. (Stantec) conducted fall acoustic bat surveys for the Project. The purpose of this study was to determine which bat species occur in the Project Boundary and Assessment Area during the fall bat migration period. During this survey, no bats were recorded. However, the detectors were deployed relatively late in the season, and the early portion of the fall migration survey was missed.

In 2022, Stantec was requested by NSPI to undertake spring/summer and fall bat acoustic surveys. This report provides the methods and results of these surveys.

Three species of bats regularly breed in Nova Scotia: little brown myotis (*Myotis lucifugus*), northern myotis (*Myotis septentrionalis*), and tri-colored bat (*Perimyotis subflavus*). All three species are listed as Endangered under Schedule 1 of the federal *Species at Risk Act* (SARA), and under the Nova Scotia *Endangered Species Act* (NSES). After emerging from hibernation in the spring, female bats of these species will form maternity colonies, where they give birth to and raise their pups. Maternity roosts are an important habitat component that should be investigated during the wind project pre-construction surveys. Maternity roosts for these species typically occur in older forest stands that have snags and other trees in various stages of decay, as well as suitable foraging habitat (Environment Canada 2015). Tri-colored bats in Nova Scotia form maternity colonies in *Usnea trichodea* lichens, which typically grow on conifer trees (Poissant et al. 2010).

Four other species of bats occur irregularly in Nova Scotia, including hoary bat (*Lasiurus cinereus*), eastern red bat (*Lasiurus borealis*), silver-haired bat (*Lasionycteris noctivagans*), and big brown bat (*Eptesicus fuscus*) (Broders 2004). The first three of these irregularly occurring species are migratory, tree-roosting bats, which are typically the most susceptible to strikes at wind farms (Arnett et al. 2008; Lausen et al. 2010).



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1.2 PROJECT AREA DESCRIPTION

The Project Boundary shown on Figure 1 (in red) refers to the area within which the turbines will be located. A wider Assessment Area (Figure 1; in black) indicates the area within which additional surveys were conducted. In some cases, survey locations are outside the Project Boundary and Assessment Areas where earlier study area boundaries were used.

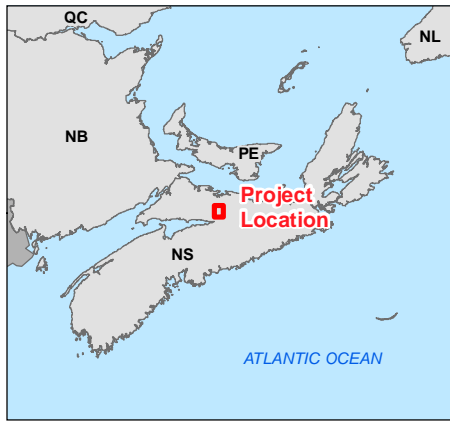
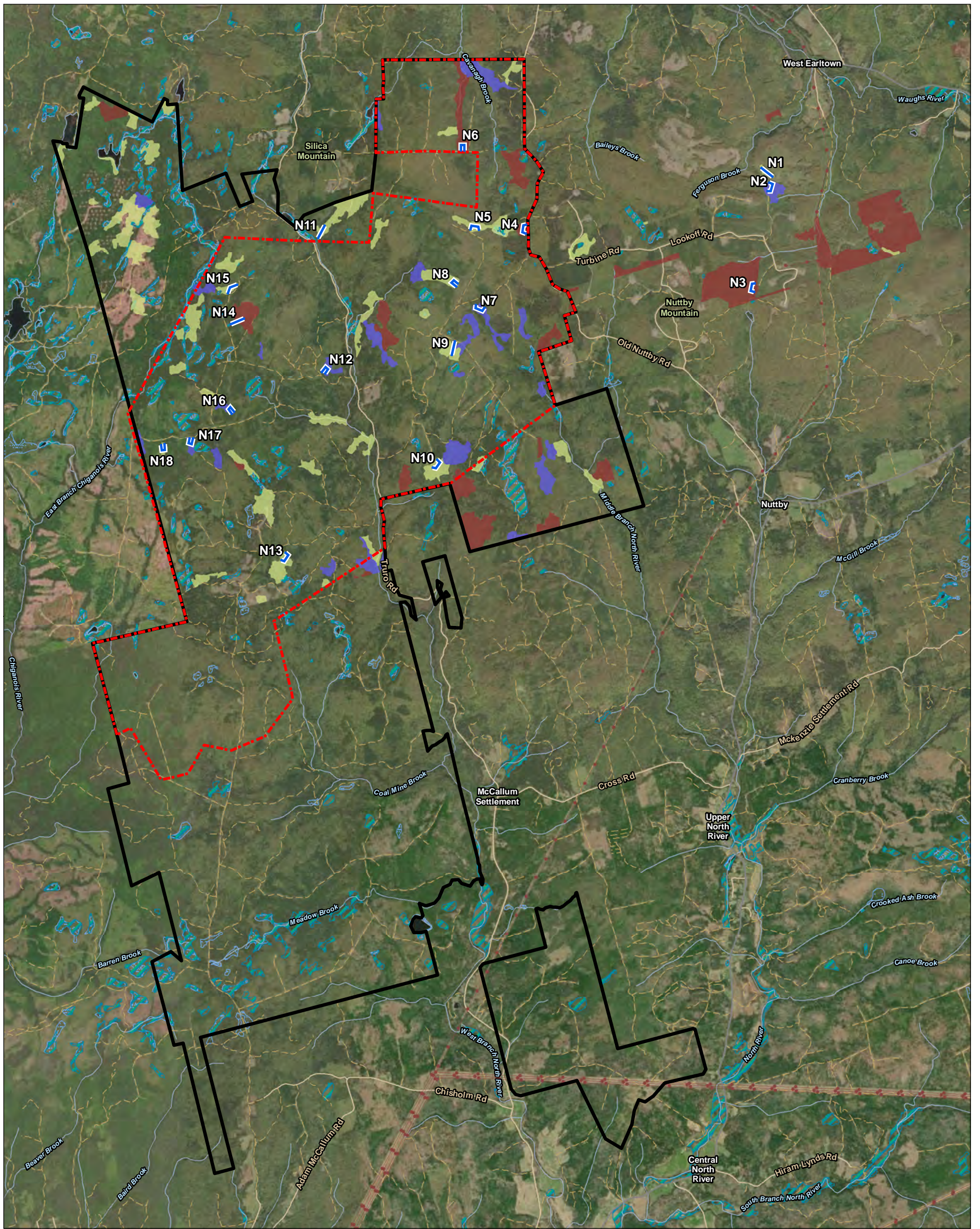
The Project is located approximately 22 km northeast of Truro, Nova Scotia, and is situated in the Uplands Ecoregion of Nova Scotia. The Project Boundary lies completely within the Cobequid Hills Ecodistrict, with southern parts of the Assessment Area within the Cobequid Slopes Ecodistrict.

The Uplands Ecoregion of Nova Scotia is characterized by a geographically complex band of rounded summits and plateaus separated by lower elevation uplands and lowlands that extend across northern mainland Nova Scotia (Nova Scotia Department of Natural Resources (NSDNR) 2017). This Ecoregion experiences more severe winters, greater precipitation, and shorter growing seasons than surrounding Ecoregions, which has given rise to the dominant Acadian hardwood forest of sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*).

The Project Boundary lies within the Cobequid Hills Ecodistrict which is a narrow upland extending approximately 150 km in an east-west direction between the towns of Pictou and Parrsboro. This Ecodistrict is characterized by large intact late-successional Acadian shade tolerant hardwood forests. Representative species include sugar maple, American beech, and yellow birch, with white ash (*Fraxinus americana*) and ironwood (*Ostrya virginiana*) on richer soils. At upper elevations, the hills give way to a level or hummocky plateau-like topography with forests of red spruce (*Picea rubens*) and black spruce (*Picea mariana*) occurring on moderately-well to imperfectly drained soils.

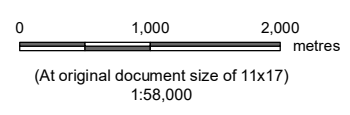
Southern portions of the Assessment Area lie within the Cobequid Slopes Ecodistrict. This Ecodistrict is characterized by a series of steep to moderate grades on the south side of the Cobequid Mountains. The climate is moderate and relatively humid. Red spruce forests occur on the middle to lower slopes of rounded hills. Sugar maple, yellow birch, and American beech are dominant on slopes or crests where soils are rich. Elsewhere, a shade tolerant mixedwood forest exists, usually dominated by red spruce, eastern hemlock (*Tsuga canadensis*), and yellow birch with occasional sugar maple, American beech, and eastern white pine (*Pinus strobus*).





- Project Boundary, February 2023
- Assessment Area, February 2023
- Maternal Roosting Habitat**
- Softwood
- Mixedwood
- Hardwood
- Survey Transect

- Collector Road
- Local Road
- Resource Road / Trail
- Transmission Line
- Watercourse
- Wetland (NSE)
- Wetland (NHN)
- Waterbody



Project Location: Nuttby Mountain, Nova Scotia
 Client/Project: Nova Scotia Power Inc., NSPI Wind EA Support Services
 Prepared on 2023-03-02
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Figure No. **1**
 Title **Bat Maternal Roosting Habitat Assessment: Nuttby Ridge**

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2.0 METHODS

2.1 BAT DETECTOR SITE SELECTION

At the time of surveys, the final turbine layout had not been determined. It was therefore not possible to deploy bat detectors at potential turbine locations. Instead, bat detectors were deployed in areas with high quality bat habitat. Two main types of bat habitat were considered: maternity roost habitat and foraging habitat. Foraging often typically occurs at wetlands, waterbodies, watercourses, or other forest clearings or edges. These features are identifiable from provincial GIS datasets and satellite imagery. It is important to note that this analysis was done using a former study area boundary. The current Project Boundary is much smaller and excludes much of the former study area.

Areas with high potential to support maternity colonies have characteristics that are not easily identified from existing GIS data or satellite imagery. A habitat assessment was therefore conducted to identify maternity roost habitat within the Assessment Area. This habitat assessment was conducted in two phases, first through a desktop review, and second by field surveys in the spring of 2022.

As a first step for estimating the presence of suitable bat roosting habitat within the Assessment Area, a desktop analysis was performed using GIS. Forest inventory data from the Nova Scotia Department of Natural Resources and Renewables (NSDNRR 2021) were mapped, and areas with mature and old or mixed-aged forest (including coniferous, deciduous and mixedwood forest) with an average diameter of at least 17 centimetre (cm) diameter at breast height (DBH) (i.e., that contain larger trees that may provide roosting habitat) were identified (Figure 1). The data, received from NSDNRR in 2022, are based on aerial photography from 2004 to 2012. The data were modified based on more recent satellite imagery to remove areas that have been harvested since the data were interpreted. Forest stands that represented potential bat roosting habitat were identified, and a subset of 18 forest stands were chosen for field verification.

Stantec biologists visited each of the 18 selected stands to verify the habitat and to assess the potential for maternity roost sites. A 200 metre (m) transect was plotted in GIS at each of the stands (Figure 1). At each site, surveyors walked this transect to determine the presence of potential maternity roost trees and noted their observations on a data sheet (Appendix A) to document the presence/relative abundance of snags, trees in decay classes 1-3 (early decay, as per Watt and Caceres 1999), *Usnea trichodea* lichen, and trees with cracks, crevices or/or peeling banks (and distinguished between trees with a DBH of >25 cm or between 10 and 25 cm). Notes were taken on overall site characteristics and dominant tree species. These surveys were conducted prior to leaf out, where it is easiest to look for specific trunk characteristics (e.g., cavities and cracks). Results of the habitat surveys are presented in Appendix B.



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Based on the results, the sites with the highest potential to support maternity colonies were identified. Sites were deemed as suitable for a bat detector if they met at least one of the following selection rules:

- Two or more of the following were ranked as common or abundant, OR three or more were ranked as uncommon or above, with at least one as common or abundant:
 - presence of snags
 - presence of trees in decay classes 1-3
 - presence of trees with DBH > 25 cm containing cavities/cracks/crevices
 - or presence of trees with DBH > 25 cm containing loose peeling bark
 - *Usnea* presence is common or abundant

Of the 18 sites surveyed, 12 met these criteria. Seven bat detector locations were chosen to represent both foraging and maternity roost habitat, to provide adequate site coverage, and to be representative of habitat types identified. In addition, one bat detector was also deployed near the radar location, as requested by NSDNRR.

2.2 DATA COLLECTION

Eight bat detectors (i.e., Wildlife Acoustic Song Meter Mini Ultrasonic Recorders) were deployed. These devices passively record the ultrasonic echolocation calls of passing bats.

Each detector was programmed to be active from 30 minutes prior to sunset until 30 minutes after sunrise. The detector settings are shown in Table 2.1.

Table 2.1 Mini Bat Acoustic Detector Settings

Mini Bat Acoustic Detector Settings	
Recording format	Full-Spectrum
Sample rate	256 kHz
Minimum trigger frequency	12 Khz
Maximum length	15 seconds
Trigger window	3 seconds
Save noise?	No
Gain	12 dB

The detector settings were chosen based on the species with potential to occur in this area, and on standard settings that are typically used for bat detection in this region.

Acoustic monitoring has known limitations. It is not always possible to identify species based on bat recordings. The calls of some species are so similar that they cannot always be distinguished from each other at a site. The number of bats present cannot be determined from acoustic monitoring. It cannot be known if all recordings represent individual bats, or if one bat was recorded on multiple occasions.



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2.2.1 Spring/Summer 2022

Eight bat detectors were deployed on June 25, 2022 (Figure 2). These detectors recorded for between 31 and 39 nights, depending on battery life, before they were picked up in early August.

2.2.2 Fall 2022

Seven bat detectors were deployed on August 26, 2022, and an eighth was deployed on September 14. Detectors were deployed at the same locations used for spring/summer 2022 (Figure 2). Batteries and SD cards were replaced on either September 14 or 23, and again on October 21, before being picked up on November 3 or 4. These detectors recorded for between 29 and 62 nights.

2.3 DATA ANALYSIS

The acoustic data were analysed using Wildlife Acoustics' Kaleidoscope Pro software. The data processing through Kaleidoscope Pro involves running the software's automatic identification, which screens out noise files (that were not previously screened out by the detector) and provides a suggested species for each bat call file. In some cases, species cannot reliably be identified based on the quality of the call. These calls are categorized as No ID by the software.

Calls were manually reviewed by a qualified biologist to confirm the identification. Where a call was reviewed and determine to be in the *Myotis* genus, but a species ID was not possible, it was categorized as *Myotis* species. In other instances, if a call was manually reviewed and of a high frequency (>35khz), and thus potentially representative of a species at risk (SAR) bat, it is categorized as 'high frequency unknown'. The category includes all SAR species (little brown myotis, northern myotis, and tri-colored bat), as well as eastern red bat. Alternatively, low frequency calls (<35khz) that could not be identified to species were categorized as 'low frequency unknown'. These calls could represent hoary, silver-haired, or big brown bats.

3.0 RESULTS

3.1 DETECTOR LOCATIONS

Based on the background habitat review and field habitat surveys described above, eight locations were chosen for bat detector deployment. The locations of the detectors are summarized in Table 3.1, and are shown on Figure 2.

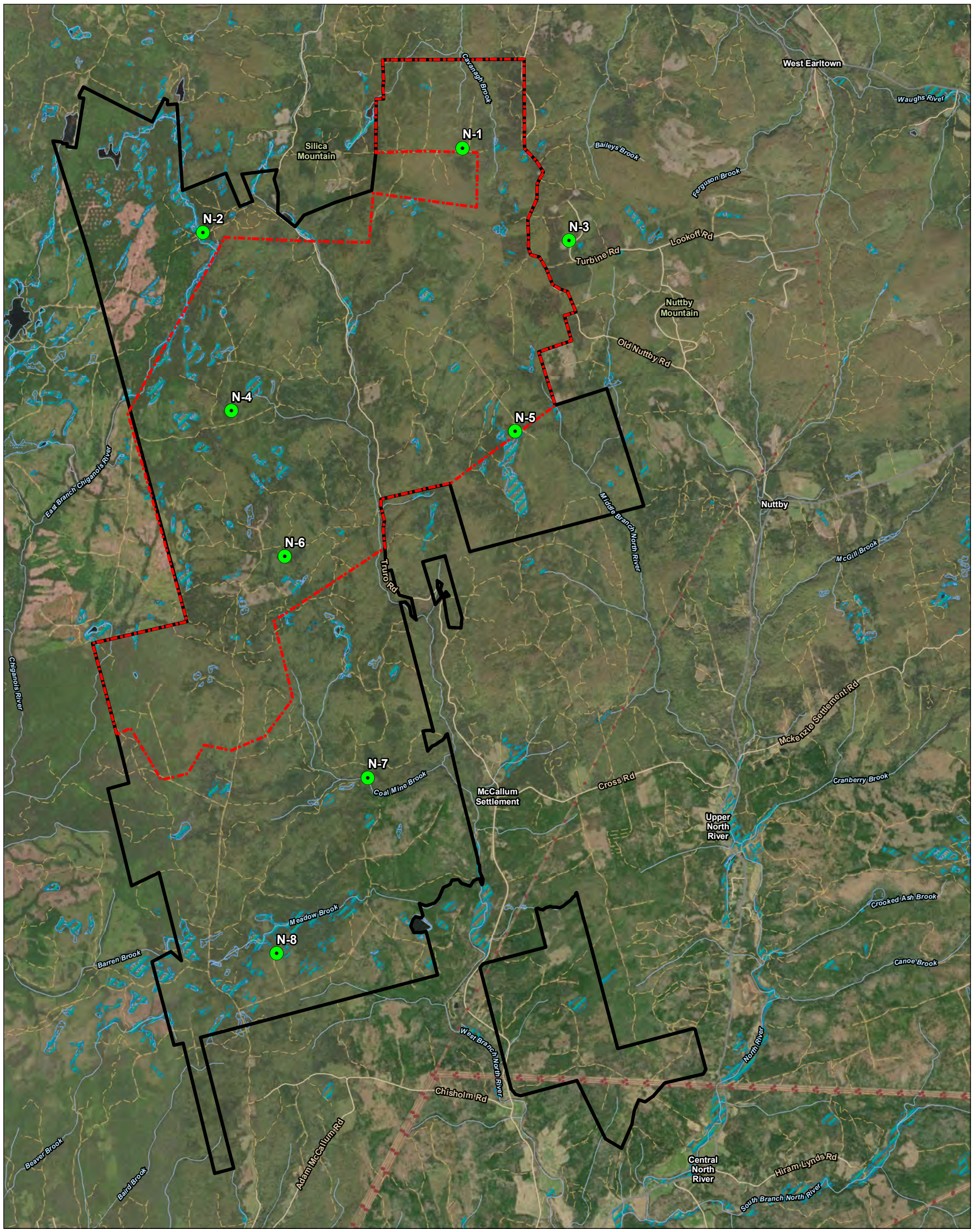


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Table 3.1 Location of Bat Detectors

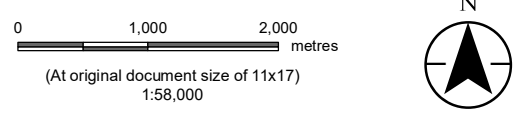
Detector Number	Detector Location	Detector Location Details	Mapped Habitat Type	Surrounding Habitat
N-1	In Project Boundary	<ul style="list-style-type: none"> In a balsam fir tree, 2 m above ground level 	Mature Softwood	<ul style="list-style-type: none"> Forest is dominated by yellow birch, balsam fir, red spruce, and Manitoba maple Adjacent to a mixedwood treed swamp with moderate tree mortality
N-2	In Assessment Area	<ul style="list-style-type: none"> In a balsam fir tree, 2 m above ground level Facing an open wetland 	Swamp	<ul style="list-style-type: none"> Low shrub swamp There is a water course flowing through the wetland that is approx. 3.5 m wide
N-3	Outside Assessment Area	<ul style="list-style-type: none"> In a spruce tree, approximately 1.5 m above ground level Located at the radar site 	Established Clearcut	<ul style="list-style-type: none"> Open area surrounded by regenerating clearcut
N-4	In Project Boundary	<ul style="list-style-type: none"> In a red spruce tree, 2 m above ground level 	Mature Mixedwood	<ul style="list-style-type: none"> Mature mixedwood stand containing red spruce, balsam fir, yellow birch, and red maple There is an active OHV trail nearby, and the detector is located approximately 25 m off trail.
N-5	In Project Boundary	<ul style="list-style-type: none"> In a balsam fir tree, 2 m above ground level 	Multi-aged/Old Softwood	<ul style="list-style-type: none"> Spruce and fir forest overlooking wetland Behind the detector, there is a treed bog with a recent clear cut
N-6	In Project Boundary	<ul style="list-style-type: none"> In a red spruce tree, 2 m above ground level 	Young Mixedwood	<ul style="list-style-type: none"> 70- to 100-year-old stand dominated by red spruce.
N-7	In Assessment Area	<ul style="list-style-type: none"> In a fir tree, 2 m above ground level Facing a wetland / watercourse open area 	Swamp/Water	<ul style="list-style-type: none"> At edge of watercourse fringed by tall shrub swamp and a mixed age/species stand. Stand includes balsam fir, red spruce, red maple, yellow birch.
N-8	In Assessment Area	<ul style="list-style-type: none"> In a black spruce tree, 2 m above ground level Microphone facing open area at the end of a road 	Mature Hardwood	<ul style="list-style-type: none"> 10-year-old clearcut immature mixedwood stand that includes red maple, black spruce, grey birch, and white birch





Notes
 1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
 2. Data Sources: Government of NS, Client, Stantec
 3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- Bat Detector Location
- Project Boundary, February 2023
- Assessment Area, February 2023
- Collector Road
- Local Road
- Resource Road / Trail
- Transmission Line
- Watercourse
- Wetland (NSE)
- Wetland (NHN)
- Waterbody



Project Location
 Nuttby Mountain
 Nova Scotia

Client/Project
 Nova Scotia Power Inc.
 NSPI Wind EA Support Services

Prepared on 2023-02-23
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Figure No.
2

Title
Bat Survey Locations: Nuttby Ridge

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3.2 SPECIES

Three species of bats were recorded: little brown myotis, hoary bat and silver-haired bat. Little brown myotis was the most commonly recorded species. Some bat calls could not be identified to species, due to the quality of the call. These calls were categorized as high frequency unknown or low frequency unknown. One call was classified as silver-haired or big brown bat; these two species can have very similar calls, and thus could not be distinguished.

3.3 SPRING/SUMMER RESULTS

A total of 51 bat calls were recorded during the spring/summer acoustic surveys (Table 3.2). Two species of bats were confirmed from these recordings. Little brown myotis was the most commonly recorded species, with 35 recordings over three detectors. Most of these recordings (29) were at N-2, which is located at an open wetland containing a watercourse. Little brown myotis were recorded throughout the survey period, from June 25 to August 1. In addition, six high-frequency unknown calls were recorded over four detectors, which may represent a *Myotis* species, a tri-colored bat, or red bat.

Six hoary bat calls were recorded at detector N-2. Four of these calls were recorded on June 22, and two were recorded on June 27. Four low frequency unknown calls were also recorded at two detectors.

Table 3.2 Results of Spring/Summer Bat Surveys

Detector ID	Location	Recording Dates (2022)	# Recording Nights	Number of Recorded Files per Species				
				Little Brown <i>Myotis</i>	Hoary Bat	HFU	LFU	Total
N-1	In Project Boundary	25-Jun to 3-Aug	39					0
N-2	In Assessment Area	25-Jun to 1-Aug	37	29	6	3	3	41
N-3	Outside Assessment Area	25-Jun to 29-Jul	34			1		1
N-4	In Project Boundary	25-Jun to 31-Jul	36	1				1
N-5	In Project Boundary	25-Jun to 26-Jul	31			1		1
N-6	In Project Boundary	25-Jun to 30-Jul	35					0
N-7	In Assessment Area	25-Jun to 2-Aug	38					0
N-8	In Assessment Area	25-Jun to 3-Aug	39	5		1	1	7
Total				35	6	6	4	51
Notes: HFU – High Frequency Unknown; LFU – Low Frequency Unknown								



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3.4 FALL RESULTS

Overall, the number of bats detected during the fall period was quite low, with only 13 recorded calls (Table 3.3). Two species were confirmed during the fall surveys: little brown myotis and silver-haired bat. Little brown myotis were recorded at detector N-5, which was in a softwood forest adjacent to a forested bog. The recordings occurred on September 3 and 5. Silver-haired bat was recorded at N-8, located at a 10-year-old clearcut in the southern portion of the Project Boundary. These recordings occurred on September 3 and 4. One other low-frequency call occurred on September 10, which may have been a silver-haired or big brown bat. Due to the similarity of these calls, they could not be distinguished in this instance. Seven high-frequency calls also occurred over four detectors. All bat calls during the fall period were recorded between August 26 and September 19.



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Table 3.3 Results of Fall Bat Surveys

Detector ID	Location	Recording Dates (2022)	# Recording Nights	Number of Recorded Files per Species				
				Little Brown <i>Myotis</i>	Silver-haired Bat	Silver-haired OR Big Brown Bat	HFU	Total
N-1	In Project Boundary	26-Aug to 14-Oct 23-Oct to 3-Nov	60					0
N-2	In Assessment Area	14-Sep to 1-Oct 22-Oct to 3-Nov	29					0
N-3	Outside Assessment Area	26-Aug to 3-Oct 21-Oct to 4-Nov	62				1	1
N-4	In Project Boundary	26-Aug to 9-Oct	44			1		1
N-5	In Project Boundary	26-Aug to 12-Oct 24-Oct to 3-Nov	57	2			2	4
N-6	In Project Boundary	26-Aug to 12-Oct 21-Oct to 4-Nov	55					0
N-7	In Assessment Area	26-Aug to 13-Oct 22-Oct to 3-Nov	60				2	2
N-8	In Assessment Area	26-Aug to 11-Oct 21-Oct to 4-Nov	60		2		3	5
Total				2	2	1	7	13
Notes: HFU – High Frequency Unknown								



4.0 DISCUSSION

Overall, bat detections were relatively low at most detectors. This is likely an indication of the low population of resident bats in Nova Scotia that has resulted from white-nose syndrome. There are signs that bat populations in Nova Scotia are starting to rebound from the steep declines that occurred at the onset of WNS in 2012/2013 (CBC 2021). Because of these population changes, these results will likely not be directly comparable to future bat data.

Little brown myotis was the most common species during the spring/summer seasons. This species is a resident in Nova Scotia and is a SAR. The high number of June and July records from N-2 suggest that little brown myotis are likely breeding in that general area. However, it is important to note that the number of recording nights varied by detector, and thus the results cannot be directly compared between detectors. Fall records of little brown myotis may be representative of animals that are foraging or making short distance movements to swarming or hibernation sites.

Two migratory species were confirmed in the Assessment Area: hoary bat and silver-haired bat. Both of these species are relatively rare in Nova Scotia. The records of hoary bats occurred during July, which is representative of the breeding season for this species. It is not known if the recorded individuals are breeding in the area. In Nova Scotia, most records of hoary bats occur during fall migration; however, records of this species from the breeding season have previously occurred (Lucas and Hebda 2011).

Two records of silver-haired bat were recorded during the fall migration period, when this species is moving southwards towards wintering areas. Overall, the number of recorded silver-haired (and other low frequency calls representing migratory bats) during the fall migratory period was low. That may indicate a low amount of migratory activity in this area. However, it is also important to note that all detectors were deployed at ground level, and thus migrants flying at height will have been missed.

5.0 RECOMMENDATIONS

To obtain two years of pre-construction bat monitoring, acoustic surveys should be repeated during the spring/summer of 2023. For the 2022 surveys, detectors were not deployed until June 25, at which point most of the spring migratory activity was over. Detectors should be deployed earlier in 2023 (i.e., in early May) to capture this period. These detectors will remain deployed until June 30 to capture the main breeding period. With general turbine locations now determined, detectors will be placed at or near the proposed turbine locations. In addition, now that the Project Boundary has been finalized, a habitat assessment should be conducted for the areas requiring vegetation clearing. This will help to determine the quantity and quality of bat habitat that will be lost because of the Project.

Once the Project is operational, two years of post-construction mortality monitoring should occur.



6.0 CLOSURE

The information presented in this report represents the best technical judgment of Stantec based on information provided by NSPI and the data obtained from the work. Conclusions are based on site conditions observed by Stantec at the time the work was performed at the specific survey locations and cannot be extrapolated to other areas around these locations.



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\\ca0213-ppfss01\work_group\1214\active\121417191\05_report_deliverable\121417191_deliverable\fnl_07_bat_fall_2022_results\nuttby
report\fnl_rpt_121417191_nspi_nuttby_bats_20230313.docx



APPENDIX A

Maternity Roost Habitat Assessment Data Sheet

Study Area _____
Stand ID _____
Date _____
Time _____
Field Staff _____

Clumps of Usnea Lichen	<input type="checkbox"/> Present	<input type="checkbox"/> Uncommon	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant
Snags	<input type="checkbox"/> Present	<input type="checkbox"/> Uncommon	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant

Trees with DBH > 25 cm, containing:

Crevices and/or cracks	<input type="checkbox"/> Present	<input type="checkbox"/> Uncommon	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant
Peeling bark	<input type="checkbox"/> Present	<input type="checkbox"/> Uncommon	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant

Trees with DBH > 10 cm, containing

Crevices and/or cracks	<input type="checkbox"/> Present	<input type="checkbox"/> Uncommon	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant
Peeling bark	<input type="checkbox"/> Present	<input type="checkbox"/> Uncommon	<input type="checkbox"/> Common	<input type="checkbox"/> Abundant

Main Tree Species Present: _____

Overall Site Notes: _____

APPENDIX B

Habitat Data

Table B1 Field data: Maternity Roost Habitat Suitability Surveys

Forest Stand ID	Location	Date	Time	Staff	Clumps of Usnea Lichen	Snags	Trees in Decay Classes 1-3	Trees with DBH > 25 cm		Trees with DBH > 10 cm		Main Tree Species Present	Overall Site Notes
								Trees with DBH > 25 cm: Cavities / Cracks / Crevices	Trees with DBH > 25 cm: Loose peeling bark	Cavities / Cracks / Crevices	Loose Peeling Bark		
N1	Oustide Assessment Area	5/7/2022	11:05 AM	JR, CB	Present	Uncommon	Uncommon	Uncommon	Uncommon	Uncommon	Uncommon	<i>Abies balsamea, Fagus grandifolia, Picea spp.</i>	Upland habitat - quite exposed at top of hill. Lots of young balsam fir & spruce. Some tall snags (maple?) that have some potential (containing cavities) but very thick understory. No water nearby. Not great potential, but if we do want to know potential activity @ a potential turbine location (high up, exposed) this would be good. Looks like they may be putting a turbine near here. Recently cleared area = pad?
N2	Oustide Assessment Area	5/7/2022	11:30 AM	JR, CB	None	Common	Common	Uncommon	Uncommon	Uncommon	Uncommon	<i>Abies balsamea, Betula papyrifera, Fagus grandifolia, Acer saccharum</i>	Overall, better habitat than site N1. Some larger snags with cavities/peeling bark. Habitat is better lower near watercourse. Moderate potential. Some areas have lots of young balsam fir. Better, potential trees mostly white birch/maple.
N3	Oustide Assessment Area	5/7/2022	12:10 PM	JR, CB	-	-	-	-	-	-	-	-	Recently cut - no potential
N4	In Project Boundary	4/26/2022	3:46 PM	HB, DM, MB	None	Common	Common	Present	Present	Uncommon	Uncommon	<i>Acer. sp., Fagus grandifolia, Betula alleghaniensis</i>	Partial cut, 50/50 snags to living trees
N5	In Project Boundary	4/26/2022	2:39 PM	HB, DM, MB	Present	Uncommon	Common	Present	Uncommon	Present	Present	<i>Picea rubens, Acer rubrum, Abies balsamea</i>	Generally mature healthy mixed wood stand, lots of immature balsam fir in the understory.
N6	In Project Boundary	5/11/2022	10:30 AM	SW, MR	Present	Uncommon	Common	Common	Uncommon	Present	Present	<i>Acer saccharum, Betula papyrifera/alleganiensis (60%), Abies balsamea, Picea glauca</i>	Moderate habitat. No water feature present. The portion of transect that's furthest from the road has the most mature trees.
N7	In Project Boundary	4/26/2022	3:15 PM	HB, DM, MB	Present	Uncommon	Common	Uncommon	Common	Present	Uncommon	<i>Picea rubens, Acer rubrum, Abies balsamea</i>	Generally healthy mature mixed wood stand, ends in partial cut. Active pileated woodpecker snag.
N8	In Project Boundary	4/26/2022	1:58 PM	HB, DM, MB	Present	Uncommon	Common	Uncommon	Uncommon	Present	Uncommon	<i>Betula alleghaniensis, Picea rubens, Abies balsamea, Acer rubrum, Fagus grandifolia</i>	Generally mature healthy mixed wood stand, some die back, dense balsam fir understory in places.
N9	In Project Boundary	4/26/2022	12:42 PM	HB, DM	Present	Common	Common	Present	Uncommon	Uncommon	Common	<i>Picea mariana, Abies balsamea, Picea rubens</i>	Narrow strip of mature conifer with understory of balsam fir. Riparian strip with stream running down center. Many decayed snags with peeling bark.
N10	In Project Boundary	4/26/2022	12:30 PM	MJC, MB	Present	Common	Present	Present	Present	Present	Present	<i>Picea rubens (40%), Acer rubrum (5%), Betula alleghaniensis (10%)</i>	Stand partially harvested. Also partially flooded by heavier activity. Many dead trees (conifers) >5 years dead.
N11	In Assessment Area	5/11/2022	11:12 AM	SW, MR	Present	Common	Common	Common	Uncommon	Uncommon	Uncommon	<i>Betula papyrifera, Acer saccharum, Abies balsamea, Picea rubens</i>	Good site, best habitat is closest to road. Decent stream running along transect, dozens of mature deciduous trees with cracks/crevices.
N12	In Project Boundary	5/7/2022	12:50 PM	JR, CB	None	Uncommon	Uncommon	Uncommon	Uncommon	Uncommon	Common	<i>Abies balsamea, Betula papyrifera, Picea spp.</i>	Moderate potential. Overall good habitat for foraging - but not tons of large mat colony suitable trees. But there are some (snags) with good surrounding habitat. Suitable, but not top priority for an ARU.
N13	In Project Boundary	5/10/2022	9:46 AM	SW, SB	Present	Common	Uncommon	Present	Uncommon	Present	Present	<i>Picea rubens, Abies balsamea, Betula papyrifera, Acer saccharum</i>	50% of transect spruce regen. Mostly coniferous forest. No water feature. Not great habitat. Blowdown with spruce (2ft) regen beneath. More mature forest closer to road not in transect.
N14	In Project Boundary	5/10/2022	3:00 PM	SW, SB	Present	Common	Uncommon	Uncommon	Uncommon	Uncommon	Uncommon	<i>Picea glauca & Abies balsamea (95%), Betula papyrifera</i>	Western portion of transect nearest to wetland may have potential. Eastern portion of transect predominantly white spruce regen.
N15	In Project Boundary	5/10/2022	2:35 PM	SW, SB	Present	Common	Uncommon	Uncommon	Uncommon	Uncommon	Uncommon	<i>Picea glauca & Abies balsamea (90%), Betula papyrifera</i>	Poor habitat. Southern portion of transect spruce regen approx 5 years old. Northern half mature spruce forest. No water feature.
N16	In Project Boundary	5/10/2022	12:57 PM	SW, SB	Present	Uncommon	Common	Common	Common	Present	Present	<i>Acer saccharum, Betula papyrifera, Betula alleghaniensis, Picea rubens, Abies balsamea</i>	Moderate habitat. No water feature present. Large birch and maple with numerous cracks, crevices and peeling bark.
N17	In Project Boundary	5/10/2022	1:25 PM	SW, SB	Uncommon	Uncommon	Common	Uncommon	Uncommon	Uncommon	Uncommon	<i>Abies balsamea/Picea rubens (80%), Betula papyrifera, Acer saccharum</i>	Dominated by conifer forest (mature). No water feature. Understory open (1ft balsam fir seedlings coming in). Moderate habitat.
N18	In Project Boundary	5/10/2022	1:45 PM	SW, SB	Present	Present	Common	Present	Present	Present	Present	<i>Picea rubens, Picea glauca, Abies balsamea</i>	Poor habitat. Dominated by white spruce. Selectively harvest with resulting numerous blowdowns. Harvest approx 1-2 years ago.

APPENDIX C

Bat Records

Table C.1 Results of Spring Bat Surveys - Nuttby Ridge

Detector ID	Location	File Name	Date	Time	Species
N-2	In Assessment Area	SMU08502_20220625_233135.wav	6/25/2022	23:31:35	MYOLUC
N-2	In Assessment Area	SMU08502_20220626_032537.wav	6/26/2022	3:25:37	MYOLUC
N-2	In Assessment Area	SMU08502_20220628_235529.wav	6/28/2022	23:55:29	MYOLUC
N-2	In Assessment Area	SMU08502_20220709_004356.wav	7/9/2022	0:43:56	MYOLUC
N-2	In Assessment Area	SMU08502_20220710_232041.wav	7/10/2022	23:20:41	MYOLUC
N-2	In Assessment Area	SMU08502_20220711_000556.wav	7/11/2022	0:05:56	MYOLUC
N-2	In Assessment Area	SMU08502_20220713_230343.wav	7/13/2022	23:03:43	MYOLUC
N-2	In Assessment Area	SMU08502_20220714_001509.wav	7/14/2022	0:15:09	MYOLUC
N-2	In Assessment Area	SMU08502_20220714_002654.wav	7/14/2022	0:26:54	MYOLUC
N-2	In Assessment Area	SMU08502_20220719_002503.wav	7/19/2022	0:25:03	MYOLUC
N-2	In Assessment Area	SMU08502_20220722_220242.wav	7/22/2022	22:02:42	LASCIN
N-2	In Assessment Area	SMU08502_20220722_220543.wav	7/22/2022	22:05:43	LASCIN
N-2	In Assessment Area	SMU08502_20220722_221251.wav	7/22/2022	22:12:51	LASCIN
N-2	In Assessment Area	SMU08502_20220722_221257.wav	7/22/2022	22:12:57	LoF
N-2	In Assessment Area	SMU08502_20220722_222258.wav	7/22/2022	22:22:58	LoF
N-2	In Assessment Area	SMU08502_20220722_222829.wav	7/22/2022	22:28:29	LoF
N-2	In Assessment Area	SMU08502_20220722_223011.wav	7/22/2022	22:30:11	LASCIN
N-2	In Assessment Area	SMU08502_20220722_230012.wav	7/22/2022	23:00:12	MYOLUC
N-2	In Assessment Area	SMU08502_20220722_231116.wav	7/22/2022	23:11:16	MYOLUC
N-2	In Assessment Area	SMU08502_20220723_024249.wav	7/23/2022	2:42:49	HiF
N-2	In Assessment Area	SMU08502_20220723_043052.wav	7/23/2022	4:30:52	MYOLUC
N-2	In Assessment Area	SMU08502_20220724_034455.wav	7/24/2022	3:44:55	MYOLUC
N-2	In Assessment Area	SMU08502_20220724_234049.wav	7/24/2022	23:40:49	MYOLUC
N-2	In Assessment Area	SMU08502_20220725_003724.wav	7/25/2022	0:37:24	MYOLUC
N-2	In Assessment Area	SMU08502_20220725_011636.wav	7/25/2022	1:16:36	MYOLUC
N-2	In Assessment Area	SMU08502_20220726_223522.wav	7/26/2022	22:35:22	MYOLUC
N-2	In Assessment Area	SMU08502_20220726_224014.wav	7/26/2022	22:40:14	MYOLUC
N-2	In Assessment Area	SMU08502_20220726_224555.wav	7/26/2022	22:45:55	MYOLUC
N-2	In Assessment Area	SMU08502_20220727_002037.wav	7/27/2022	0:20:37	LASCIN
N-2	In Assessment Area	SMU08502_20220727_004611.wav	7/27/2022	0:46:11	MYOLUC
N-2	In Assessment Area	SMU08502_20220727_215358.wav	7/27/2022	21:53:58	LASCIN
N-2	In Assessment Area	SMU08502_20220728_012628.wav	7/28/2022	1:26:28	MYOLUC
N-2	In Assessment Area	SMU08502_20220728_223548.wav	7/28/2022	22:35:48	MYOLUC
N-2	In Assessment Area	SMU08502_20220729_000521.wav	7/29/2022	0:05:21	MYOLUC
N-2	In Assessment Area	SMU08502_20220729_000537.wav	7/29/2022	0:05:37	MYOLUC
N-2	In Assessment Area	SMU08502_20220729_012131.wav	7/29/2022	1:21:31	MYOLUC
N-2	In Assessment Area	SMU08502_20220729_223112.wav	7/29/2022	22:31:12	HiF
N-2	In Assessment Area	SMU08502_20220731_001150.wav	7/31/2022	0:11:50	MYOLUC
N-2	In Assessment Area	SMU08502_20220731_011912.wav	7/31/2022	1:19:12	HiF
N-2	In Assessment Area	SMU08502_20220801_005908.wav	8/1/2022	0:59:08	MYOLUC
N-2	In Assessment Area	SMU08502_20220801_024925.wav	8/1/2022	2:49:25	MYOLUC
N-3	Outside Assessment Area	SMU08503_20220626_005804.wav	6/26/2022	0:58:04	HiF
N-4	In Project Boundary	SMU08278_20220730_013229.wav	7/30/2022	1:32:29	MYOLUC
N-5	In Project Boundary	SMU08247_20220714_002344.wav	7/14/2022	0:23:44	HiF
N-8	In Assessment Area	SMU08215_20220711_234854.wav	7/11/2022	23:48:54	MYOLUC
N-8	In Assessment Area	SMU08215_20220717_233320.wav	7/17/2022	23:33:20	MYOLUC
N-8	In Assessment Area	SMU08215_20220726_234237.wav	7/26/2022	23:42:37	MYOLUC
N-8	In Assessment Area	SMU08215_20220731_010058.wav	7/31/2022	1:00:58	MYOLUC
N-8	In Assessment Area	SMU08215_20220731_223027.wav	7/31/2022	22:30:27	HiF
N-8	In Assessment Area	SMU08215_20220801_002304.wav	8/1/2022	0:23:04	MYOLUC
N-8	In Assessment Area	SMU08215_20220803_010939.wav	8/3/2022	1:09:39	LoF

Note: MYOLUC = Myotis lucifugus, LASCIN = lasiurus cinereus, HiF = high frequency unknown, LoF = Low frequency unknown

Table C.2 Results of Fall Bat Surveys - Nuttby Ridge

Detector ID	Location	File Name	Date	Time	Species
N-3	Outside Assessment Area	MB11_20220907_223328.wav	9/7/2022	22:33:28	HiF
N-4	In Project Boundary	MB16_20220910_232955.wav	9/10/2022	23:29:55	LASNOC/EPTFUS
N-5	In Project Boundary	MB12_20220826_204547.wav	8/26/2022	20:45:47	HiF
N-5	In Project Boundary	MB12_20220827_214150.wav	8/27/2022	21:41:50	HiF
N-5	In Project Boundary	MB12_20220903_013604.wav	9/3/2022	1:36:04	MYOLUC
N-5	In Project Boundary	MB12_20220905_024931.wav	9/5/2022	2:49:31	MYOLUC
N-7	In Assessment Area	MB14_20220904_213735.wav	9/4/2022	21:37:35	HiF
N-7	In Assessment Area	MB14_20220918_221310.wav	9/18/2022	22:13:10	HiF
N-8	In Assessment Area	MB15_20220902_004811.wav	9/2/2022	0:48:11	HiF
N-8	In Assessment Area	MB15_20220903_212943.wav	9/3/2022	21:29:43	LASNOC
N-8	In Assessment Area	MB15_20220904_205955.wav	9/4/2022	20:59:55	HiF
N-8	In Assessment Area	MB15_20220904_223117.wav	9/4/2022	22:31:17	LASNOC
N-8	In Assessment Area	MB15_20220908_225640.wav	9/8/2022	22:56:40	HiF

Note: MYOLUC = Myotis lucifugus, LASNOC = Lasiurus noctivagans, LASNOC/EPTFUS = Lasiurus noctivagans/Eptesicus fuscus, HiF = high frequency unknown, LoF = Low frequency unknown

APPENDIX O
STANTEC OVERWINTERING BIRD AND
NOCTURNAL OWL SURVEY PROGRAMS



Overwintering Bird and Nocturnal
Owl Survey Programs for
Proposed Wind Project near
Nuttby, Nova Scotia

Final Report

March 15, 2023

Prepared for:

Nova Scotia Power Inc.
1223 Lower Water St.
Halifax, NS B3J 3S8

Prepared by:

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File: 121417191

OVERWINTERING BIRD AND NOCTURNAL OWL SURVEY PROGRAMS FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

This document titled Overwintering Bird and Nocturnal Owl Survey Programs for Proposed Wind Project near Nuttby, Nova Scotia was prepared by Stantec Consulting Ltd. (“Stantec”) for the account of Nova Scotia Power Inc. (the “Client”). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec’s professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.



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1.0 INTRODUCTION

Nova Scotia Power Incorporated (NSPI) is the Proponent for the proposed Nuttby Ridge Wind Project near Nuttby, which is approximately 22 km northeast of Truro, Nova Scotia, (the Project). The Project consists of the construction and operation of approximately 16 to 23 wind turbines, in the range of 4 to 6 MW, for a total project capacity of up to 98 MW.

The Project Boundary shown on Figure 1 (in red) refers to the area within which the turbines will be located. A wider Assessment Area (Figure 1; in black) indicates the area within which additional surveys were conducted. In some cases, survey locations are outside the Project Boundary and Assessment Areas where earlier study area boundaries were used.

In 2021 and 2022, Stantec completed a variety of bird surveys in the vicinity of the proposed Project. This report presents the results of two of the surveys: the overwintering and nocturnal owl surveys. The primary objective of these surveys was to characterize the composition and abundance of the bird communities in the study area, including possible Species at Risk (SAR) and Species of Conservation Concern (SOCC), during winter and early spring of 2021 and 2022 (December through March).

Species at Risk (SAR) are herein defined as those species listed as being either *endangered*, *threatened*, *vulnerable*, or of *special concern* under the Nova Scotia *Endangered Species Act* (NS ESA), the federal *Species at Risk Act* (SARA) and/or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Species of Conservation Concern (SOCC) are those species that do not meet the above definition of SAR, but are listed as S1, S2, or S3 in Nova Scotia by the Atlantic Canada Conservation Data Centre (AC CDC; Table 1.1).

Table 1.1 AC CDC Status Ranks

S-Rank/ Qualifier	Description
S1	Critically Imperiled - Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences). May be especially vulnerable to extirpation.
S2	Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.
S3	Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations.
S4	Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors (80+ occurrences).
S5	Secure - Common, widespread, and abundant in the province.
S#S#	A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community
?	Inexact or Uncertain - Denotes inexact or uncertain numeric rank.
SNR	Unranked - Provincial conservation status not yet assessed.
SU	Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.



OVERWINTERING BIRD AND NOCTURNAL OWL SURVEY PROGRAMS FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

Table 1.1 AC CDC Status Ranks

S-Rank/ Qualifier	Description
SNA	Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
B	Breeding - Conservation status refers to the breeding population of the species in the province
N	Nonbreeding - Conservation status refers to the non-breeding population of the species in the province.
M	Migrant - Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.
Reference: AC CDC 2023	

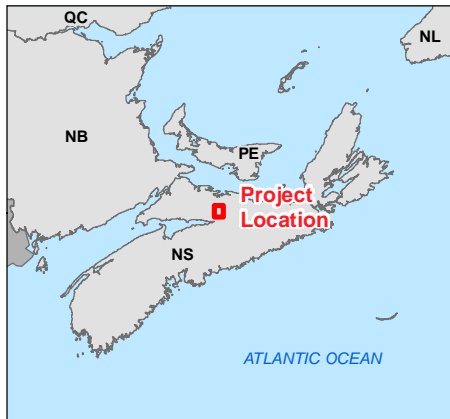
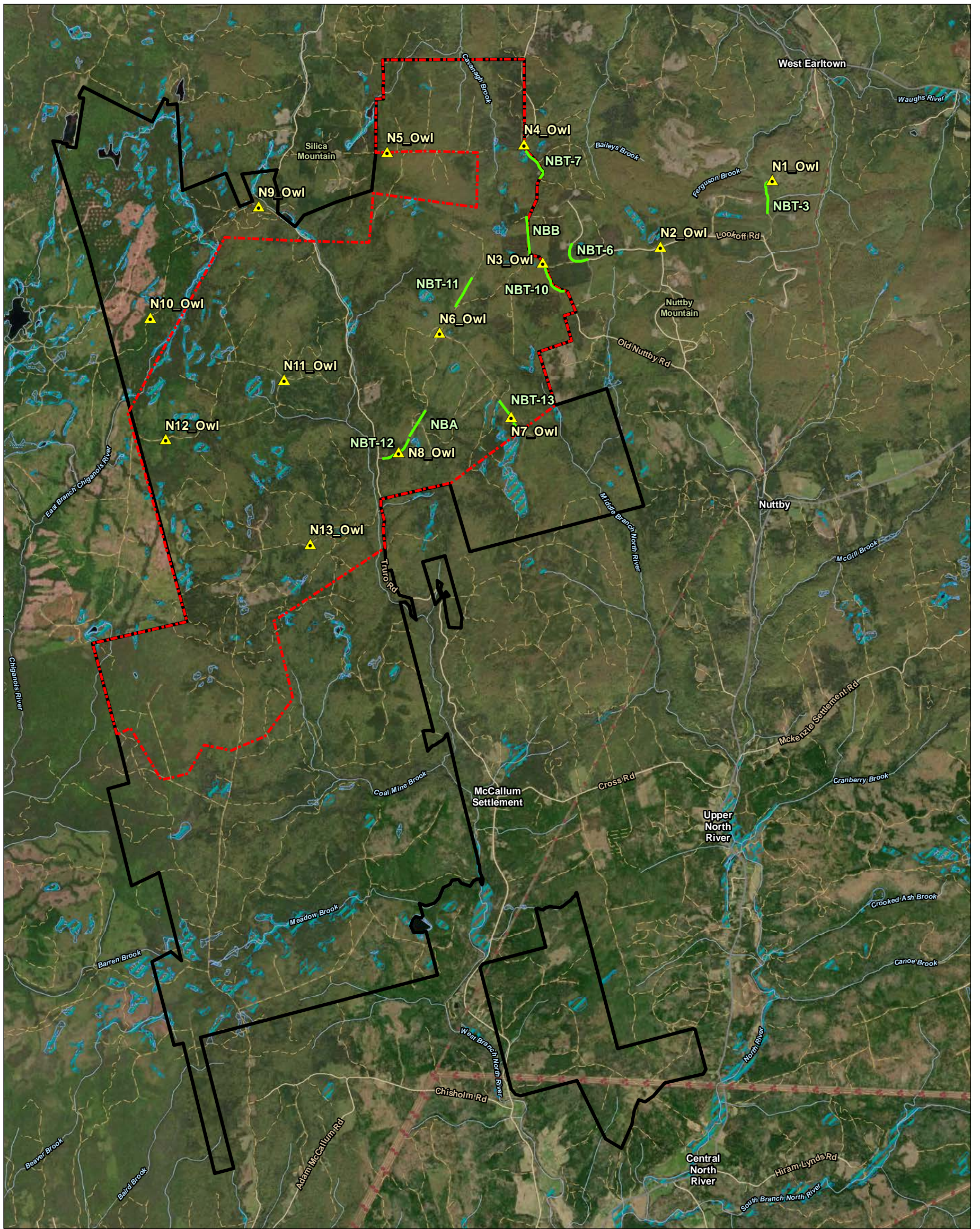
The Project is located approximately 22 km northeast of Truro, Nova Scotia, and is situated in the Uplands Ecoregion of Nova Scotia. The Project Boundary lies completely within the Cobequid Hills Ecodistrict, with southern parts of the Assessment Area within the Cobequid Slopes Ecodistrict.

The Uplands Ecoregion of Nova Scotia is characterized by a geographically complex band of rounded summits and plateaus separated by lower elevation uplands and lowlands that extend across northern mainland Nova Scotia (Nova Scotia Department of Natural Resources (NSDNR) 2017). This Ecoregion experiences more severe winters, greater precipitation, and shorter growing seasons than surrounding Ecoregions, which has given rise to the dominant Acadian hardwood forest of sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*).

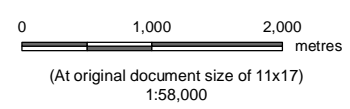
The Project Boundary lies within the Cobequid Hills Ecodistrict which is a narrow upland extending approximately 150 km in an east-west direction between the towns of Pictou and Parrsboro. This Ecodistrict is characterized by large intact late-successional Acadian shade tolerant hardwood forests. Representative species include sugar maple, American beech, and yellow birch, with white ash (*Fraxinus americana*) and ironwood (*Ostrya virginiana*) on richer soils. At upper elevations, the hills give way to a level or hummocky plateau-like topography with forests of red spruce (*Picea rubens*) and black spruce (*Picea mariana*) occurring on moderately-well to imperfectly drained soils.

Southern portions of the Assessment Area lie within the Cobequid Slopes Ecodistrict. This Ecodistrict is characterized by a series of steep to moderate grades on the south side of the Cobequid Mountains. The climate is moderate and relatively humid. Red spruce forests occur on the middle to lower slopes of rounded hills. Sugar maple, yellow birch, and American beech are dominant on slopes or crests where soils are rich. Elsewhere, a shade tolerant mixedwood forest exists, usually dominated by red spruce, eastern hemlock (*Tsuga canadensis*), and yellow birch with occasional sugar maple, American beech, and eastern white pine (*Pinus strobus*).





- ▲ Owl Survey Location
- Winter Survey Transect
- Project Boundary, February 2023
- Assessment Area, February 2023
- Collector Road
- Local Road
- Resource Road / Trail
- Transmission Line
- Watercourse
- Wetland (NSE)
- Wetland (NHN)
- Waterbody



Project Location: Nuttby Mountain, Nova Scotia
 Client/Project: Nova Scotia Power Inc., NSPI Wind EA Support Services
 Prepared on 2023-02-23
 121417191_011a

Figure No. 1
 Title

Survey Locations for Overwintering Bird and Nocturnal Owl Surveys: Nuttby Ridge

I:\cad215-ppls\01\work_group\121417191\03_data\gis\mapping\img\report\121417191_011a_Overwinter_Owl_Nuttby.mxd Revised: 2023-03-02 By: mblackwood

Notes
 1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
 2. Data Sources: Government of NS, Client, Stantec
 3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

2.0 METHODS

2.1 OVERWINTERING SURVEYS

Overwintering bird surveys were conducted to assess the species composition and relative abundance of bird species in the area during the winter months. Transects established during the migration monitoring program that were accessible during winter conditions (Figure 1 and Table 2.1) were surveyed using a line-transect survey method to quantify overwintering species in the area based on the methods described in EC and CWS (2007). The subset of transects which were accessible over the winter varied from month to month due to changing snow depths. In total, 9 transect locations were surveyed over the course of the program. Accessible transects were visited once monthly from December through March, and all birds detected through visual or auditory cues along each 500 metre (m) long transect were recorded.

Table 2.1 Completed Overwintering Bird Surveys

Date	Transects Completed
December 14, 2021	NBT10, NBT11, NBT12, NBT13, NBT3, NBT6, NBT7
January 5, 2022	NBT10, NBT11, NBT12, NBT13, NBT3, NBT6, NBT7
February 16, 2022	NBA, NBT12, NBT13
February 24, 2022	NBB, NBT10, NBT3, NBT6
March 5, 2022	NBA, NBT12, NBT13
March 31, 2022	NBB, NBT10, NBT3, NBT6

Habitat types crossed by the transects vary along the length of each transect and include a representative sample of habitats. Sampled habitat types include hardwood, softwood, and mixedwood stands of varying ages, regenerating clearcuts, and treed swamps.

Birds detected either visually or through auditory cues were documented, and information on the species, number of individuals, distance from the transect, behaviour, flight height, and the direction of travel were recorded. Surveys were conducted under suitable environmental conditions, including light winds, no precipitation, and good visibility.

In total, 9 transect locations were surveyed. A complete survey of all transects took a single survey day each month except in February and March where transects were completed over the course of two survey days due to environmental conditions. In total 28 transect surveys were completed over a total of 6 survey days.



2.2 NOCTURNAL OWL SURVEYS

Nocturnal owl surveys were conducted within various habitats in April 2022 to assess the species composition and relative abundance of nocturnal owls. The survey approach applied representative sampling across the land cover types in the study area which were considered to have potential to provide suitable habitat for nocturnal owls. The survey method followed that outlined by the Nova Scotia Nocturnal Owl Survey Guide for Volunteers (Birds Canada 2019).

Thirteen survey stops situated in locations accessible by vehicle and spaced a minimum of 1.6 kilometres (km) apart, were visited once in April 2022 (Figure 1). Surveys began approximately one-half hour after sunset under suitable environmental conditions, including light winds and little to no precipitation. The Nova Scotia Nocturnal Owl Survey broadcast recording, which lasts approximately 9.5 minutes, was played at each survey location, and any owls or other nocturnal bird species encountered either by visual or auditory cues were recorded.

3.0 RESULTS

3.1 OVERWINTERING SURVEYS

Twenty-eight surveys of 500 m long transects were conducted over six survey days in winter and early spring of 2021/22. Transect surveys were conducted monthly from December through March. In total, 89 observations of 139 individual birds, representing 20 species were made (Table 3.1, Table A.1 in Appendix A). Observations included 15 passerines, three woodpeckers, one gamebird, and one waterfowl species. Overall, the bird species noted during the overwintering surveys were expected for this environment and are typical of the habitat types found in the area.

Table 3.1 Bird Species Observed During 2021/22 Overwintering Surveys

Common Name	Scientific Name	SARA Status (Schedule 1)	COSEWIC Status	NS ESA Status	AC CDC Rank	Number Observed
Canada goose	<i>Branta canadensis</i>	-	-	-	SUB,S4N, S5M	1
ruffed grouse	<i>Bonasa umbellus</i>	-	-	-	S5	4
downy woodpecker	<i>Dryobates pubescens</i>	-	-	-	S5	4
hairy woodpecker	<i>Dryobates villosus</i>	-	-	-	S5	4
pileated woodpecker	<i>Dryocopus pileatus</i>	-	-	-	S5	3
Canada jay	<i>Perisoreus canadensis</i>	-	-	-	S3	2
American crow	<i>Corvus brachyrhynchos</i>	-	-	-	S5	6
common raven	<i>Corvus corax</i>	-	-	-	S5	10
black-capped chickadee	<i>Poecile atricapillus</i>	-	-	-	S5	36
boreal chickadee	<i>Poecile hudsonicus</i>	-	-	-	S3	5



Table 3.1 Bird Species Observed During 2021/22 Overwintering Surveys

Common Name	Scientific Name	SARA Status (Schedule 1)	COSEWIC Status	NS ESA Status	AC CDC Rank	Number Observed
red-breasted nuthatch	<i>Sitta canadensis</i>	-	-	-	S4S5	9
golden-crowned kinglet	<i>Regulus satrapa</i>	-	-	-	S5	4
American robin	<i>Turdus migratorius</i>	-	-	-	S5B,S3N	1
evening grosbeak	<i>Coccothraustes vespertinus</i>	Special Concern	Special Concern	Vulnerable	S3B,S3N, S3M	1
purple finch	<i>Haemorhous purpureus</i>	-	-	-	S4S5B,S3 S4N,S5M	3
red crossbill	<i>Loxia curvirostra</i>	-	-	-	S3S4	10
white-winged crossbill	<i>Loxia leucoptera</i>	-	-	-	S4S5	20
American goldfinch	<i>Spinus tristis</i>	-	-	-	S5	3
dark-eyed junco	<i>Junco hyemalis</i>	-	-	-	S4S5	11
song sparrow	<i>Melospiza melodia</i>	-	-	-	S5B	2
SAR are presented in bold text.						

The most abundant species observed included black-capped chickadee (*Poecile atricapillus*; 36 individuals), white-winged crossbill (*Loxia Leucoptera*; 20 individuals), and dark-eyed junco (*Junco hyemalis*; 11 individuals). The most frequently recorded species were black-capped chickadee (18 observations), common raven (*Corvus corax*; 8 observations), and dark-eyed junco (8 observations).

One of the birds observed during the overwintering surveys, evening grosbeak (*Coccothraustes vespertinus*) is considered a SAR. Evening grosbeaks are listed as *special concern* under the federal SARA and are listed as *vulnerable* under the NS ESA. A single evening grosbeak was observed on February 24, 2022 flying over the NBT10 transect which is within the Project Boundary. Two bird SOCC were recorded during the overwintering surveys, including Canada jay (*Perisoreus canadensis*) and boreal chickadee (*Poecile atricapillus*). Both Canada jay and boreal chickadee are listed as S3 by the AC CDC. A pair of Canada jays was observed foraging along the edge of a woods road on transect NBA on February 16, 2022. NBA is within the Project Boundary. Three boreal chickadees were observed foraging along the NBT7 transect on January 5, 2022. NBT7 is also located within the Project Boundary. Two other boreal chickadees were recorded along NBT6 on March 31, 2022. NBT6 is located outside the Assessment Area.

3.2 NOCTURNAL OWL SURVEYS

Nocturnal owl surveys were conducted at 13 locations between 20:21 on April 26, 2022, and 0:04 on April 27, 2022. Six individual owls, representing two species, barred owl (*Strix varia*) and northern saw-whet owl (*Aegolius acadicus*), were observed during these surveys (Table 3.2, Table A.2, Appendix A). Neither of the species observed are considered SAR or SOCC.



Table 3.2 Owls Observed During 2022 Early Breeding (Nocturnal Owl) Surveys

Survey Date	Survey Station ID	Location	Species Recorded
April 26/27, 2022	N1_OWL	Outside Assessment Area	-
	N2_OWL	Outside Assessment Area	-
	N3_OWL	Outside Assessment Area	northern saw-whet owl (<i>Aegolius acadicus</i>)
	N4_OWL	In Project Boundary	barred owl (<i>Strix varia</i>)
	N5_OWL	In Project Boundary	barred owl (<i>Strix varia</i>)
	N6_OWL	In Project Boundary	-
	N7_OWL	In Project Boundary	-
	N8_OWL	In Project Boundary	-
	N9_OWL	In Assessment Area	barred owl (<i>Strix varia</i>)
	N10_OWL	In Assessment Area	barred owl (<i>Strix varia</i>)
	N11_OWL	In Project Boundary	barred owl (<i>Strix varia</i>)
	N12_OWL	In Project Boundary	-
	N13_OWL	In Project Boundary	-

Neither of the species observed are considered SAR or SOCC. During the surveys, incidental observations of other bird and wildlife species were made including an additional bird species (American woodcock (*Scolopax minor*)), one mammal species (Eastern coyote (*Canis latrans*)), and two herpetiles (spring peeper (*Pseudacris crucifer*) and wood frog (*Lithobates sylvaticus*)).

4.0 SUMMARY

The overwintering surveys, conducted between December 14, 2021, and March 31, 2022, identified the presence of 20 species of birds, including one SAR (evening grosbeak) and two SOCC (Canada jay and boreal chickadee). The early breeding (nocturnal owl) surveys conducted on April 26/27, 2022, identified two owl species (barred owl and northern saw-whet owl) potentially breeding near the proposed Project and recorded an additional crepuscular bird species (American woodcock).

5.0 CLOSURE

The information presented in this report represents the best technical judgment of Stantec based on information provided by NSPI and the data obtained from the work. Conclusions are based on site conditions observed by Stantec at the time the work was performed at the specific survey locations and cannot be extrapolated to other areas around these locations.



6.0 REFERENCES

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APPENDIX A

Bird Survey Data

Table A.1 Overwintering Bird Survey Data

Date	Site	Transect	Location	Time	Common Name	Scientific Name	Number Observed	Distance (m)	Behaviour	Height ¹	Direction of Travel	Comments
12/14/2021	Nuttby	NBT12	In Project Boundary	8:57	red crossbill	<i>Loxia curvirostra</i>	1	0	Flyover	Medium	West	much of this transect was harvested in the last few months
12/14/2021	Nuttby	NBT13	In Project Boundary	9:22	golden-crowned kinglet	<i>Regulus satrapa</i>	2	10	Foraging	Low	Local Movement	
12/14/2021	Nuttby	NBT11	In Project Boundary	9:50	none	<i>none</i>	0	n/a	n/a	n/a	n/a	no birds
12/14/2021	Nuttby	NBT7	In Project Boundary	10:19	black-capped chickadee	<i>Poecile atricapillus</i>	1	5	Foraging	Low	Local Movement	
12/14/2021	Nuttby	NBT7	In Project Boundary	10:23	American crow	<i>Corvus brachyrhynchos</i>	1	0	Flyover	Low	Southwest	
12/14/2021	Nuttby	NBT10	In Project Boundary	10:40	none	<i>none</i>	0	n/a	n/a	n/a	n/a	no birds
12/14/2021	Nuttby	NBT6	Outside Assessment Area	11:03	none	<i>none</i>	0	n/a	n/a	n/a	n/a	no birds
12/14/2021	Nuttby	NBT3	Outside Assessment Area	11:37	pileated woodpecker	<i>Dryocopus pileatus</i>	1	200	Calling	Low	Local Movement	
1/5/2022	Nuttby	NBT12	In Project Boundary	8:38	unidentified passerine	<i>n/a</i>	1	150	Flyover	Medium	Local Movement	
1/5/2022	Nuttby	NBT12	In Project Boundary	8:43	red crossbill	<i>Loxia curvirostra</i>	4	5	Foraging	Low	Local Movement	
1/5/2022	Nuttby	NBT13	In Project Boundary	9:11	American crow	<i>Corvus brachyrhynchos</i>	1	400	Calling	n/a	n/a	
1/5/2022	Nuttby	NBT13	In Project Boundary	9:15	red crossbill	<i>Loxia curvirostra</i>	1	0	Flyover	Medium	Northeast	
1/5/2022	Nuttby	NBT13	In Project Boundary	9:16	common raven	<i>Corvus corax</i>	1	300	Flyover	Medium	Southeast	
1/5/2022	Nuttby	NBT13	In Project Boundary	9:20	red crossbill	<i>Loxia curvirostra</i>	1	0	Flyover	Medium	Southwest	possibly the same RECR observed at 9:15
1/5/2022	Nuttby	NBT11	In Project Boundary	n/a	none	<i>none</i>	0	n/a	n/a	n/a	n/a	no birds
1/5/2022	Nuttby	NBT7	In Project Boundary	10:17	white-winged crossbill	<i>Loxia leucoptera</i>	1	300	Flyover	n/a	n/a	
1/5/2022	Nuttby	NBT7	In Project Boundary	10:20	red crossbill	<i>Loxia curvirostra</i>	1	150	Foraging	Low	Local Movement	
1/5/2022	Nuttby	NBT7	In Project Boundary	10:27	white-winged crossbill	<i>Loxia leucoptera</i>	2	0	Foraging	Low	Local Movement	
1/5/2022	Nuttby	NBT7	In Project Boundary	10:27	black-capped chickadee	<i>Poecile atricapillus</i>	2	5	Foraging	Low	Local Movement	
1/5/2022	Nuttby	NBT7	In Project Boundary	10:28	white-winged crossbill	<i>Loxia leucoptera</i>	1	50	Calling	Low	Local Movement	
1/5/2022	Nuttby	NBT7	In Project Boundary	10:33	black-capped chickadee	<i>Poecile atricapillus</i>	1	5	Foraging	Low	Local Movement	
1/5/2022	Nuttby	NBT7	In Project Boundary	10:33	boreal chickadee	<i>Poecile hudsonicus</i>	2	5	Foraging	Low	Local Movement	
1/5/2022	Nuttby	NBT7	In Project Boundary	10:30	boreal chickadee	<i>Poecile hudsonicus</i>	1	5	Foraging	Low	Local Movement	
1/5/2022	Nuttby	NBT10	In Project Boundary	n/a	none	<i>none</i>	0	n/a	n/a	n/a	n/a	no birds
1/5/2022	Nuttby	NBT6	Outside Assessment Area	11:23	downy woodpecker	<i>Dryobates pubescens</i>	1	100	Foraging	Low	Local Movement	
1/5/2022	Nuttby	NBT3	Outside Assessment Area	11:39	ruffed grouse	<i>Bonasa umbellus</i>	1	10	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBT12	In Project Boundary	9:12	common raven	<i>Corvus corax</i>	2	400	Calling	Low	Local Movement	
2/16/2022	Nuttby	NBT12	In Project Boundary	9:23	black-capped chickadee	<i>Poecile atricapillus</i>	6	10	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBT12	In Project Boundary	9:23	red-breasted nuthatch	<i>Sitta canadensis</i>	1	50	Calling	Low	Local Movement	
2/16/2022	Nuttby	NBT12	In Project Boundary	9:31	ruffed grouse	<i>Bonasa umbellus</i>	1	10	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBA	In Project Boundary	9:36	black-capped chickadee	<i>Poecile atricapillus</i>	1	100	Calling	Low	Local Movement	
2/16/2022	Nuttby	NBA	In Project Boundary	9:36	downy woodpecker	<i>Dryobates pubescens</i>	1	50	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBA	In Project Boundary	9:41	downy woodpecker	<i>Dryobates pubescens</i>	1	80	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBA	In Project Boundary	9:49	black-capped chickadee	<i>Poecile atricapillus</i>	4	0	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBA	In Project Boundary	9:49	red-breasted nuthatch	<i>Sitta canadensis</i>	2	5	Calling	Low	Local Movement	

Table A.1 Overwintering Bird Survey Data

Date	Site	Transect	Location	Time	Common Name	Scientific Name	Number Observed	Distance (m)	Behaviour	Height ¹	Direction of Travel	Comments
2/16/2022	Nuttby	NBA	In Project Boundary	9:49	Canada jay	<i>Perisoreus canadensis</i>	2	5	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBA	In Project Boundary	9:50	downy woodpecker	<i>Dryobates pubescens</i>	1	20	Calling	Low	Local Movement	
2/16/2022	Nuttby	NBA	In Project Boundary	9:49	pileated woodpecker	<i>Dryocopus pileatus</i>	1	70	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBA	In Project Boundary	9:59	American goldfinch	<i>Spinus tristis</i>	1	20	Calling	Low	Local Movement	
2/16/2022	Nuttby	NBT13	In Project Boundary	10:48	black-capped chickadee	<i>Poecile atricapillus</i>	1	100	Calling	Low	Local Movement	
2/16/2022	Nuttby	NBT13	In Project Boundary	11:06	pileated woodpecker	<i>Dryocopus pileatus</i>	1	70	Foraging	Low	Local Movement	
2/16/2022	Nuttby	NBT13	In Project Boundary	11:06	red crossbill	<i>Loxia curvirostra</i>	2	0	Flyover	Low	Local Movement	
2/16/2022	Nuttby	NBT13	In Project Boundary	11:06	red-breasted nuthatch	<i>Sitta canadensis</i>	2	50	Calling	Low	Local Movement	
2/24/2022	Nuttby	NBT6	Outside Assessment Area	n/a	none	<i>none</i>	0	n/a	n/a	n/a	n/a	no birds
2/24/2022	Nuttby	NBT10	In Project Boundary	9:05	evening grosbeak	<i>Coccothraustes vespertinus</i>	1	0	Flyover	Medium	West	
2/24/2022	Nuttby	NBT10	In Project Boundary	9:16	red-breasted nuthatch	<i>Sitta canadensis</i>	1	20	Calling	Low	Local Movement	
2/24/2022	Nuttby	NBT10	In Project Boundary	9:16	black-capped chickadee	<i>Poecile atricapillus</i>	3	30	Calling	Low	Local Movement	
2/24/2022	Nuttby	NBT10	In Project Boundary	9:20	American crow	<i>Corvus brachyrhynchos</i>	1	200	Calling	n/a	n/a	
2/24/2022	Nuttby	NBB	In Project Boundary	9:35	American crow	<i>Corvus brachyrhynchos</i>	1	300	Calling	n/a	n/a	
2/24/2022	Nuttby	NBB	In Project Boundary	9:37	ruffed grouse	<i>Bonasa umbellus</i>	1	5	Foraging	Low	Local Movement	
2/24/2022	Nuttby	NBB	In Project Boundary	9:42	golden-crowned kinglet	<i>Regulus satrapa</i>	1	50	Calling	Low	Local Movement	
2/24/2022	Nuttby	NBB	In Project Boundary	9:49	common raven	<i>Corvus corax</i>	1	200	Flyover	Medium	West	
2/24/2022	Nuttby	NBB	In Project Boundary	9:49	golden-crowned kinglet	<i>Regulus satrapa</i>	1	20	Calling	Low	Local Movement	
2/24/2022	Nuttby	NBT3	Outside Assessment Area	n/a	none	<i>none</i>	0	n/a	n/a	n/a	n/a	no birds
3/5/2022	Nuttby	NBT12	In Project Boundary	9:01	black-capped chickadee	<i>Poecile atricapillus</i>	3	20	Foraging	Low	Local Movement	
3/5/2022	Nuttby	NBT12	In Project Boundary	9:04	common raven	<i>Corvus corax</i>	1	500	Calling	n/a	n/a	
3/5/2022	Nuttby	NBT12	In Project Boundary	9:05	common raven	<i>Corvus corax</i>	2	0	Flyover	Medium	North	
3/5/2022	Nuttby	NBT12	In Project Boundary	9:08	black-capped chickadee	<i>Poecile atricapillus</i>	1	50	Calling	Low	Local Movement	
3/5/2022	Nuttby	NBA	In Project Boundary	9:12	red-breasted nuthatch	<i>Sitta canadensis</i>	3	30	Foraging	Low	Local Movement	
3/5/2022	Nuttby	NBA	In Project Boundary	9:15	black-capped chickadee	<i>Poecile atricapillus</i>	2	40	Foraging	Low	Local Movement	
3/5/2022	Nuttby	NBA	In Project Boundary	9:19	American goldfinch	<i>Spinus tristis</i>	1	0	Flyover	Medium	Local Movement	
3/5/2022	Nuttby	NBA	In Project Boundary	9:27	white-winged crossbill	<i>Loxia leucoptera</i>	1	0	Flyover	Medium	South	
3/5/2022	Nuttby	NBA	In Project Boundary	9:27	purple finch	<i>Haemorhous purpureus</i>	1	70	Calling	Low	Local Movement	
3/5/2022	Nuttby	NBT13	In Project Boundary	n/a	none	<i>none</i>	0	n/a	n/a	n/a	n/a	no birds
3/31/2022	Nuttby	NBB	In Project Boundary	9:38	dark-eyed junco	<i>Junco hyemalis</i>	1	200	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBB	In Project Boundary	9:40	dark-eyed junco	<i>Junco hyemalis</i>	2	5	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBB	In Project Boundary	9:42	Canada goose	<i>Branta canadensis</i>	1	300	Flyover	n/a	n/a	
3/31/2022	Nuttby	NBB	In Project Boundary	9:46	black-capped chickadee	<i>Poecile atricapillus</i>	2	5	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBB	In Project Boundary	9:46	black-capped chickadee	<i>Poecile atricapillus</i>	2	0	Flyover	Low	East	
3/31/2022	Nuttby	NBB	In Project Boundary	9:48	dark-eyed junco	<i>Junco hyemalis</i>	2	10	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBB	In Project Boundary	9:50	ruffed grouse	<i>Bonasa umbellus</i>	1	5	Foraging	Low	Local Movement	

Table A.1 Overwintering Bird Survey Data

Date	Site	Transect	Location	Time	Common Name	Scientific Name	Number Observed	Distance (m)	Behaviour	Height ¹	Direction of Travel	Comments
3/31/2022	Nuttby	NBT3	Outside Assessment Area	10:23	common raven	<i>Corvus corax</i>	1	100	Flyover	High	North	
3/31/2022	Nuttby	NBT3	Outside Assessment Area	10:30	dark-eyed junco	<i>Junco hyemalis</i>	1	50	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT3	Outside Assessment Area	10:36	hairy woodpecker	<i>Dryobates villosus</i>	2	20	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBT3	Outside Assessment Area	10:36	common raven	<i>Corvus corax</i>	1	100	Flyover	Medium	South	
3/31/2022	Nuttby	NBT3	Outside Assessment Area	10:42	American goldfinch	<i>Spinus tristis</i>	1	100	Flyover	n/a	n/a	
3/31/2022	Nuttby	NBT3	Outside Assessment Area	10:42	hairy woodpecker	<i>Dryobates villosus</i>	1	50	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBT3	Outside Assessment Area	10:45	black-capped chickadee	<i>Poecile atricapillus</i>	2	0	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBT3	Outside Assessment Area	10:46	song sparrow	<i>Melospiza melodia</i>	2	5	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBT6	Outside Assessment Area	8:47	dark-eyed junco	<i>Junco hyemalis</i>	2	10	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT6	Outside Assessment Area	8:47	black-capped chickadee	<i>Poecile atricapillus</i>	1	100	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT6	Outside Assessment Area	8:51	American crow	<i>Corvus brachyrhynchos</i>	1	500	Calling	n/a	n/a	
3/31/2022	Nuttby	NBT6	Outside Assessment Area	8:51	boreal chickadee	<i>Poecile hudsonicus</i>	2	50	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBT6	Outside Assessment Area	8:51	black-capped chickadee	<i>Poecile atricapillus</i>	1	50	Foraging	Low	Local Movement	
3/31/2022	Nuttby	NBT6	Outside Assessment Area	8:55	dark-eyed junco	<i>Junco hyemalis</i>	1	40	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT6	Outside Assessment Area	8:56	common raven	<i>Corvus corax</i>	1	0	Flyover	Medium	Local Movement	
3/31/2022	Nuttby	NBT6	Outside Assessment Area	8:57	white-winged crossbill	<i>Loxia leucoptera</i>	15	0	Flyover	Low	West	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:10	dark-eyed junco	<i>Junco hyemalis</i>	1	200	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:16	purple finch	<i>Haemorhous purpureus</i>	1	60	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:16	American robin	<i>Turdus migratorius</i>	1	70	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:17	black-capped chickadee	<i>Poecile atricapillus</i>	1	30	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:19	purple finch	<i>Haemorhous purpureus</i>	1	100	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:21	dark-eyed junco	<i>Junco hyemalis</i>	1	80	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:21	American crow	<i>Corvus brachyrhynchos</i>	1	400	Calling	n/a	n/a	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:21	black-capped chickadee	<i>Poecile atricapillus</i>	2	100	Calling	Low	Local Movement	
3/31/2022	Nuttby	NBT10	In Project Boundary	9:25	hairy woodpecker	<i>Dryobates villosus</i>	1	200	Singing	Low	Local Movement	drumming

¹ Low: 10-60 m, Medium: 60-120 m, High: 120 m and above.

Table A.2 Nocturnal Owl Survey Data

Date	Survey Start Time	Site	Station	Location	Temperature (°C)	Cloud (%)	Wind (Beaufort)	Precipitation	Ambient Noise	Species	Scientific Name	Distance (m)	Comment
27-Apr-22	0:04	Nuttby	N1_OWL	Outside Assessment Area	4	90	1	Light fog	None	None		n/a	
26-Apr-22	20:51	Nuttby	N2_OWL	Outside Assessment Area	4	90	1	None	Light	None		n/a	Spring peepers, wood frogs calling
26-Apr-22	20:51	Nuttby	N3_OWL	Outside Assessment Area	4	90	1	None	Light	Northern saw-whet owl	<i>Aegolius acadicus</i>	n/a	
26-Apr-22	20:45	Nuttby	N4_OWL	In Project Boundary	-	100	2	None	light	Barred owl	<i>Strix varia</i>	200	American woodcock calling
26-Apr-22	20:51	Nuttby	N5_OWL	In Project Boundary	4	90	1	None	light	Barred owl	<i>Strix varia</i>	n/a	
26-Apr-22	20:51	Nuttby	N6_OWL	In Project Boundary	4	90	1	None	Light	none		n/a	
26-Apr-22	20:51	Nuttby	N7_OWL	In Project Boundary	4	90	1	None	Moderate	none		n/a	American woodcock calling
26-Apr-22	22:57	Nuttby	N8_OWL	In Project Boundary	-	100	2	Light rain	-	None		n/a	Coyote calling, 300m
26-Apr-22	22:08	Nuttby	N9_OWL	In Assessment Area	-	100	2	Light rain	-	Barred owl	<i>Strix varia</i>	200	
26-Apr-22	22:27	Nuttby	N10_OWL	In Assessment Area	-	100	2	Light rain	-	Barred owl	<i>Strix varia</i>	300	
26-Apr-22	21:42	Nuttby	N11_OWL	In Project Boundary	-	100	2	Light rain	Light	Barred owl	<i>Strix varia</i>	n/a	
26-Apr-22	21:23	Nuttby	N12_OWL	In Project Boundary	-	100	2	Light rain	Light	None		n/a	
26-Apr-22	23:15	Nuttby	N13_OWL	In Project Boundary	-	100	2	Light rain	-	None		n/a	

APPENDIX P
STANTEC BREEDING BIRD SURVEY PROGRAM



Breeding Bird Survey Program for
Proposed Wind Project near
Nuttby, Nova Scotia

Final Report

March 16, 2023

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BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

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BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

1.0 INTRODUCTION

Nova Scotia Power Incorporated (NSPI) is the Proponent for the proposed Nuttby Ridge Wind Project, near Nuttby, which is approximately 22 km northeast of Truro, Nova Scotia (the Project). The Project consists of the construction and operation of approximately 16 to 23 wind turbines, in the range of 4 to 6 MW, for a total project capacity of up to 98 MW.

The Project Boundary shown on Figure 1 (in red) refers to the area within which the turbines will be located. A wider Assessment Area (Figure 1; in black) indicates the area within which additional surveys were conducted. In some cases, survey locations are outside the Project Boundary and Assessment Areas where earlier study area boundaries were used.

In 2021 and 2022, Stantec completed a variety of bird surveys in the vicinity of the proposed Project. This report presents the results of breeding bird surveys completed in 2022. The primary objective of these surveys was to characterize the composition and abundance of the breeding bird communities in the study area, including possible Species at Risk (SAR) and Species of Conservation Concern (SOCC) in June and July.

Species at Risk (SAR) are herein defined as those species listed as being either *endangered*, *threatened*, *vulnerable*, or of *special concern* under the Nova Scotia *Endangered Species Act* (NS ESA), the federal *Species at Risk Act* (SARA) and/or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Species of Conservation Concern (SOCC) are those species that do not meet the above definition of SAR, but are listed as S1, S2, or S3 in Nova Scotia by the Atlantic Canada Conservation Data Centre (AC CDC; Table 1.1).

Table 1.1 AC CDC Status Ranks

S-Rank/ Qualifier	Description
S1	Critically Imperiled - Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences). May be especially vulnerable to extirpation.
S2	Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.
S3	Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations.
S4	Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors (80+ occurrences).
S5	Secure - Common, widespread, and abundant in the province.
S#S#	A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community
?	Inexact or Uncertain - Denotes inexact or uncertain numeric rank.
SNR	Unranked - Provincial conservation status not yet assessed.
SU	Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.



BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

Table 1.1 AC CDC Status Ranks

S-Rank/ Qualifier	Description
SNA	Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
B	Breeding - Conservation status refers to the breeding population of the species in the province
N	Nonbreeding - Conservation status refers to the non-breeding population of the species in the province.
M	Migrant - Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.
Reference: AC CDC 2023	

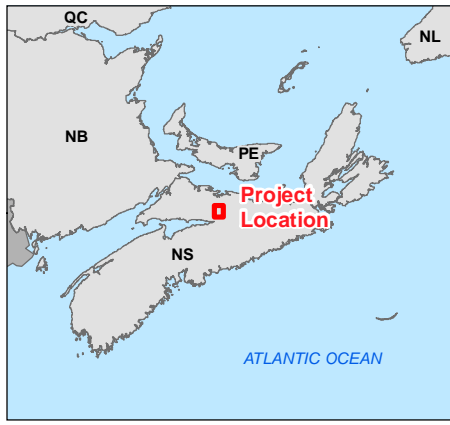
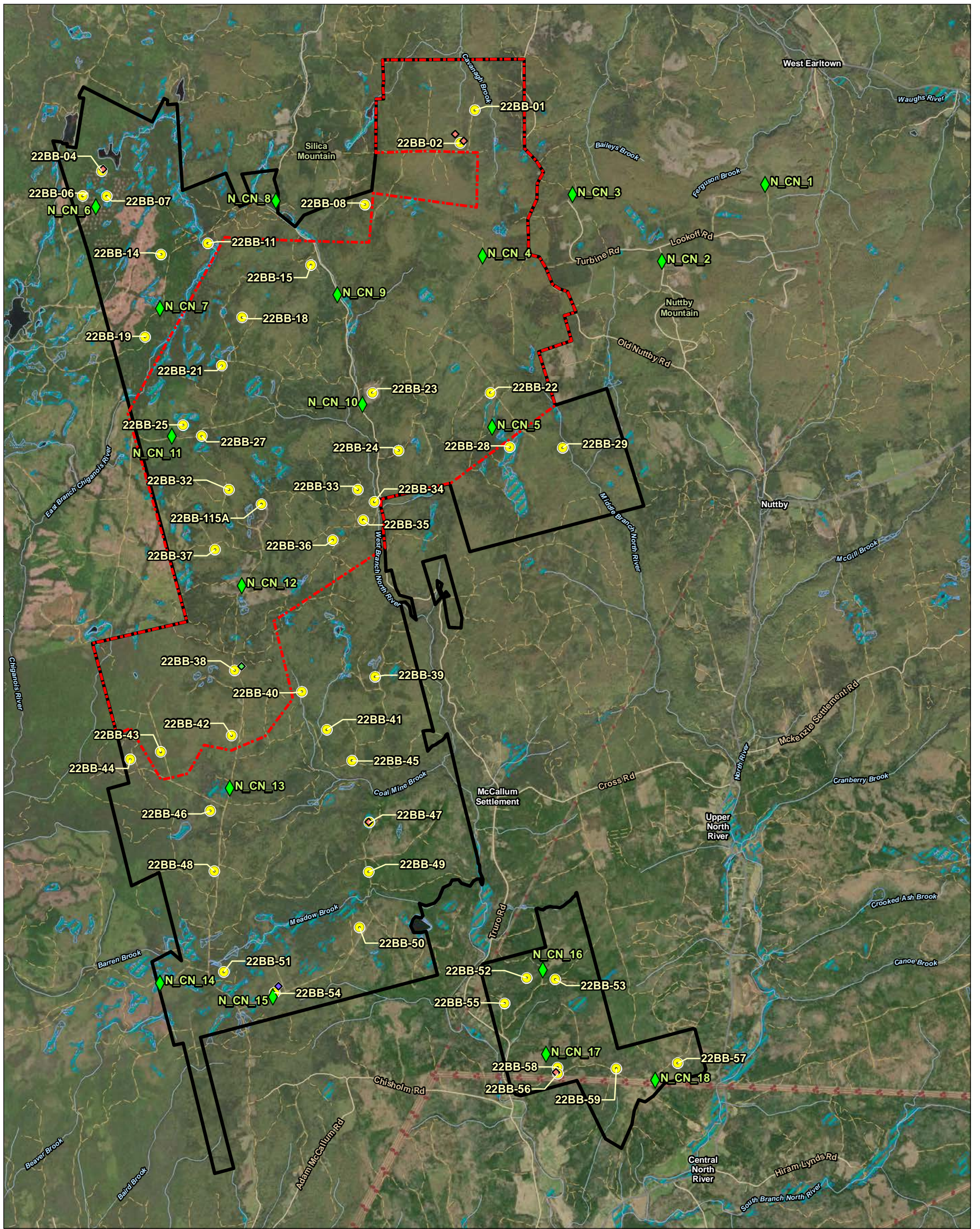
The Project is located approximately 22 km northeast of Truro, Nova Scotia, and is situated in the Uplands Ecoregion of Nova Scotia. The Project Boundary lies completely within the Cobequid Hills Ecodistrict, with southern parts of the Assessment Area within the Cobequid Slopes Ecodistrict.

The Uplands Ecoregion of Nova Scotia is characterized by a geographically complex band of rounded summits and plateaus separated by lower elevation uplands and lowlands that extend across northern mainland Nova Scotia (Nova Scotia Department of Natural Resources (NSDNR) 2017). This Ecoregion experiences more severe winters, greater precipitation, and shorter growing seasons than surrounding Ecoregions, which has given rise to the dominant Acadian hardwood forest of sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*).

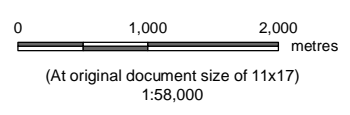
The Project Boundary lies within the Cobequid Hills Ecodistrict which is a narrow upland extending approximately 150 km in an east-west direction between the towns of Pictou and Parrsboro. This Ecodistrict is characterized by large intact late-successional Acadian shade tolerant hardwood forests. Representative species include sugar maple, American beech, and yellow birch, with white ash (*Fraxinus americana*) and ironwood (*Ostrya virginiana*) on richer soils. At upper elevations, the hills give way to a level or hummocky plateau-like topography with forests of red spruce (*Picea rubens*) and black spruce (*Picea mariana*) occurring on moderately-well to imperfectly drained soils.

Southern portions of the Assessment Area lie within the Cobequid Slopes Ecodistrict. This Ecodistrict is characterized by a series of steep to moderate grades on the south side of the Cobequid Mountains. The climate is moderate and relatively humid. Red spruce forests occur on the middle to lower slopes of rounded hills. Sugar maple, yellow birch, and American beech are dominant on slopes or crests where soils are rich. Elsewhere, a shade tolerant mixedwood forest exists, usually dominated by red spruce, eastern hemlock (*Tsuga canadensis*), and yellow birch with occasional sugar maple, American beech, and eastern white pine (*Pinus strobus*).





- ◆ Common Nighthawk Point Count Location
- Breeding Bird Point Count Location
- Species at Risk**
 - ◆ Canada Warbler
 - ◆ Eastern Wood-Pewee
 - ◆ Olive-sided Flycatcher
- Project Boundary, February 2023
- Assessment Area, February 2023
- Collector Road
- Local Road
- Resource Road / Trail
- Transmission Line
- Watercourse
- Wetland (NSE)
- Wetland (NHN)
- Waterbody



Project Location: Nuttby Mountain, Nova Scotia
 Client/Project: Nova Scotia Power Inc., NSPI Wind EA Support Services
 Prepared on 2023-03-01
 121417191_019a

Figure No. **1**
 Title **Breeding Bird Point Count Locations: Nuttby Ridge**

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Notes
 1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
 2. Data Sources: Government of NS, Client, Stantec
 3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

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2.0 METHODS

The breeding bird communities in the area are represented by two broad groups: species which are most detectible during crepuscular periods (dusk and dawn; crepuscular species), and those which are most detectible during the day (diurnal species). To gather data on birds within each group, two types of surveys were completed.

2.1 NIGHTJAR SURVEYS

Common nighthawk (*Chordeiles minor*) and Eastern whip-poor-will (*Antrostomus vociferus*) are nightjar species and both are federally listed as SAR. These species are most detectible in the evening or pre-dawn hours. Surveys targeting crepuscular species were completed during the full moon, beginning 30 minutes prior to sunset on July 13 through July 14, 2022. Surveys were also completed at some survey stations on July 12; however, the wind conditions were strong so the data collected were considered incidental and surveys were repeated. Survey stations were established a minimum of 1 km apart in habitat suitable for breeding. Surveys began with six minutes of silent listening, as per the CWS Canadian Nightjar Survey Protocol (2020). Except for the July 12 surveys which were repeated, surveys were generally completed in good environmental conditions with low winds and no precipitation.

2.2 BREEDING BIRD POINT COUNTS

To assess species composition and relative abundance of diurnal breeding birds in the study area, a survey program was completed in a variety of habitats in June 2022. Given the wide variety of land cover types which could potentially provide suitable habitat for breeding bird species, and the patchy mosaic of habitats available in the study area, the survey approach applied representative sampling across land cover types which were considered to have potential to provide suitable habitat for breeding birds, including SAR and SOCC.

The 48 early morning point count locations were allocated among various land cover types (Table 2.1), accounting for site accessibility. Early morning survey stations were established with a minimum distance of 250 m between points, and 100 m from edges of other land cover types, where possible.

Table 2.1 Land Cover Types Sampled during Breeding Bird Surveys in 2022

Land Cover Type	Number of Point Counts Completed	Area of Land Cover Type Within Project Boundary (km ²)
Forested		
Old Hardwood	1	0.352
Old Mixedwood	5	1.178
Old Softwood	1	1.932
Mature Hardwood	4	4.891
Mature Mixedwood	6	3.746



BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

Table 2.1 Land Cover Types Sampled during Breeding Bird Surveys in 2022

Land Cover Type	Number of Point Counts Completed	Area of Land Cover Type Within Project Boundary (km ²)
Mature Softwood	6	5.305
Young Hardwood	3	1.572
Young Mixedwood	3	1.857
Young Softwood	7	4.538
Clearcut	7	7.377
Unclassified Forest	0	0.060
Wetland		
Bog and Fen	2	0.004
Marsh	0	0.024
Shrub	0	0.041
Treed Swamp	3	0.845
Unclassified Wetland	0	0.012
Other		
Anthropogenic	0	0.109
Open Water	0	0.017
Total	48	33.862

Point count locations were each visited once in June 2022, and a ten-minute point count was completed at each of the 48 locations. Survey methods were based on a modified fixed-radius point count sampling procedure (Bibby et al. 2000). All detected birds were recorded, but birds recorded more than 100 m from the observer (outside the 100 m count circle), were considered incidental. Morning point count survey days began near dawn, continued until approximately 10:00 am, and were completed under suitable environmental conditions (light winds and light to no precipitation) (Table 2.2).

Table 2.2 Summary of Environmental Conditions during 2022 Breeding Bird Point Count Surveys

Survey Date	Temperature and Cloud Cover	Beaufort Wind Speed and Precipitation
June 19, 2022	14-15°C and 40-100% cloud cover	0-3 Beaufort wind, light drizzle to no precipitation.
June 20, 2022	10-14°C and 80-100% cloud cover	1-3 Beaufort wind, intermittent light rain to no precipitation.
June 25, 2022	18°C and 100% cloud cover	1 Beaufort wind, light drizzle to no precipitation.

Data collected during each point count included time and date of survey, environmental conditions, and other relevant information (e.g., habitat, bird behaviour). Breeding evidence for each species was assessed using the methodology described in the Maritimes Breeding Bird Atlas (Birds Canada 2022).



BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

3.0 RESULTS

3.1 NIGHTJAR SURVEY RESULTS

Four common nighthawks were observed during the surveys completed on July 13 and July 14, 2022. A single bird was observed at each of the stations N-10, N-13, N-16, and N-17 (Table 3.1). The males noted at N-13 and N-17 were performing wing booms. On July 12, surveys were completed under high wind conditions. Although these data are considered incidental due to the strong winds, four common nighthawk detections were made. One individual was observed at each of N-7, N-10, N-12, and N-14. It is possible that the individual observed at N-10 on July 12 was the same bird observed again at N-10 on July 14. No eastern whip-poor-will were observed during the nightjar surveys.

Table 3.1 Nightjar Survey Data

Survey Date(s)	Station ID	Location	Species Recorded
July 13, 2022	N-1	Outside Assessment Area	-
July 13, 2022	N-2	Outside Assessment Area	-
July 13, 2022	N-3	Outside Assessment Area	-
July 13, 2022	N-4	In Project Boundary	-
July 13, 2022	N-5	In Project Boundary	-
July 12 and 14, 2022	N-6	In Assessment Area	-
July 12 and 14, 2022	N-7	In Assessment Area	common nighthawk (incidental)
July 12 and 14, 2022	N-8	In Assessment Area	-
July 12 and 14, 2022	N-9	In Project Boundary	-
July 12 and 14, 2022	N-10	In Project Boundary	common nighthawk
July 12 and 14, 2022	N-11	In Project Boundary	-
July 12, 2022	N-12	In Project Boundary	common nighthawk
July 12 and 14, 2022	N-13	In Assessment Area	common nighthawk
July 12, 2022	N-14	In Assessment Area	common nighthawk (incidental)
July 12 and 14, 2022	N-15	In Assessment Area	-
July 13, 2022	N-16	In Assessment Area	common nighthawk
July 13, 2022	N-17	In Assessment Area	common nighthawk
July 13, 2022	N-18	In Assessment Area	-



BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

3.2 BREEDING BIRD POINT COUNT RESULTS

Forty-eight point counts were completed over three survey days on June 19, June 20, and June 25, 2022. Including incidental observations, 60 species, predominantly passerines, were observed (Table 3.2). Incidental observations added eleven species (American woodcock (*Scolopax minor*), belted kingfisher (*Megaceryle alcyon*), red-tailed hawk (*Buteo jamaicensis*), broad-winged hawk (*Buteo platypterus*), eastern wood-pewee (*Contopus virens*), olive-sided flycatcher (*Contopus cooperi*), rose-breasted grosbeak (*Pheucticus ludovicianus*), swamp sparrow (*Melospiza georgiana*), song sparrow (*Melospiza melodia*), white-winged crossbill (*Loxia leucoptera*), and merlin (*Falco columbarius*)).

Relative abundance was calculated, excluding incidental observations, for each observed species. Relative abundance is a measure of the proportion of each when compared with the total number of birds observed, expressed as a percentage of the birds observed (Table 3.2). All species records are presented in Table A.1 in Appendix A along with their population status ranks.

Table 3.2 Species Diversity and Relative Abundance – 2022 Breeding Bird Point Count Surveys

Common Name	Scientific Name	Number Observed	Relative Abundance ¹ (%)
mourning dove	<i>Zenaida macroura</i>	4	0.68
yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	1	0.17
black-backed woodpecker	<i>Picoides arcticus</i>	2	0.34
hairy woodpecker	<i>Dryobates villosus</i>	1	0.17
northern flicker	<i>Colaptes auratus</i>	1	0.17
yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	3	0.51
alder flycatcher	<i>Empidonax alnorum</i>	7	1.20
least flycatcher	<i>Empidonax minimus</i>	16	2.74
blue-headed vireo	<i>Vireo solitarius</i>	13	2.23
Philadelphia vireo	<i>Vireo philadelphicus</i>	1	0.17
red-eyed vireo	<i>Vireo olivaceus</i>	37	6.34
Canada jay	<i>Perisoreus canadensis</i>	4	0.68
blue jay	<i>Cyanocitta cristata</i>	6	1.03
American crow	<i>Corvus brachyrhynchos</i>	4	0.68
common raven	<i>Corvus corax</i>	1	0.17
black-capped chickadee	<i>Poecile atricapillus</i>	12	2.05
red-breasted nuthatch	<i>Sitta canadensis</i>	7	1.20
brown creeper	<i>Certhia americana</i>	4	0.68
winter wren	<i>Troglodytes hiemalis</i>	18	3.08
golden-crowned kinglet	<i>Regulus satrapa</i>	21	3.60
ruby-crowned kinglet	<i>Regulus calendula</i>	3	0.51



BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

Table 3.2 Species Diversity and Relative Abundance – 2022 Breeding Bird Point Count Surveys

Common Name	Scientific Name	Number Observed	Relative Abundance ¹ (%)
Swainson's thrush	<i>Catharus ustulatus</i>	5	0.86
hermit thrush	<i>Catharus guttatus</i>	40	6.85
American robin	<i>Turdus migratorius</i>	28	4.79
cedar waxwing	<i>Bombycilla cedrorum</i>	7	1.20
purple finch	<i>Haemorhous purpureus</i>	2	0.34
pine siskin	<i>Spinus pinus</i>	5	0.86
American goldfinch	<i>Spinus tristis</i>	3	0.51
chipping sparrow	<i>Spizella passerina</i>	1	0.17
dark-eyed junco	<i>Junco hyemalis</i>	33	5.65
white-throated sparrow	<i>Zonotrichia albicollis</i>	29	4.97
Lincoln's sparrow	<i>Melospiza lincolni</i>	1	0.17
ovenbird	<i>Seiurus aurocapilla</i>	53	9.08
black-and-white warbler	<i>Mniotilta varia</i>	31	5.31
Nashville warbler	<i>Leiothlypis ruficapilla</i>	4	0.68
mourning warbler	<i>Geothlypis philadelphia</i>	4	0.68
common yellowthroat	<i>Geothlypis trichas</i>	15	2.57
American redstart	<i>Setophaga ruticilla</i>	27	4.62
northern parula	<i>Setophaga americana</i>	19	3.25
magnolia warbler	<i>Setophaga magnolia</i>	22	3.77
bay-breasted warbler	<i>Setophaga castanea</i>	2	0.34
blackburnian warbler	<i>Setophaga fusca</i>	11	1.88
chestnut-sided warbler	<i>Setophaga pensylvanica</i>	1	0.17
black-throated blue warbler	<i>Setophaga caerulescens</i>	1	0.17
palm warbler	<i>Setophaga palmarum</i>	1	0.17
yellow-rumped warbler	<i>Setophaga coronata</i>	6	1.03
black-throated green warbler	<i>Setophaga virens</i>	62	10.62
Canada warbler	<i>Cardellina canadensis</i>	4	0.68
Wilson's warbler	<i>Cardellina pusilla</i>	1	0.17

Note:
¹ Number observed as a percentage of total observed
SAR are presented in **bold** text



BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

The most abundant species observed during the surveys were black-throated green warbler (*Setophaga virens*; 62 individuals, 10.62% relative abundance), ovenbird (*Seiurus aurocapilla*; 53 individuals, 9.08% relative abundance), and hermit thrush (*Catharus guttatus*; 40 individuals observed, 6.85% relative abundance), all of which were assessed as “possible” breeders.

Three SAR were identified during the breeding bird point count surveys: Canada warbler (*Cardellina canadensis*); eastern wood-pewee (*Contopus virens*); and olive-sided flycatcher (*Contopus cooperi*). Five SOCC were identified: Philadelphia vireo (*Vireo philadelphicus*); Canada jay (*Perisoreus canadensis*); pine siskin (*Spinus pinus*); Wilson’s warbler (*Cardellina pusilla*); and rose-breasted grosbeak (*Pheucticus ludovicianus*).

Species richness is defined as the number of different species recorded within a given habitat type excluding incidental observations. This was calculated for each of the habitat types sampled (Table 3.3).

Level of survey effort varied between habitat types; therefore, species richness is not directly comparable between habitats. Due to the fragmented habitat in the study area, species were at times recorded in a different habitat type than the location of the observer. In calculating species richness and average abundance per survey, birds that were observed incidentally, including those recorded as fly-bys, were excluded as there was no evidence that they were using the habitat type over which they were seen.

Table 3.3 Habitat Types Sampled During Field Surveys and Species Richness

Land Classification Type	Breeding Bird Point Counts Completed	Area within Project Boundary (km ²)	Species Richness (# species)	Average Abundance per Survey
Forested				
Old Hardwood	1	0.352	11	21.0
Old Mixedwood	5	1.178	21	16.0
Old Softwood	1	1.932	12	13.0
Mature Hardwood	4	4.891	17	11.5
Mature Mixedwood	6	3.746	28	11.0
Mature Softwood	6	5.305	24	9.8
Young Hardwood	3	1.572	17	10.7
Young Mixedwood	3	1.857	20	14.0
Young Softwood	7	4.538	29	15.9
Wetland				
Bog and Fen	2	0.004	8	8.5
Treed Swamp	3	0.845	15	7.0
Other				
Clearcut	7	7.377	25	13.1



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The habitat types with the highest species richness were young softwood (29 species), mature mixedwood (28 species), and clearcut (25 species). These three habitat types also represented a large part of the available habitat and had a proportionally higher number of point counts completed.

Average abundance per survey values were calculated for each habitat type to provide a more comparable estimate of bird abundance in each habitat type. The highest average abundance per survey values were obtained in the old hardwood (21 individuals per survey on average), old mixedwood (16 individuals per survey on average) and young softwood (15.9 individuals per survey on average) habitats.

3.3 SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

Five SOCC and four SAR were identified during the two surveys. The species and rankings are presented in Table 3.4 below. SAR are discussed further below.

Table 3.4 SAR and SOCC Recorded During Breeding Bird Surveys in 2022

Common Name	Scientific Name	SARA Status	COSEWIC Status	NS ESA Rank	AC CDC Rank
common nighthawk	<i>Chordeiles minor</i>	Threatened	Special Concern	Threatened	S3B
olive-sided flycatcher	<i>Contopus cooperi</i>	Threatened	Special Concern	Threatened	S3B
eastern wood-pewee	<i>Contopus virens</i>	Special Concern	Special Concern	Vulnerable	S3S4B
Philadelphia vireo	<i>Vireo philadelphicus</i>	-	-	-	S2?B,SUM
Canada jay	<i>Perisoreus canadensis</i>	-	-	-	S3
pine siskin	<i>Spinus pinus</i>	-	-	-	S3
Canada warbler	<i>Cardellina canadensis</i>	Threatened	Special Concern	Endangered	S3B
Wilson's warbler	<i>Cardellina pusilla</i>	-	-	-	S3B,S5M
rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	-	-	-	S3B

The common nighthawk is listed as *threatened* under Schedule 1 of SARA and *threatened* under the NS ESA. In Canada, the common nighthawk occurs in all the provinces and territories, except for Nunavut. They are commonly found throughout the maritime provinces. The common nighthawk breeds in a wide range of open, vegetation-free habitats, including dunes, beaches, grasslands, pastures, recent clear-cuts, marshes, lakeshores, and riverbanks (Government of Canada 2022). Critical habitat has not yet been identified for this species.

The olive-sided flycatcher is a medium-sized passerine listed as *threatened* under Schedule 1 of the SARA and *threatened* under the NS ESA. This species breeds throughout much of forested Canada and is most often associated with forest openings containing tall trees or snags for perching (Government of Canada 2022). Generally, preferred forest habitat is either coniferous or mixed coniferous. Suitable habitat often occurs near wetland areas. Critical habitat has not yet been established for this species.



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The eastern wood-pewee is listed as *special concern* under Schedule 1 of the SARA and *vulnerable* under the NS ESA. In Canada, they can be found breeding from southeastern Saskatchewan to the Maritime Provinces. The preferred habitat of the eastern wood-pewee is the mid-canopy layer of deciduous and mixed forests located near forest edges and clearings (Government of Canada 2022). Critical habitat has not been identified for this species.

The Canada warbler is listed as *threatened* under Schedule 1 of the SARA and *endangered* under the NS ESA. During the breeding season, 85% of the global breeding population can be found in Canada. This species breeds across the southeastern parts of the country and can be found in every province and territory, with the exceptions of Newfoundland and Labrador, and Nunavut. They can primarily be found nesting in areas with wet, mixed deciduous-coniferous forest that include a well-developed shrub layer (Government of Canada 2022). Critical habitat has not yet been identified for this species.

3.4 INCIDENTAL WILDLIFE OBSERVATIONS

A variety of wildlife species in addition to avifauna were observed incidentally during the breeding bird monitoring field program. The following species were either observed directly or indirectly (e.g., scat, tracks).

Mammals

- white-tailed deer (*Odocoileus virginianus*)
- American black bear (*Ursus americanus*)
- North American porcupine (*Erethizon dorsatum*)

Herptiles

- green frog (*Lithobates clamitans*)
- spring peeper (*Pseudacris crucifer*)

Each of the mammal and herptile species above are common and considered secure in Nova Scotia.

4.0 SUMMARY

Breeding bird surveys identified 61 species of birds during the June-July breeding bird period in 2022. Four SAR and five SOCC were observed. SAR recorded during the surveys included common nighthawk, olive-sided flycatcher, eastern wood-pewee, and Canada warbler. SOCC observed during the surveys included Philadelphia vireo, Canada jay, pine siskin, rose-breasted grosbeak, and Wilson's warbler.

Overall, the observed species are typical of the area and can potentially breed within the habitats found in the Assessment Area. Most birds appeared to be foraging or exhibiting behaviours (such as territorial singing) which indicate they are "possible" breeders. Of the 61 species observed, 1 was confirmed as breeding, and two were assessed as "probable" breeders.



5.0 CLOSURE

The information presented in this report represents the best technical judgment of Stantec based on information provided by NSPI and the data obtained from the work. Conclusions are based on site conditions observed by Stantec at the time the work was performed at the specific survey locations and cannot be extrapolated to other areas around these locations.



BREEDING BIRD SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

6.0 REFERENCES

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APPENDIX A
2022 Breeding Bird Data

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
Incidental	45.451473 -63.302937	06/19/22	7:57 AM	na	na	na	na	None	American woodcock	1	Habitat	Probable	n/a	Yes
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	American redstart	1	Singing	Possible	137.3	yes
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	American robin	1	Singing	Confirmed	31.9	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	American robin	1	Singing	Confirmed	29.82	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	black-capped chickadee	1	Calling	Possible	25.36	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	72.05	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	2 - 5	None	blue-headed vireo	1	Singing	Possible	120.08	yes
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	blue-headed vireo	1	Singing	Possible	107.11	yes
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	chipping sparrow	1	Singing	Possible	69.96	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	golden-crowned kinglet	1	Singing	Possible	64.95	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	143.21	yes
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	71.11	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	least flycatcher	1	Singing	Possible	166.48	yes
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	72.63	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	northern parula	1	Singing	Possible	134.25	yes
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	59.47	no
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	127.47	yes
22BB-51	45.468438, -63.307411	06/19/22	8:02 AM	15	None	100	'2 - 5	None	white-throated sparrow	1	Singing	Possible	101.62	yes
Incidental	45.469285 -63.312118	06/19/22	8:15 AM	na	na	na	na	None	rose-breasted grosbeak	1	Singing male present	Possible	n/a	Yes
Incidental	45.469947 -63.309414	06/19/22	8:17 AM	na	na	na	na	None	Canada warbler	1	Singing male present	Possible	n/a	Yes
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	American crow	1	Calling	Possible	85.54	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	American crow	1	Calling	Possible	95.67	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	American robin	1	Singing	Confirmed	32.11	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	American robin	1	Singing	Confirmed	78.38	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	Blackburnian warbler	1	Singing	Possible	53.35	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	Blackburnian warbler	1	Singing	Possible	34.16	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	black-capped chickadee	1	Singing	Possible	54.31	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	dark-eyed junco	1	Singing	Possible	63.81	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	dark-eyed junco	1	Singing	Possible	72.03	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	golden-crowned kinglet	1	Singing	Possible	52.53	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	golden-crowned kinglet	1	Singing	Possible	67.87	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	hermit thrush	1	Singing	Possible	91.65	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	hermit thrush	1	Singing	Possible	87.37	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	hermit thrush	1	Singing	Possible	45.9	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	mourning dove	1	Singing	Possible	125.98	yes
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	northern parula	1	Singing	Possible	54.84	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	ovenbird	1	Singing	Possible	20.4	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	ovenbird	1	Singing	Possible	81.1	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	red-eyed vireo	1	Singing	Possible	69.53	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	red-eyed vireo	1	Singing	Possible	67.05	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	winter wren	1	Singing	Possible	98.48	no
22BB-58	45.456134, -63.245520	06/19/22	8:20 AM	14	None	100	'6 - 11	None	yellow-rumped warbler	1	Singing	Possible	65.55	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	American redstart	1	Singing	Possible	63.54	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	American robin	1	Calling	Confirmed	70.53	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	black-and-white warbler	1	Singing	Possible	46.72	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	14.82	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	dark-eyed junco	1	Singing	Possible	55.26	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	dark-eyed junco	1	Visual and Singing/Calling	Possible	16.13	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	golden-crowned kinglet	1	Calling	Possible	70.08	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	61.51	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	northern parula	1	Singing	Possible	39.95	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	northern parula	1	Singing	Possible	80.72	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	northern parula	1	Singing	Possible	77.62	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	68.25	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	16.14	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	red-eyed vireo	1	Singing	Possible	78.52	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	red-eyed vireo	1	Singing	Possible	83.86	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	white-throated sparrow	1	Singing	Possible	86.31	no
22BB-48	45.481583, -63.309249	06/19/22	8:26 AM	15	None	100	'2 - 5	None	yellow-bellied sapsucker	1	Calling	Possible	72.35	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	American goldfinch	1	Calling	Possible	36.12	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	American robin	1	Singing	Confirmed	89.3	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	black-capped chickadee	1	Singing	Possible	70.57	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	black-capped chickadee	1	Visual and Singing/Calling	Possible	15.06	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	black-throated green warbler	1	Singing	Possible	22.67	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	common yellowthroat	1	Singing	Possible	80.43	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	dark-eyed junco	1	Singing	Possible	12.93	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	golden-crowned kinglet	1	Singing	Possible	56.74	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	hermit thrush	1	Singing	Possible	84.43	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	magnolia warbler	1	Singing	Possible	36.3	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	mourning warbler	1	Singing	Possible	108.19	yes
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	red-eyed vireo	1	Singing	Possible	92.08	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	rose-breasted grosbeak	1	Flyover Singing/Calling	Possible	13.12	Yes
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	ruby-crowned kinglet	1	Singing	Possible	69.21	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	white-throated sparrow	1	Singing	Possible	65.77	no
22BB-46	45.489450, -63.310017	06/19/22	8:48 AM	15	None	100	'<2	None	winter wren	1	Singing	Possible	65.36	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	American redstart	1	Singing	Possible	46.8	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	black-and-white warbler	1	Singing	Possible	58.8	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	Blackburnian warbler	1	Singing	Possible	61.95	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	black-throated green warbler	1	Singing	Possible	83.77	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	Canada warbler	1	Singing	Possible	37.96	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	hermit thrush	1	Singing	Possible	67.46	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	hermit thrush	1	Calling	Possible	65.61	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	magnolia warbler	1	Singing	Possible	59.21	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	mourning dove	1	Calling	Possible	89.78	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	red-breasted nuthatch	1	Singing	Possible	90.77	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	red-eyed vireo	1	Singing	Possible	67.3	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	red-eyed vireo	1	Singing	Possible	84.08	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	Swainson's thrush	1	Singing	Possible	99.58	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	Swainson's thrush	1	Singing	Possible	46.86	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	white-throated sparrow	1	Singing	Possible	80.12	no
22BB-56	45.455356, -63.245444	06/19/22	8:56 AM	14	None	100	'6 - 11	None	yellow-bellied flycatcher	1	Calling	Possible	55.16	no
Incidental	45.489591 -63.311271	06/19/22	9:03 AM	na	na	na	na	None	northern flicker	1	Habitat	Possible	n/a	Yes
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	American robin	1	Singing	Confirmed	68.09	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	American robin	1	Calling	Confirmed	88.45	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	black-and-white warbler	1	Singing	Possible	71	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	44.5	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	76.84	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	blue-headed vireo	1	Singing	Possible	77.04	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	dark-eyed junco	1	Calling	Possible	22.91	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	84.09	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	85.37	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	60.39	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	35.91	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	pine siskin	4	Calling	Possible	23.03	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	red-eyed vireo	1	Singing	Possible	75.57	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	white-throated sparrow	1	Singing	Possible	62.97	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	white-throated sparrow	1	Singing	Possible	20.61	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	white-throated sparrow	1	Singing	Possible	83.67	no
22BB-44	45.496124, -63.324897	06/19/22	9:09 AM	15	None	100	'2 - 5	None	winter wren	1	Singing	Possible	81.57	no
Incidental	45.464082 -63.242336	06/19/22	9:19 AM	na	na	na	na	None	Canada jay	1	Habitat	Possible	n/a	Yes
Incidental	45.464497 -63.241988	06/19/22	9:20 AM	na	na	na	na	None	Canada warbler	1	Singing male present	Possible	n/a	Yes
Incidental	45.463988 -63.241697	06/19/22	9:20 AM	na	na	na	na	None	yellow-bellied flycatcher	1	Habitat	Possible	n/a	Yes
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	black-and-white warbler	1	Singing	Possible	56.1	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	black-throated green warbler	1	Singing	Possible	76.32	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	black-throated green warbler	1	Singing	Possible	27.28	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	dark-eyed junco	1	Singing	Possible	50.25	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	golden-crowned kinglet	2	Calling	Possible	58.85	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	hermit thrush	1	Singing	Possible	84.87	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	hermit thrush	1	Singing	Possible	26.29	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	hermit thrush	1	Calling	Possible	72.1	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	northern parula	1	Singing	Possible	29.89	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	ovenbird	1	Singing	Possible	60.01	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	ovenbird	1	Singing	Possible	63.26	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	ovenbird	1	Singing	Possible	8.79	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	red-eyed vireo	1	Singing	Possible	69.56	no
22BB-43	45.497128, -63.319275	06/19/22	9:34 AM	15	Fog	100	'<2	None	red-eyed vireo	1	Singing	Possible	42.95	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	American crow	1	Calling	Possible	82.88	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	American robin	1	Singing	Confirmed	93.46	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	60.8	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	57.15	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	dark-eyed junco	1	Singing	Possible	47.38	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	105.79	yes
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	82.72	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	least flycatcher	1	Singing	Possible	66.84	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	mourning warbler	1	Singing	Possible	78.13	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	northern parula	1	Singing	Possible	87.08	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	northern parula	1	Singing	Possible	71.27	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	northern parula	1	Singing	Possible	96.12	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	58.61	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	63.18	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	41.54	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	106.42	yes
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	66.3	no
22BB-59	45.456026, -63.234649	06/19/22	9:42 AM	14	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	26.41	no
Incidental	45.492274 -63.307677	06/19/22	9:51 AM	na	na	na	na	None	swamp sparrow	1	Singing male present	Possible	n/a	Yes
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	American robin	1	Singing	Confirmed	70.69	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	black-and-white warbler	1	Singing	Possible	78.66	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	33.64	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	68.17	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	blue jay	1	Calling	Possible	79.8	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	chestnut-sided warbler	1	Singing	Possible	67.01	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	dark-eyed junco	1	Calling	Possible	27.86	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	dark-eyed junco	1	Visual and Singing/Calling	Possible	7.91	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	hermit thrush	1	Singing	Possible	89.69	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	northern parula	1	Singing	Possible	28.8	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	ovenbird	1	Singing	Possible	35.36	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	ovenbird	1	Singing	Possible	77.28	no
22BB-39	45.507006, -63.279604	06/19/22	10:02 AM	15	Fog	100	'2 - 5	None	white-throated sparrow	1	Singing	Possible	87.94	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	American redstart	1	Singing	Possible	65.53	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	American robin	1	Calling	Confirmed	78.24	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	black-and-white warbler	1	Singing	Possible	25.91	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	black-and-white warbler	1	Singing	Possible	50.97	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	85.18	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	67.19	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	18.26	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	55.99	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	blue-headed vireo	1	Singing	Possible	66.47	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	common raven	1	Calling	Possible	80.09	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	golden-crowned kinglet	1	Singing	Possible	70.95	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	70.8	no

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Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	least flycatcher	1	Singing	Possible	78.9	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	18.33	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	60.49	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	80.35	no
22BB-57	45.456757, -63.223308	06/19/22	10:13 AM	15	None	100	'6 - 11	Slight	white-throated sparrow	1	Singing	Possible	89.98	no
Incidental	45.503297 -63.278145	06/19/22	10:17 AM	na	na	na	na	None	American robin	1	Adult carrying food	Confirmed	n/a	Yes
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	American redstart	1	Singing	Possible	43.26	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	American redstart	1	Singing	Possible	59.91	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	American robin	1	Singing	Confirmed	108.83	yes
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	black-and-white warbler	1	Singing	Possible	109.26	yes
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	49.51	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	27.44	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	common yellowthroat	1	Singing	Possible	88.51	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	dark-eyed junco	1	Visual and Singing/Calling	Possible	11.76	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	hermit thrush	1	Singing	Possible	118.17	yes
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	hermit thrush	1	Singing	Possible	119.77	yes
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	83.14	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	northern parula	1	Singing	Possible	83.25	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	ovenbird	1	Singing	Possible	111.49	yes
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	ovenbird	1	Singing	Possible	38.27	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	red-eyed vireo	1	Singing	Possible	64.76	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	red-eyed vireo	1	Singing	Possible	101.29	yes
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	white-throated sparrow	1	Singing	Possible	75.45	no
22BB-45	45.496060, -63.283791	06/19/22	10:20 AM	15	Fog	100	'2 - 5	None	winter wren	1	Singing	Possible	110.96	yes
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	American goldfinch	1	Calling	Possible	63.54	no
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	American redstart	1	Singing	Possible	11.72	no
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	33.78	no
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	golden-crowned kinglet	1	Singing	Possible	67.54	no
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	hermit thrush	1	Calling	Possible	79.6	no
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	magnolia warbler	1	Flyover Visual	Possible	12.76	Yes
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	northern parula	1	Singing	Possible	40.52	no
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	84.06	no
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	57.35	no
22BB-41	45.500077, -63.288492	06/19/22	10:45 AM	14	None	100	'2 - 5	None	red-eyed vireo	1	Singing	Possible	47.3	no

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22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	American crow	1	Calling	Possible	90.6	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	black-and-white warbler	1	Singing	Possible	59.58	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	65.52	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	48.19	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	99.01	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	mourning dove	1	Singing	Possible	98.89	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	75.84	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	53.19	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	64.71	no
22BB-55	45.464475, -63.255352	06/19/22	10:48 AM	15	Drizzle	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	42.39	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	American redstart	1	Singing	Possible	72.05	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	American redstart	1	Singing	Possible	17.79	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	American robin	1	Calling	Confirmed	84.34	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	black-and-white warbler	1	Singing	Possible	30.38	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	39.31	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	81.07	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	93.8	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	least flycatcher	1	Singing	Possible	93.76	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	least flycatcher	1	Singing	Possible	52.51	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	71.98	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	purple finch	1	Singing	Possible	50.56	no
22BB-40	45.505028, -63.293164	06/19/22	11:12 AM	14	None	100	'6 - 11	Slight	white-throated sparrow	1	Singing	Possible	109.71	yes
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	American redstart	1	Singing	Possible	64.79	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	American redstart	1	Singing	Possible	68.17	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	American robin	1	Calling	Confirmed	92.84	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	American robin	1	Singing	Confirmed	76.34	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	62.63	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	93.46	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	blue-headed vireo	1	Singing	Possible	64.48	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	golden-crowned kinglet	1	Singing	Possible	43.35	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	golden-crowned kinglet	1	Singing	Possible	58.94	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	98.62	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	99.96	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	mourning dove	1	Singing	Possible	96.16	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	mourning dove	1	Singing	Possible	94.99	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	Nashville warbler	1	Singing	Possible	41.38	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	29.62	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	red-breasted nuthatch	1	Singing	Possible	92.98	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	red-breasted nuthatch	1	Singing	Possible	82.45	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	winter wren	1	Singing	Possible	41.59	no
22BB-53	45.467633, -63.246033	06/19/22	11:13 AM	15	None	100	'6 - 11	Slight	winter wren	1	Singing	Possible	69.75	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	American robin	1	Calling	Confirmed	97.49	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	black-and-white warbler	1	Singing	Possible	44.15	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	93.43	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	97.86	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	62.29	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	blue jay	2	Calling	Possible	88.33	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	blue-headed vireo	1	Singing	Possible	51.73	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	dark-eyed junco	1	Singing	Possible	54.05	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	golden-crowned kinglet	1	Calling	Possible	55.65	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	magnolia warbler	1	Singing	Possible	36.23	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	Nashville warbler	1	Singing	Possible	57.89	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	48.6	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	73.89	no
22BB-52	45.467802, -63.251334	06/19/22	11:40 AM	15	None	70	'6 - 11	Slight	winter wren	1	Singing	Possible	81.9	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	alder flycatcher	1	Singing	Possible	51.66	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	alder flycatcher	1	Singing	Possible	76.05	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	American redstart	1	Singing	Possible	74.68	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	black-and-white warbler	1	Singing	Possible	34.71	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	black-capped chickadee	1	Calling	Possible	72.45	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	black-throated green warbler	1	Singing	Possible	76.04	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	blue jay	1	Calling	Possible	81.75	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	blue-headed vireo	1	Singing	Possible	58.39	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	blue-headed vireo	1	Singing	Possible	62.74	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	dark-eyed junco	1	Singing	Possible	86.47	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	least flycatcher	1	Singing	Possible	87.06	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	magnolia warbler	1	Singing	Possible	42.94	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	Nashville warbler	1	Singing	Possible	80.64	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	northern parula	1	Singing	Possible	61.3	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	ovenbird	1	Singing	Possible	113.16	yes
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	palm warbler	1	Singing	Possible	21.79	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	red-breasted nuthatch	1	Calling	Possible	108.2	yes
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	red-breasted nuthatch	2	Visual and Singing/Calling	Possible	25.56	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	white-throated sparrow	1	Singing	Possible	77.14	no
22BB-50	45.474325, -63.282288	06/19/22	11:44 AM	15	None	70	'6 - 11	None	winter wren	1	Singing	Possible	128.95	yes
Incidental	45.463909 -63.251553	06/19/22	12:03 PM	na	na	na	na	None	red-tailed hawk	1	Habitat	Possible	n/a	Yes
Incidental	45.463186 -63.251553	06/19/22	12:04 PM	na	na	na	na	None	olive-sided flycatcher	1	Habitat	Possible	n/a	Yes
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	alder flycatcher	1	Singing	Possible	69.45	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	American redstart	1	Singing	Possible	79.38	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	black-and-white warbler	1	Singing	Possible	72.39	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	black-throated green warbler	1	Singing	Possible	58.07	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	blue-headed vireo	1	Singing	Possible	72.01	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	Canada jay	1	Calling	Possible	87.51	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	cedar waxwing	2	Calling	Probable	31.26	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	common yellowthroat	1	Singing	Possible	80.36	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	dark-eyed junco	1	Singing	Possible	62.56	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	magnolia warbler	1	Singing	Possible	23.06	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	Nashville warbler	1	Singing	Possible	58.77	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	olive-sided flycatcher	1	Singing	Possible	109.48	yes
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	ovenbird	1	Singing	Possible	110.52	yes
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	red-eyed vireo	1	Singing	Possible	110.06	yes
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	white-throated sparrow	1	Singing	Possible	73.63	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	white-throated sparrow	1	Singing	Possible	41.68	no
22BB-54	45.465769, -63.297959	06/19/22	12:07 PM	14	None	50	'6 - 11	None	winter wren	1	Singing	Possible	124	yes
Incidental	45.471805 -63.300699	06/19/22	12:19 PM	na	na	na	na	None	olive-sided flycatcher	1	Singing male present	Possible	n/a	Yes
Incidental	45.465189 -63.297454	06/19/22	12:22 PM	na	na	na	na	None	song sparrow	1	Singing male present	Possible	n/a	Yes
22BB-42	45.499282, -63.306120	06/19/22	12:44 PM	15	None	70	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	75.15	no
22BB-42	45.499282, -63.306120	06/19/22	12:44 PM	15	None	70	'6 - 11	Slight	least flycatcher	1	Singing	Possible	52.32	no
22BB-42	45.499282, -63.306120	06/19/22	12:44 PM	15	None	70	'6 - 11	Slight	magnolia warbler	1	Singing	Possible	44.42	no
22BB-42	45.499282, -63.306120	06/19/22	12:44 PM	15	None	70	'6 - 11	Slight	ovenbird	1	Singing	Possible	101.46	yes
22BB-42	45.499282, -63.306120	06/19/22	12:44 PM	15	None	70	'6 - 11	Slight	ovenbird	1	Singing	Possible	65.95	no
22BB-42	45.499282, -63.306120	06/19/22	12:44 PM	15	None	70	'6 - 11	Slight	ovenbird	1	Singing	Possible	92.02	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-42	45.499282, -63.306120	06/19/22	12:44 PM	15	None	70	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	51.76	no
22BB-42	45.499282, -63.306120	06/19/22	12:44 PM	15	None	70	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	51.75	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	American redstart	1	Singing	Possible	33.33	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	broad-winged hawk	2	Flyover Visual	Possible	123.59	yes
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	eastern wood-pewee	1	Singing	Possible	116.37	yes
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	least flycatcher	1	Singing	Possible	67.8	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	least flycatcher	1	Singing	Possible	89.22	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	least flycatcher	1	Singing	Possible	68	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	mourning warbler	1	Singing	Possible	57.12	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	northern parula	1	Singing	Possible	70.69	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	ovenbird	1	Singing	Possible	86.21	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	ovenbird	1	Singing	Possible	70.33	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	Philadelphia vireo	1	Singing	Possible	19.45	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	red-eyed vireo	1	Singing	Possible	82.84	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	red-eyed vireo	1	Singing	Possible	81.02	no
22BB-38	45.507777, -63.305640	06/19/22	12:49 PM	15	None	40	'12 - 19	Slight	white-throated sparrow	1	Singing	Possible	118.32	yes
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	40	no
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	80	no
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	dark-eyed junco	1	Singing	Possible	40	no
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	40	no
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	black-and-white warbler	1	Singing	Possible	60	no
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	99	no
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	Swainson's thrush	1	Calling	Possible	80	no
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	blue jay	1	Calling	Possible	50	no
22BB-08	45.568495, -63.28178	06/20/22	10:23 AM	13	None	100	'2 - 5	None	winter wren	1	Singing	Possible	40	no
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	American robin	1	Visual and Singing/Calling	Confirmed	1092.8	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	American robin	1	Singing	Confirmed	1152.88	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	1065.42	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	black-throated green warbler	1	Visual and Singing/Calling	Possible	1102.75	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	1167.16	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	blue-headed vireo	1	Singing	Possible	1034.91	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	dark-eyed junco	1	Singing	Possible	1068.12	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	dark-eyed junco	1	Singing	Possible	1093.77	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	golden-crowned kinglet	1	Calling	Possible	1149.93	Yes

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	1123.49	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	1044.5	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	1109.59	Yes
22BB-24	45.543710, -63.285907	06/20/22	8:29 AM	13	None	100	'2 - 5	None	yellow-rumped warbler	1	Singing	Possible	1127.66	Yes
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	American redstart	1	Singing	Possible	73.56	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	American redstart	1	Singing	Possible	67.43	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	American robin	2	Visual	Confirmed	33.23	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	cedar waxwing	2	Visual	Probable	59.35	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	hermit thrush	1	Singing	Possible	94.98	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	hermit thrush	1	Singing	Possible	103.48	Yes
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	least flycatcher	1	Singing	Possible	39.66	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	least flycatcher	1	Singing	Possible	33.8	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	least flycatcher	1	Singing	Possible	9.62	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	least flycatcher	1	Singing	Possible	70.7	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	ovenbird	1	Singing	Possible	36.46	no
22BB-37	45.523479, -63.309329	06/20/22	8:40 AM	11	Drizzle	100	'6 - 11	None	red-eyed vireo	1	Singing	Possible	32.54	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	American redstart	1	Singing	Possible	85.05	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	black-and-white warbler	1	Singing	Possible	67.09	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	Blackburnian warbler	1	Singing	Possible	30.4	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	black-throated green warbler	1	Singing	Possible	82.33	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	common yellowthroat	1	Singing	Possible	29.05	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	dark-eyed junco	1	Singing	Possible	87.22	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	dark-eyed junco	1	Singing	Possible	25.04	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	golden-crowned kinglet	1	Singing	Possible	35.87	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	hermit thrush	1	Singing	Possible	87.5	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	magnolia warbler	1	Singing	Possible	72.83	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	northern parula	1	Singing	Possible	47.71	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	purple finch	1	Singing	Possible	69.08	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	ruby-crowned kinglet	1	Singing	Possible	81.52	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	Swainson's thrush	1	Singing	Possible	87.86	no
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	white-throated sparrow	1	Singing	Possible	112.11	Yes
22BB-18	45.553776, -63.304510	06/20/22	8:57 AM	13	None	90	'6 - 11	None	yellow-rumped warbler	1	Singing	Possible	83.65	no
Incidental	45.54199 -63.255597	06/20/22	9:04 AM	na	na	na	na	None	merlin	1	Habitat	Possible	n/a	Yes
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	alder flycatcher	1	Singing	Possible	15	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	white-throated sparrow	1	Singing	Possible	150	yes
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	common yellowthroat	1	Singing	Possible	60	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	black-and-white warbler	1	Singing	Possible	20	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	Wilson's warbler	1	Singing	Possible	30	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	ovenbird	1	Singing	Possible	15	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	Blackburnian warbler	1	Singing	Possible	20	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	winter wren	1	Singing	Possible	90	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	American robin	1	Singing	Confirmed	70	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	black-capped chickadee	1	Habitat	Possible	5	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	American robin	1	Calling	Confirmed	5	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	white-throated sparrow	1	Singing	Possible	90	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	hairy woodpecker	1	Calling	Possible	50	no
22BB-22	45.544048, -63.25836	06/20/22	5:45 AM	12	Fog	100	'12 - 19	None	dark-eyed junco	1	Singing	Possible	60	no
22BB-28	45.536969, -63.25479	06/20/22	6:20 AM	12	None	90	'2 - 5	None	Lincoln's sparrow	1	Singing	Possible	40	no
22BB-28	45.536969, -63.25479	06/20/22	6:20 AM	12	None	90	'2 - 5	None	dark-eyed junco	1	Singing	Possible	80	no
22BB-28	45.536969, -63.25479	06/20/22	6:20 AM	12	None	90	'2 - 5	None	white-throated sparrow	1	Singing	Possible	70	no
22BB-28	45.536969, -63.25479	06/20/22	6:20 AM	12	None	90	'2 - 5	None	blue-headed vireo	1	Singing	Possible	150	yes
22BB-28	45.536969, -63.25479	06/20/22	6:20 AM	12	None	90	'2 - 5	None	common yellowthroat	1	Habitat	Possible	5	no
22BB-28	45.536969, -63.25479	06/20/22	6:20 AM	12	None	90	'2 - 5	None	yellow-bellied flycatcher	1	Singing	Possible	99	no
22BB-28	45.536969, -63.25479	06/20/22	6:20 AM	12	None	90	'2 - 5	None	black-and-white warbler	1	Singing	Possible	60	no
22BB-28	45.536969, -63.25479	06/20/22	6:20 AM	12	None	90	'2 - 5	None	common yellowthroat	1	Habitat	Possible	55	no
22BB-29	45.536903, -63.244953	06/20/22	7:20 AM	12	None	80	'2 - 5	None	black-throated green warbler	1	Singing	Possible	60	no
22BB-29	45.536903, -63.244953	06/20/22	7:20 AM	12	None	80	'2 - 5	None	ovenbird	1	Singing	Possible	60	no
22BB-29	45.536903, -63.244953	06/20/22	7:20 AM	12	None	80	'2 - 5	None	golden-crowned kinglet	1	Calling	Possible	20	no
22BB-29	45.536903, -63.244953	06/20/22	7:20 AM	12	None	80	'2 - 5	None	hermit thrush	1	Singing	Possible	150	yes
22BB-29	45.536903, -63.244953	06/20/22	7:20 AM	12	None	80	'2 - 5	None	red-eyed vireo	1	Calling	Possible	40	no
22BB-29	45.536903, -63.244953	06/20/22	7:20 AM	12	None	80	'2 - 5	None	Blackburnian warbler	1	Singing	Possible	30	no
22BB-29	45.536903, -63.244953	06/20/22	7:20 AM	12	None	80	'2 - 5	None	black-and-white warbler	1	Singing	Possible	30	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	yellow-rumped warbler	1	Singing	Possible	40	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	hermit thrush	1	Calling	Possible	35	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	dark-eyed junco	1	Habitat	Possible	30	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	yellow-bellied flycatcher	1	Singing	Possible	180	yes
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	common yellowthroat	1	Singing	Possible	90	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	white-throated sparrow	1	Singing	Possible	90	no

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Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	winter wren	1	Singing	Possible	200	yes
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	American robin	1	Singing	Confirmed	80	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	ruby-crowned kinglet	1	Singing	Possible	70	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	common yellowthroat	1	Singing	Possible	80	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	white-throated sparrow	1	Singing	Possible	90	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	dark-eyed junco	1	Singing	Possible	70	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	black-throated green warbler	1	Singing	Possible	200	yes
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	northern flicker	1	Calling	Possible	99	no
22BB-23	45.543959, -63.280288	06/20/22	8:09 AM	13	None	100	'6 - 11	None	white-throated sparrow	1	Singing	Possible	60	no
22BB-02	45.576595, -63.264145	06/20/22	8:54 AM	13	None	100	'12 - 19	None	hermit thrush	1	Singing	Possible	90	no
22BB-02	45.576595, -63.264145	06/20/22	8:54 AM	13	None	100	'12 - 19	None	red-eyed vireo	1	Singing	Possible	90	no
22BB-02	45.576595, -63.264145	06/20/22	8:54 AM	13	None	100	'12 - 19	None	ovenbird	1	Singing	Possible	80	no
22BB-02	45.576595, -63.264145	06/20/22	8:54 AM	13	None	100	'12 - 19	None	black-and-white warbler	1	Singing	Possible	40	no
22BB-02	45.576595, -63.264145	06/20/22	8:54 AM	13	None	100	'12 - 19	None	Canada warbler	1	Singing	Possible	60	no
22BB-02	45.576595, -63.264145	06/20/22	8:54 AM	13	None	100	'12 - 19	None	Canada warbler	1	Singing	Possible	150	yes
22BB-02	45.576595, -63.264145	06/20/22	8:54 AM	13	None	100	'12 - 19	None	blue jay	1	Calling	Possible	40	no
22BB-02	45.576595, -63.264145	06/20/22	8:54 AM	13	None	100	'12 - 19	None	white-throated sparrow	1	Singing	Possible	90	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	ovenbird	1	Singing	Possible	50	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	90	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	golden-crowned kinglet	1	Forage	Possible	3	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	99	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	American robin	1	Singing	Confirmed	90	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	white-throated sparrow	1	Singing	Possible	40	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	hermit thrush	1	Calling	Possible	90	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	American robin	1	Calling	Confirmed	70	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	dark-eyed junco	1	Singing	Possible	60	no
22BB-01	45.580889, -63.261436	06/20/22	9:30 AM	12	Light Rain	100	'2 - 5	None	black-and-white warbler	1	Singing	Possible	40	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	alder flycatcher	1	Singing	Possible	48.65	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	American redstart	1	Singing	Possible	45.75	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	American redstart	1	Singing	Possible	41.77	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	American redstart	1	Singing	Possible	23.7	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	American redstart	1	Singing	Possible	67.7	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	black-and-white warbler	1	Singing	Possible	51.42	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	41.54	no

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Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	cedar waxwing	2	Calling	Probable	67.92	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	dark-eyed junco	1	Visual and Singing/Calling	Possible	44.1	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	88.06	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	83.57	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	magnolia warbler	1	Visual	Possible	34.21	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	mourning warbler	1	Singing	Possible	56.6	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	white-throated sparrow	1	Singing	Possible	92.49	no
22BB-32	45.531338, -63.306786	06/20/22	9:17 AM	10	Fog	100	'6 - 11	Slight	winter wren	1	Singing	Possible	70.4	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	alder flycatcher	1	Singing	Possible	72.93	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	American goldfinch	4	Flyover Singing/Calling	Possible	64.51	Yes
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	American robin	1	Calling	Confirmed	85.49	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	Blackburnian warbler	1	Singing	Possible	25.46	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	black-throated green warbler	1	Singing	Possible	51.75	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	blue-headed vireo	1	Singing	Possible	97.49	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	common yellowthroat	1	Singing	Possible	52.33	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	golden-crowned kinglet	1	Calling	Possible	19.54	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	magnolia warbler	2	Singing	Possible	10.3	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	ovenbird	1	Singing	Possible	71.88	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	red-eyed vireo	1	Singing	Possible	40.27	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	white-throated sparrow	1	Singing	Possible	115.65	Yes
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	winter wren	1	Singing	Possible	91.02	no
22BB-21	45.547480, -63.308244	06/20/22	9:29 AM	13	None	90	'2 - 5	None	yellow-rumped warbler	1	Singing	Possible	68.31	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	51.46	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	89.28	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	48.58	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	42.76	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	blue-headed vireo	1	Singing	Possible	60.52	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	92.85	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	110.17	Yes
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	magnolia warbler	1	Singing	Possible	43.97	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	44.4	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	63.87	no
22BB-115A	45.529450, -63.300755	06/20/22	9:51 AM	10	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	77.16	no
Incidental	45.538181 -63.249803	06/20/22	9:55 AM	na	na	na	na	None	American woodcock	2	Pair in suitable nest	Probable	n/a	Yes

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	American goldfinch	1	Calling	Possible	64.65	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	American redstart	1	Singing	Possible	119.03	Yes
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	belted kingfisher	1	Flyover Singing/Calling	Possible	87.63	Yes
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	black-backed woodpecker	1	Singing	Possible	43.18	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	blue-headed vireo	1	Singing	Possible	77.54	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	blue-headed vireo	1	Singing	Possible	111.35	Yes
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	common yellowthroat	1	Singing	Possible	71.7	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	common yellowthroat	1	Singing	Possible	71.26	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	dark-eyed junco	1	Singing	Possible	63.26	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	golden-crowned kinglet	1	Singing	Possible	18.32	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	ovenbird	1	Singing	Possible	124.42	Yes
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	red-breasted nuthatch	1	Singing	Possible	59.18	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	white-throated sparrow	1	Singing	Possible	84.37	no
22BB-27	45.538298, -63.311880	06/20/22	10:05 AM	13	None	90	'2 - 5	None	winter wren	1	Singing	Possible	42.81	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	American redstart	1	Singing	Possible	62.16	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	American redstart	1	Singing	Possible	33.18	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	American robin	1	Singing	Confirmed	84.99	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	black-capped chickadee	2	Calling	Possible	47.33	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	hairy woodpecker	1	Drumming	Possible	101.03	Yes
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	82.63	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	78.39	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	least flycatcher	1	Singing	Possible	35.45	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	least flycatcher	1	Singing	Possible	30.21	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	41.24	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	54.58	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	65.36	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	62.85	no
22BB-36	45.524772, -63.287555	06/20/22	10:11 AM	11	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	86.73	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	American redstart	1	Singing	Possible	47	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	American robin	1	Visual	Confirmed	33.71	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	American robin	1	Calling	Confirmed	68.3	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	black-and-white warbler	1	Singing	Possible	32.61	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	black-and-white warbler	1	Singing	Possible	55.68	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	black-capped chickadee	1	Visual and Singing/Calling	Possible	11.18	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	black-capped chickadee	1	Singing	Possible	59.62	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	black-throated green warbler	1	Singing	Possible	28.35	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	black-throated green warbler	1	Singing	Possible	61.57	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	brown creeper	2	Visual and Singing/Calling	Possible	29.89	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	cedar waxwing	1	Calling	Probable	88.81	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	hermit thrush	1	Singing	Possible	93.07	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	northern parula	1	Singing	Possible	47.34	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	northern parula	1	Singing	Possible	45.24	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	ovenbird	1	Singing	Possible	90.03	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	ovenbird	1	Singing	Possible	85.95	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	ovenbird	1	Singing	Possible	58.83	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	red-eyed vireo	1	Singing	Possible	87.48	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	red-eyed vireo	1	Singing	Possible	71.27	no
22BB-35	45.527422, -63.281859	06/20/22	10:29 AM	11	None	100	'6 - 11	None	white-throated sparrow	1	Singing	Possible	85.06	no
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	black-and-white warbler	1	Singing	Possible	108.5	Yes
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	black-capped chickadee	1	Calling	Possible	67.64	no
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	black-throated green warbler	1	Singing	Possible	84.58	no
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	dark-eyed junco	1	Singing	Possible	95.11	no
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	hermit thrush	1	Singing	Possible	124.08	Yes
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	hermit thrush	1	Singing	Possible	121.84	Yes
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	least flycatcher	1	Singing	Possible	98.69	no
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	magnolia warbler	1	Singing	Possible	116.79	Yes
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	northern parula	1	Singing	Possible	82.32	no
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	ovenbird	1	Singing	Possible	117.51	Yes
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	red-breasted nuthatch	1	Singing	Possible	97.13	no
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	white-throated sparrow	1	Singing	Possible	37.67	no
22BB-25	45.539704, -63.315337	06/20/22	10:33 AM	14	None	80	'6 - 11	None	winter wren	1	Singing	Possible	90.09	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	American redstart	1	Singing	Possible	65.87	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	American redstart	1	Singing	Possible	48.64	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	black-and-white warbler	1	Singing	Possible	33.31	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	black-and-white warbler	1	Singing	Possible	32.11	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	black-capped chickadee	1	Singing	Possible	61.83	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	black-throated green warbler	1	Singing	Possible	94.11	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	black-throated green warbler	1	Singing	Possible	86.5	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	brown creeper	1	Singing	Possible	39.67	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	magnolia warbler	1	Singing	Possible	49.68	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	magnolia warbler	1	Visual	Possible	41.48	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	northern parula	1	Singing	Possible	66.16	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	ovenbird	1	Singing	Possible	45.64	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	ovenbird	1	Singing	Possible	71.16	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	red-eyed vireo	1	Singing	Possible	78.26	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	red-eyed vireo	1	Singing	Possible	68.93	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	winter wren	1	Singing	Possible	96.66	no
22BB-34	45.529784, -63.279798	06/20/22	10:57 AM	11	None	100	'6 - 11	Moderate	winter wren	1	Singing	Possible	82.83	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	American robin	1	Visual	Confirmed	40.36	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	82.47	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	black-throated green warbler	1	Singing	Possible	81.1	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	blue-headed vireo	1	Singing	Possible	76.01	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	dark-eyed junco	1	Singing	Possible	64.46	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	golden-crowned kinglet	1	Singing	Possible	72.61	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	hermit thrush	1	Singing	Possible	90.86	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	northern parula	1	Singing	Possible	53.45	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	35.85	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	ovenbird	1	Singing	Possible	79.41	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	67.38	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	22.49	no
22BB-33	45.531363, -63.282916	06/20/22	11:40 AM	11	None	100	'6 - 11	Slight	red-eyed vireo	1	Singing	Possible	67.04	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	Blackburnian warbler	1	Singing	Possible	85.15	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	Blackburnian warbler	1	Visual and Singing/Calling	Possible	6.82	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	Blackburnian warbler	1	Singing	Possible	40.53	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	black-throated green warbler	1	Singing	Possible	72.56	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	black-throated green warbler	1	Singing	Possible	55.11	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	dark-eyed junco	2	Visual and Singing/Calling	Possible	9.37	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	hermit thrush	1	Singing	Possible	41.74	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	hermit thrush	1	Singing	Possible	88.38	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	hermit thrush	1	Singing	Possible	95.11	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	ovenbird	1	Singing	Possible	63.98	no
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	red-eyed vireo	1	Singing	Possible	46.19	no

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Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-19	45.551152, -63.322470	06/20/22	11:55 AM	13	None	100	'6 - 11	None	white-throated sparrow	1	Calling	Possible	26.65	no
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	alder flycatcher	1	Singing	Possible	57.32	no
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	American redstart	1	Singing	Possible	77.99	no
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	common yellowthroat	1	Singing	Possible	85.93	no
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	golden-crowned kinglet	1	Singing	Possible	83.92	no
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	northern parula	1	Singing	Possible	109.85	Yes
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	pine siskin	2	Flyover Singing/Calling	Possible	38.25	Yes
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	white-throated sparrow	1	Visual and Singing/Calling	Possible	15.37	no
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	white-throated sparrow	1	Singing	Possible	54.38	no
22BB-07	45.569507, -63.329650	06/20/22	12:18 PM	14	None	90	'6 - 11	None	white-throated sparrow	1	Singing	Possible	60.85	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	black-and-white warbler	2	Singing	Possible	71.32	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	black-throated green warbler	1	Singing	Possible	76.47	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	black-throated green warbler	1	Singing	Possible	15.95	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	blue-headed vireo	1	Singing	Possible	89.09	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	common yellowthroat	1	Visual and Singing/Calling	Possible	11.08	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	dark-eyed junco	1	Singing	Possible	69.82	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	golden-crowned kinglet	1	Calling	Possible	87.47	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	hermit thrush	1	Singing	Possible	80.87	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	magnolia warbler	1	Singing	Possible	45.63	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	mourning warbler	1	Singing	Possible	35.47	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	ovenbird	1	Singing	Possible	46.47	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	ovenbird	1	Singing	Possible	86.55	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	pine siskin	1	Calling	Possible	12.81	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	white-throated sparrow	1	Singing	Possible	94.09	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	winter wren	1	Singing	Possible	65.66	no
22BB-06	45.569511, -63.334137	06/20/22	12:36 PM	13	Drizzle	90	'2 - 5	None	yellow-rumped warbler	1	Calling	Possible	75.03	no
Incidental	45.580226 -63.261957	06/20/22	12:44 PM	na	na	na	na	None	cedar waxwing	2	Pair in suitable nest	Probable	n/a	Yes
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	black-and-white warbler	1	Singing	Possible	77.86	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	black-and-white warbler	1	Singing	Possible	77.51	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	Blackburnian warbler	1	Singing	Possible	37.37	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	black-throated green warbler	1	Singing	Possible	65.18	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	black-throated green warbler	1	Singing	Possible	34.94	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	Canada jay	3	Calling	Possible	77.82	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	Canada warbler	1	Singing	Possible	34.34	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	common yellowthroat	1	Singing	Possible	91.6	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	dark-eyed junco	1	Singing	Possible	84.85	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	white-throated sparrow	1	Singing	Possible	113.98	Yes
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	winter wren	1	Singing	Possible	69.96	no
22BB-04	45.572756, -63.330621	06/20/22	12:56 PM	13	None	90	'2 - 5	None	yellow-rumped warbler	1	Singing	Possible	64.88	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	20	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	golden-crowned kinglet	1	Singing	Possible	15	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	90	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	white-winged crossbill	2	Flyover	Possible	60	Yes
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	dark-eyed junco	1	Singing	Possible	90	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	150	yes
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	bay-breasted warbler	1	Singing	Possible	15	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	80	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	90	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	brown creeper	1	Singing	Possible	20	no
22BB-49	45.481577, -63.28068	06/25/22	5:40 AM	18	None	100	'2 - 5	None	magnolia warbler	1	Singing	Possible	90	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	Canada warbler	1	Singing	Possible	10	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	60	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	hermit thrush	1	Singing	Possible	80	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	dark-eyed junco	1	Habitat	Possible	5	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	black-and-white warbler	1	Singing	Possible	40	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	blue-headed vireo	1	Singing	Possible	90	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	dark-eyed junco	1	Singing	Possible	70	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	90	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	Swainson's thrush	1	Singing	Possible	90	no
22BB-47	45.488004, -63.280548	06/25/22	6:08 AM	18	None	100	'2 - 5	None	black-backed woodpecker	1	Habitat	Possible	2	no
22BB-11	45.56339, -63.310864	06/25/22	7:11 AM	18	Drizzle	100	'2 - 5	Moderate	white-throated sparrow	1	Singing	Possible	80	no
22BB-11	45.56339, -63.310864	06/25/22	7:11 AM	18	Drizzle	100	'2 - 5	Moderate	bay-breasted warbler	1	Singing	Possible	20	no
22BB-11	45.56339, -63.310864	06/25/22	7:11 AM	18	Drizzle	100	'2 - 5	Moderate	black-throated green warbler	1	Singing	Possible	60	no
22BB-11	45.56339, -63.310864	06/25/22	7:11 AM	18	Drizzle	100	'2 - 5	Moderate	American redstart	1	Singing	Possible	50	no
22BB-11	45.56339, -63.310864	06/25/22	7:11 AM	18	Drizzle	100	'2 - 5	Moderate	American robin	1	Calling	Confirmed	80	no
22BB-11	45.56339, -63.310864	06/25/22	7:11 AM	18	Drizzle	100	'2 - 5	Moderate	black-throated green warbler	1	Singing	Possible	80	no
22BB-14	45.561908, -63.319586	06/25/22	7:36 AM	18	None	100	'2 - 5	None	winter wren	1	Singing	Possible	50	no
22BB-14	45.561908, -63.319586	06/25/22	7:36 AM	18	None	100	'2 - 5	None	ovenbird	1	Singing	Possible	90	no

Table A.1 Breeding Bird Survey Data

Survey Location ID	Survey Location Coordinate	Survey Date	Survey Start Time	Temperature (°C)	Precipitation	Cloud Cover (%)	Wind Speed (km/h)	Ambient Noise	Common Name	Abundance	Behaviour	Species Highest Breeding Status	Detection Distance (m)	Incidental Observation (yes/no)
22BB-14	45.561908, -63.319586	06/25/22	7:36 AM	18	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	55	no
22BB-14	45.561908, -63.319586	06/25/22	7:36 AM	18	None	100	'2 - 5	None	black-throated green warbler	1	Singing	Possible	90	no
22BB-14	45.561908, -63.319586	06/25/22	7:36 AM	18	None	100	'2 - 5	None	black-and-white warbler	1	Singing	Possible	20	no
22BB-15	45.560625, -63.291721	06/25/22	8:12 AM	18	None	100	'2 - 5	Moderate	black-and-white warbler	1	Singing	Possible	40	no
22BB-15	45.560625, -63.291721	06/25/22	8:12 AM	18	None	100	'2 - 5	Moderate	red-eyed vireo	1	Singing	Possible	60	no
22BB-15	45.560625, -63.291721	06/25/22	8:12 AM	18	None	100	'2 - 5	Moderate	yellow-bellied flycatcher	1	Singing	Possible	30	no
22BB-15	45.560625, -63.291721	06/25/22	8:12 AM	18	None	100	'2 - 5	Moderate	black-throated green warbler	1	Singing	Possible	85	no
22BB-15	45.560625, -63.291721	06/25/22	8:12 AM	18	None	100	'2 - 5	Moderate	winter wren	1	Singing	Possible	80	no
22BB-15	45.560625, -63.291721	06/25/22	8:12 AM	18	None	100	'2 - 5	Moderate	ovenbird	1	Singing	Possible	40	no
22BB-15	45.560625, -63.291721	06/25/22	8:12 AM	18	None	100	'2 - 5	Moderate	black-throated blue warbler	1	Singing	Possible	30	no

APPENDIX Q
STANTEC AVIAN MIGRATION SURVEY PROGRAM



Avian Migration Survey Program
for Proposed Wind Project near
Nuttby, Nova Scotia

Final Report

March 15, 2023

Prepared for:

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AVIAN MIGRATION SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

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AVIAN MIGRATION SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

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Appendix A Survey Data



1.0 INTRODUCTION

Nova Scotia Power Inc. (NSPI) is the Proponent for the proposed Nuttby Ridge Wind Project near Nuttby, which is approximately 22 km northeast of Truro, Nova Scotia, (the Project). The Project consists of the construction and operation of approximately 16 to 23 wind turbines, in the range of 4 to 6 MW, for a total project capacity of up to 98 MW.

The Project Boundary shown on Figure 1 (in red) refers to the area within which the turbines will be located. A wider Assessment Area (Figure 1; in black) indicates the area within which additional surveys were conducted. In some cases, survey locations are outside the Project Boundary and Assessment Areas where earlier study area boundaries were used.

In 2021 and 2022, Stantec completed a variety of bird surveys in the vicinity of the proposed Project. This report presents the results of two of the surveys: the stopover migration transect surveys and the raptor watch surveys. The primary objective of these surveys was to characterize the composition and relative abundance of the bird communities stopping over in the study area, including possible Species at Risk (SAR) and Species of Conservation Concern (SOCC) during spring (April-May) and fall (August-October) migration.

Species at Risk (SAR) are herein defined as those species listed as being either *endangered*, *threatened*, *vulnerable*, or of *special concern* under the Nova Scotia *Endangered Species Act* (NS ESA), the federal *Species at Risk Act* (SARA) and/or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Species of Conservation Concern (SOCC) are those species that do not meet the above definition of SAR, but are listed as S1, S2, or S3 in Nova Scotia by the Atlantic Canada Conservation Data Centre (AC CDC; Table 1.1).

Table 1.1 AC CDC Status Ranks

S-Rank/ Qualifier	Description
S1	Critically Imperiled - Critically imperiled in the province because of extreme rarity (often 5 or fewer occurrences). May be especially vulnerable to extirpation.
S2	Imperiled - Imperiled in the province because of rarity due to very restricted range, very few populations (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.
S3	Vulnerable - Vulnerable in the province due to a restricted range, relatively few populations.
S4	Apparently Secure - Uncommon but not rare; some cause for long-term concern due to declines or other factors (80+ occurrences).
S5	Secure - Common, widespread, and abundant in the province.
S#S#	A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community
?	Inexact or Uncertain - Denotes inexact or uncertain numeric rank.
SNR	Unranked - Provincial conservation status not yet assessed.



AVIAN MIGRATION SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

Table 1.1 AC CDC Status Ranks

S-Rank/ Qualifier	Description
SU	Unrankable - Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA	Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
B	Breeding - Conservation status refers to the breeding population of the species in the province
N	Nonbreeding - Conservation status refers to the non-breeding population of the species in the province.
M	Migrant - Migrant species occurring regularly on migration at particular staging areas or concentration spots where the species might warrant conservation attention. Conservation status refers to the aggregating transient population of the species in the province.
Reference: AC CDC 2023	

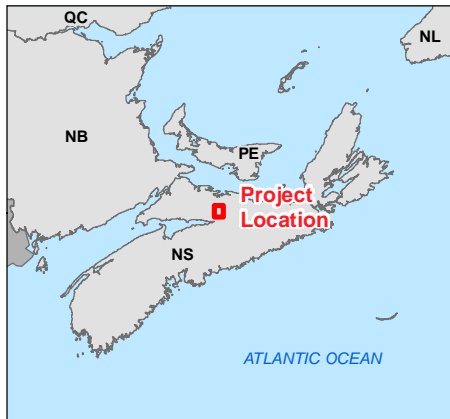
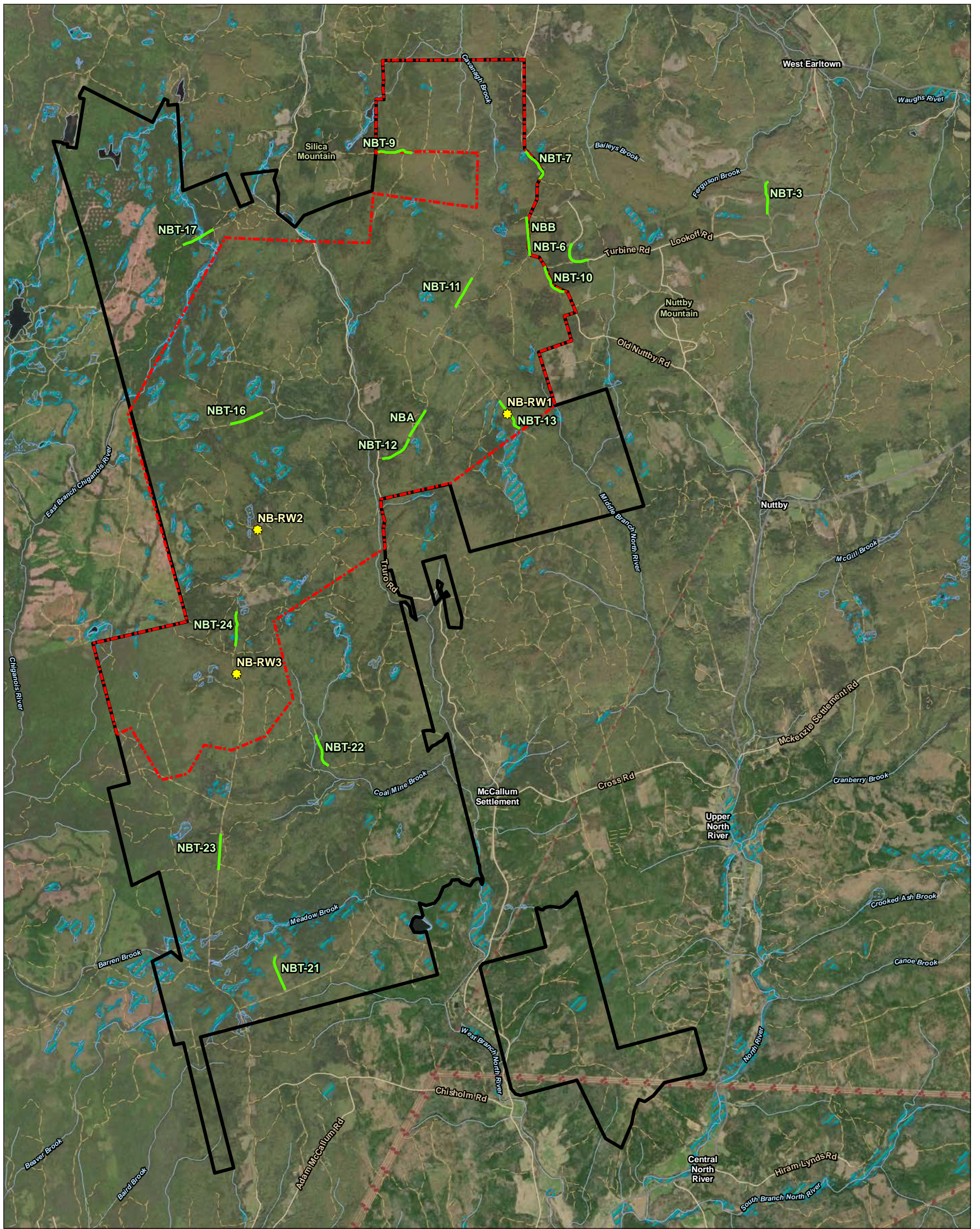
The Project is located approximately 22 km northeast of Truro, Nova Scotia, and is situated in the Uplands Ecoregion of Nova Scotia. The Project Boundary lies completely within the Cobequid Hills Ecodistrict, with southern parts of the Assessment Area within the Cobequid Slopes Ecodistrict.

The Uplands Ecoregion of Nova Scotia is characterized by a geographically complex band of rounded summits and plateaus separated by lower elevation uplands and lowlands that extend across northern mainland Nova Scotia (Nova Scotia Department of Natural Resources (NSDNR) 2017). This Ecoregion experiences more severe winters, greater precipitation, and shorter growing seasons than surrounding Ecoregions, which has given rise to the dominant Acadian hardwood forest of sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*).

The Project Boundary lies within the Cobequid Hills Ecodistrict which is a narrow upland extending approximately 150 km in an east-west direction between the towns of Pictou and Parrsboro. This Ecodistrict is characterized by large intact late-successional Acadian shade tolerant hardwood forests. Representative species include sugar maple, American beech, and yellow birch, with white ash (*Fraxinus americana*) and ironwood (*Ostrya virginiana*) on richer soils. At upper elevations, the hills give way to a level or hummocky plateau-like topography with forests of red spruce (*Picea rubens*) and black spruce (*Picea mariana*) occurring on moderately-well to imperfectly drained soils.

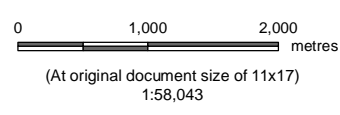
Southern portions of the Assessment Area lie within the Cobequid Slopes Ecodistrict. This Ecodistrict is characterized by a series of steep to moderate grades on the south side of the Cobequid Mountains. The climate is moderate and relatively humid. Red spruce forests occur on the middle to lower slopes of rounded hills. Sugar maple, yellow birch, and American beech are dominant on slopes or crests where soils are rich. Elsewhere, a shade tolerant mixedwood forest exists, usually dominated by red spruce, eastern hemlock (*Tsuga canadensis*), and yellow birch with occasional sugar maple, American beech, and eastern white pine (*Pinus strobus*).





Notes
 1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
 2. Data Sources: Government of NS, Client, Stantec
 3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- Raptor Survey Location
- Migratory Survey Transect
- Project Boundary, February 2023
- Assessment Area, February 2023
- Collector Road
- Local Road
- Resource Road / Trail
- Transmission Line
- Watercourse
- Wetland (NSE)
- Wetland (NHN)
- Waterbody



Project Location
 Nuttby Mountain
 Nova Scotia

Client/Project
 Nova Scotia Power Inc.
 NSPI Wind EA Support Services

Prepared on 2023-03-02
 121417191_017a

Figure No.
 1

Title
 Survey Locations for Avian Migration
 Survey Program: Nuttby Ridge

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2.0 METHODS

Stantec considered information and guidance provided in Environment Canada’s guidelines for wind turbines and birds (Environment Canada 2007a) and survey protocols document (Environment Canada 2007b), as well as previous guidance from the Canadian Wildlife Service (CWS) on methodology, timing and frequency of surveys when developing survey protocols. The following sections describe the methods used to undertake diurnal transect and raptor watch surveys.

2.1 SPRING AND FALL STOPOVER MIGRATION SURVEYS

Stopover bird migration monitoring surveys were conducted during the spring and fall seasons and involved the collection of presence and behavioural data of birds observed from accessible survey transects. Transects were established along existing roads (mainly forest roads) through representative habitats (Table 2.1, Figure 1) and were 500 metres (m) long. As the study area changed, additional transects were included in the survey program. Transects were surveyed during both the spring and fall migration monitoring periods.

Table 2.1 Habitat Descriptions of Each Stopover Migration Survey Transect

Transect ID	Location	Habitat Types Intersected by Transect
NBA	In Project Boundary	Young hardwood, young mixedwood, mature softwood, old softwood
NBB	In Project Boundary	Young hardwood, mature softwood, young softwood
NBT-3	Outside Assessment Area	Mature hardwood, mature mixedwood, young softwood
NBT-6	Outside Assessment Area	Mature softwood, young mixedwood
NBT-7	In Project Boundary	Old mixedwood, old softwood, young mixedwood, clearcut
NBT-9	In Project Boundary	Old softwood, mature hardwood, young softwood
NBT-10	In Project Boundary	Mature hardwood, mature softwood
NBT-11	In Project Boundary	Mature hardwood, young hardwood, clearcut
NBT-12	In Project Boundary	Old softwood, young hardwood, young mixedwood, young softwood, clearcut
NBT-13	In Project Boundary	Mature mixedwood, mature softwood, clearcut
NBT-16	In Project Boundary	Clearcut
NBT-17	In Assessment Area	Young softwood, swamp
NBT-21	In Assessment Area	Clearcut
NBT-22	In Assessment Area	Old mixedwood, young softwood
NBT-23	In Assessment Area	Clearcut, old mixedwood, young mixedwood
NBT-24	In Project Boundary	Alder shrub, mature mixedwood, mature softwood, old softwood, swamp



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Stopover migration transect surveys were completed weekly at each transect and repeated through the migration periods. Fall migration surveys began mid-season in 2021 which missed the early part of the season. Follow-up surveys were conducted in the early fall season of 2022.

Surveys generally began near sunrise and continued until late morning. The order in which transects were completed was randomized to the extent possible, accounting for site accessibility and travel time. A variation of the standardized area search method was completed at each 500 m long transect. Birds detected either visually or through auditory cues were documented, and information on the species, number of individuals, and behaviour (including relative flight height, where applicable) was recorded for each observation.

Surveys were completed during suitable environmental conditions, including light to no precipitation and low to moderate winds. A summary of environmental conditions encountered on each survey day is provided in Table 2.2.

Table 2.2 Summary of Environmental Conditions During Stopover Migration Transect Surveys

Date	Temperature and Visibility	Relative Wind Speed and Direction	Completed Transects
Fall 2021			
September 22	10-18°C. Clear to light fog and little cloud cover to overcast	Light winds	NBT-6, 7, 9, 10, 11, 12, 13
September 28	15-17°C. Clear and overcast with intermittent light drizzle	Light winds	NBT-3, 6, 7, 10, 11, 12, 13
October 4	8-10°C. Clear and overcast with intermittent light drizzle	Light winds	NBT-3, 6, 7, 10, 11, 12, 13
October 12	4-12°C. Clear with little cloud cover	Light winds	NBT-3, 6, 7, 10, 11, 12, 13
October 19	4-9°C. Clear to light fog and mostly cloudy	Light winds	NBT-3, 6, 7, 10, 11, 12, 13
Spring 2022			
March 31	2-3°C. Clear and overcast	Light winds	NBT-3, 6, 10, NBB
April 14	-2-8°C. Clear and partly cloudy	Light winds	NBT-10, 11, 12, 13, NBA
April 15	5-6°C. Clear and overcast. Intermittent light drizzle	Light winds	NBT-6
April 21	3-6°C. Clear with little to no cloud cover	Light winds	NBT-3, 6, 7, 10, 11, 12, 13, NBA
April 26	-1-4°C. Clear and partly to mostly cloudy	Light winds	NBT-3, 7, 10, 11, 12, 13
May 2	1-7°C. Clear and partly cloudy	Light winds	NBT-3, 7, 10, 11, 12, 13, 16
May 18	4-12°C. Clear and mostly cloudy	Light to moderate winds	NBT-3, 7, 10, 11, 12, 13, 16, 17
May 30	13-17°C. Clear and mostly cloudy to overcast	Light winds	NBT-3, 7, 10, 11, 12, 13, 16, 17



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Table 2.2 Summary of Environmental Conditions During Stopover Migration Transect Surveys

Date	Temperature and Visibility	Relative Wind Speed and Direction	Completed Transects
Fall 2022			
August 25	17-20°C. Clear and partly cloudy to overcast	Light winds	NBT-16, 17, 21, 22, 23, 24
August 26	16-18°C. Clear with light cloud cover	Light winds	NBT-3, 7, 9, 10, 11, 12, 13
August 31	n/a	n/a	NBT-9, 16, 17, 21, 22, 23, 24
September 1	19°C. Clear and cloudy with intermittent light drizzle	Light winds	NBT-3, 6, 7, 10, 11, 12, 13
September 6	14-16°C. Clear and mostly cloudy to overcast	Light winds	NBT-6, 9, 21, 22, 23, 24
September 9	12-15°C. Clear and partly cloudy	Light winds	NBT-3, 6, 7, 10, 11, 12, 13
September 15	15-18°C. Clear to light fog and partly cloudy	Light to moderate winds	NBT-12, 16, 17, 21, 22, 23, 24
September 17	13-18°C. Clear and partly to mostly cloudy	Moderate winds	NBT-3, 6, 7, 9, 10, 11, 13

2.2 DIURNAL RAPTOR PASSAGE MONITORING SURVEYS

Raptor watch count surveys targeting migrating raptors were completed at points of high elevation during fall of 2021 and 2022 (Figure 1). Diurnal raptor passage monitoring surveys were conducted on one day during the fall of 2021 and three separate days in fall of 2022 (Table 2.3). These surveys were conducted under suitable environmental conditions including no precipitation and good visibility.

Table 2.3 Summary of Environmental Conditions during Diurnal Raptor Passage Monitoring Surveys

Date	Temperature and Visibility	Relative Windspeed and Direction	Site Surveyed	Location
November 1, 2021	8-10°C. Clear and partly cloudy	Light west winds	NB-RW1	In Project Boundary
October 20, 2022	10-15°C. Clear with 30-70% cloud cover	Light southwest winds	NB-RW2	In Project Boundary
October 21, 2022	11-15 °C. Clear with 30-70% cloud cover	Light to moderate southwest winds	NB-RW3	In Project Boundary
October 28, 2022	9-10°C. Clear and partly cloudy	Light north winds	NB-RW1	In Project Boundary



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Surveys were carried out between approximately 11:00 and 14:00 each day, when conditions for the creation of thermals which allow thermal soaring are more prevalent and migratory raptor movements are most visible. Using binoculars and a spotting scope, the surveyor scanned for birds in flight from all visible directions. Information collected during this survey included environmental data, observations of migrating birds, and behavioral data including relative flight height and direction of travel.

3.0 RESULTS

3.1 STOPOVER MIGRATION SURVEYS

In general, the bird species noted during the 2021 and 2022 migration monitoring period were expected for the environments sampled and are typical of the habitat types found in the Uplands Ecoregion of Nova Scotia.

3.1.1 Spring Migration

Spring stopover migration monitoring was completed from March 31 through May 30, 2022. Not including individuals not identified to species level, the surveys identified 1,049 individual birds representing 62 species (Table 3.1). Relative abundance was calculated for each observed species; this is a measure of the proportion of each when compared with the total number of birds observed.

Table 3.1 Species Diversity and Relative Abundance, Spring Stopover Migration Transect Surveys

Common Name	Scientific Name	Bird Group	Total	
			Abundance - Individuals (Observations)	Relative Abundance - %Individuals (%Observations)
Canada goose	<i>Branta canadensis</i>	Waterfowl	53 (3)	5.05 (0.35)
ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	9 (6)	0.86 (0.70)
ruby-throated hummingbird	<i>Archilochus colubris</i>	Landbirds	2 (2)	0.19 (0.23)
turkey vulture	<i>Cathartes aura</i>	Raptors	1 (1)	0.1 (0.12)
northern goshawk	<i>Accipiter gentilis</i>	Raptors	1 (1)	0.1 (0.12)
barred owl	<i>Strix varia</i>	Owls	3 (3)	0.29 (0.35)
belted kingfisher	<i>Megaceryle alcyon</i>	Landbirds	1 (1)	0.1 (0.12)
yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	10 (9)	0.95 (1.06)
black-backed woodpecker	<i>Picoides arcticus</i>	Landbirds	1 (1)	0.1 (0.12)
downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	9 (8)	0.86 (0.94)
hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	11 (10)	1.05 (1.17)
northern flicker	<i>Colaptes auratus</i>	Landbirds	40 (39)	3.81 (4.85)
pileated woodpecker	<i>Dryocopus pileatus</i>	Landbirds	2 (2)	0.19 (0.23)



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Table 3.1 Species Diversity and Relative Abundance, Spring Stopover Migration Transect Surveys

Common Name	Scientific Name	Bird Group	Total	
			Abundance - Individuals (Observations)	Relative Abundance - %Individuals (%Observations)
olive-sided flycatcher	<i>Contopus cooperi</i>	Landbirds	1 (1)	0.1 (0.12)
yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	Landbirds	2 (2)	0.19 (0.23)
alder flycatcher	<i>Empidonax alnorum</i>	Landbirds	9 (9)	0.86 (1.06)
least flycatcher	<i>Empidonax minimus</i>	Landbirds	5 (5)	0.48 (0.59)
eastern phoebe	<i>Sayornis phoebe</i>	Landbirds	1 (1)	0.1 (0.12)
blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	6 (6)	0.57 (0.70)
Philadelphia vireo	<i>Vireo philadelphicus</i>	Landbirds	1 (1)	0.1 (0.12)
red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	16 (16)	1.53 (1.88)
Canada jay	<i>Perisoreus canadensis</i>	Landbirds	3 (2)	0.29 (0.23)
blue jay	<i>Cyanocitta cristata</i>	Landbirds	15 (10)	1.43 (1.17)
American crow	<i>Corvus brachyrhynchos</i>	Landbirds	4 (4)	0.38 (0.47)
common raven	<i>Corvus corax</i>	Landbirds	18 (12)	1.72 (1.41)
black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	57 (40)	5.43 (4.69)
boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	10 (7)	0.95 (0.82)
red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	7 (7)	0.67 (0.82)
brown creeper	<i>Certhia americana</i>	Landbirds	1 (1)	0.1 (0.12)
winter wren	<i>Troglodytes hiemalis</i>	Landbirds	42 (38)	4 (4.46)
golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	20 (19)	1.91 (2.23)
ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	18 (18)	1.72 (2.11)
Swainson's thrush	<i>Catharus ustulatus</i>	Landbirds	4 (4)	0.38 (0.47)
hermit thrush	<i>Catharus guttatus</i>	Landbirds	45 (39)	4.29 (4.58)
American robin	<i>Turdus migratorius</i>	Landbirds	98 (84)	9.34 (9.86)
cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	3 (1)	0.29 (0.12)
evening grosbeak	<i>Coccothraustes vespertinus</i>	Landbirds	1 (1)	0.1 (0.12)
pine grosbeak	<i>Pinicola enucleator</i>	Landbirds	2 (2)	0.19(0.23)
purple finch	<i>Haemorhous purpureus</i>	Landbirds	32 (29)	3.05 (3.40)
red crossbill	<i>Loxia curvirostra</i>	Landbirds	1 (1)	0.1 (0.12)
white-winged crossbill	<i>Loxia leucoptera</i>	Landbirds	15 (1)	1.43 (0.12)
American goldfinch	<i>Spinus tristis</i>	Landbirds	21 (11)	2 (1.29)
dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	91 (65)	8.67 (7.63)
white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	98 (86)	9.34 (10.09)



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Table 3.1 Species Diversity and Relative Abundance, Spring Stopover Migration Transect Surveys

Common Name	Scientific Name	Bird Group	Total	
			Abundance - Individuals (Observations)	Relative Abundance - %Individuals (%Observations)
song sparrow	<i>Melospiza melodia</i>	Landbirds	15 (13)	1.43 (1.53)
Lincoln's sparrow	<i>Melospiza lincolnii</i>	Landbirds	3 (3)	0.29 (0.35)
swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	5 (4)	0.48 (0.47)
common grackle	<i>Quiscalus quiscula</i>	Landbirds	4 (2)	0.38 (0.23)
ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	42 (42)	4 (4.93)
northern waterthrush	<i>Parkesia noveboracensis</i>	Landbirds	5 (5)	0.48 (0.59)
black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	11 (11)	1.05 (1.29)
mourning warbler	<i>Geothlypis philadelphia</i>	Landbirds	6 (6)	0.57 (0.70)
common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	20 (19)	1.91 (2.23)
American redstart	<i>Setophaga ruticilla</i>	Landbirds	8 (8)	0.76 (0.94)
cape may warbler	<i>Setophaga tigrina</i>	Landbirds	1 (1)	0.1 (0.12)
magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	18 (17)	1.72 (2.00)
bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	3 (3)	0.29 (0.35)
black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	4 (4)	0.38 (0.47)
palm warbler	<i>Setophaga palmarum</i>	Landbirds	20 (19)	1.91 (2.23)
yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	31 (29)	2.96 (3.40)
black-throated green warbler	<i>Setophaga virens</i>	Landbirds	47 (42)	4.48 (4.93)
Canada warbler	<i>Cardellina canadensis</i>	Landbirds	4 (4)	0.38 (0.47)
unidentified passerine	#N/A	Landbirds	12 (11)	1.14 (1.29)

Note: SAR are presented in **bold** text

Three of the species observed during the spring migration surveys are SAR: olive-sided flycatcher, evening grosbeak and Canada warbler. Six SOCC were also observed: turkey vulture, Philadelphia vireo, Canada jay, boreal chickadee, pine grosbeak, and Cape May warbler.

The most abundant species observed during spring migration were American robin and white-throated sparrow (98 individuals, 9.34% relative abundance) and dark-eyed junco (91 individuals, 8.67% relative abundance). These three species were also the most frequently detected species.

Most birds were observed singly or in small (i.e., fewer than 10 individuals) groups, but a small number of larger groups were observed. The largest single observation of a group of birds was of 50 Canada goose seen flying over transect NBT-12 on May 2, 2022. The second largest observation was of 15 white-winged crossbills seen flying low over transect NBT-6 on March 31, 2022.



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The single survey of all transects in March produced records of 56 birds representing 13 species. Surveys completed in April (four survey days) produced records of 315 birds representing 31 species. Surveys completed over three survey days in May produced records of 678 birds representing 57 species.

Information on the flight height of resident and migrant birds observed during the stopover transect surveys was collected opportunistically and may complement flight height data gathered during nocturnal migration radar studies. Different bird groups demonstrate differences in potential sensitivity to the presence of wind turbines (Kingsley and Whittam 2004). The data on migration have therefore been summarized according to seven bird groups: landbirds (including most passerines), waterfowl (including ducks and geese), waterbirds (including herons, gulls, and cormorants), shorebirds (including plovers and sandpipers), raptors (including hawks, falcons, eagles, and for the purposes of this summary, vultures), owls, and gamebirds (including grouse), as indicated in Table 3.2.

Table 3.2 summarizes the flying heights of the bird groups observed during the stopover migration transect surveys. These values include birds that were not identified to species but were successfully identified to bird group. Birds observed within 10 m of the ground were considered at Low (L) level, those from 10 to 60 m of the ground were considered to be at Medium (M) level, those flying between 60-120 m above ground were considered to be at High (H) level, and those above 120 m above ground were considered to be at Very High (VH) height.

Table 3.2 Relative Heights of Birds Observed during Spring Stopover Migration Transect Surveys

Bird Group	Height ¹				N ²
	L	M	H	VH	
Gamebirds	100.00 (100.00)	-	-	-	6 (9)
Landbirds	97.62 (96.14)	2.14 (3.66)	0.24 (0.20)	-	840 (984)
Owls	100.00 (100.00)	-	-	-	3 (3)
Raptors	50.00 (50.00)	50.00 (50.00)	-	-	2 (2)
Waterfowl	100.00 (100.00)	-	-	-	3 (53)
TOTAL	97.54 (96.29)	2.22 (3.52)	0.23 (0.19)	-	854 (1051)
Notes:					
1	Data presented are percentage of observations (percentage of individual birds) observed in each area. L=<10m; M=10-60m; H=60-120m; VH=>120				
2	Total number of observations (total number of individual birds).				



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Landbirds dominated the observations, and most (over 96%) were observed foraging or flying within 10 m of the ground. Two observations of two individual raptors were made during spring migration, with one individual flying within 10 m of the ground, and the other flying between 10-60 m of the ground.

Most birds (96.29% of individual birds) were observed within 10 m of the ground. None of the 1,051 birds recorded during the spring surveys were observed flying above 120 m from the ground.

3.1.2 Fall Migration

Fall stopover migration monitoring was completed from September 22 through October 19, 2021 and August 25 through September 17, 2022. Excluding individuals not identified to species level, the surveys identified 1,248 individual birds representing 63 species (Table 3.3)

Table 3.3 Species Diversity and Relative Abundance, Fall Stopover Migration Transect Surveys

Common Name	Scientific Name	Bird Group	Total	
			Abundance - Individuals (Observations)	Relative Abundance - %Individuals (%Observations)
Canada goose	<i>Branta canadensis</i>	Waterfowl	15 (1)	1.08 (0.13)
ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	5 (4)	0.36 (0.50)
spruce grouse	<i>Falcapennis canadensis</i>	Gamebirds	1 (1)	0.07 (0.13)
black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	Landbirds	1 (1)	0.07 (0.13)
ruby-throated hummingbird	<i>Archilochus colubris</i>	Landbirds	3 (3)	0.22 (0.38)
spotted sandpiper	<i>Actitis macularius</i>	Shorebirds	1 (1)	0.07 (0.13)
great blue heron	<i>Ardea herodias</i>	Waterbirds	1 (1)	0.07 (0.13)
turkey vulture	<i>Cathartes aura</i>	Raptors	1 (1)	0.07 (0.13)
sharp-shinned hawk	<i>Accipiter striatus</i>	Raptors	3 (3)	0.22 (0.38)
red-shouldered hawk	<i>Buteo lineatus</i>	Raptors	1 (1)	0.07 (0.13)
barred owl	<i>Strix varia</i>	Owls	2 (1)	0.14 (0.13)
downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	9 (8)	0.65 (1.01)
hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	14 (12)	1.01 (1.51)
northern flicker	<i>Colaptes auratus</i>	Landbirds	22 (19)	1.58 (2.39)
pileated woodpecker	<i>Dryocopus pileatus</i>	Landbirds	3 (3)	0.22 (0.38)
American kestrel	<i>Falco sparverius</i>	Raptors	1 (1)	0.07 (0.13)
blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	16 (9)	1.15 (1.13)
red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	52 (42)	3.74 (5.28)
Canada jay	<i>Perisoreus canadensis</i>	Landbirds	11 (7)	0.79 (0.88)
blue jay	<i>Cyanocitta cristata</i>	Landbirds	50 (43)	3.6 (5.41)
American crow	<i>Corvus brachyrhynchos</i>	Landbirds	1 (1)	0.07 (0.13)



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Table 3.3 Species Diversity and Relative Abundance, Fall Stopover Migration Transect Surveys

Common Name	Scientific Name	Bird Group	Total	
			Abundance - Individuals (Observations)	Relative Abundance - %Individuals (%Observations)
common raven	<i>Corvus corax</i>	Landbirds	12 (10)	0.86 (1.26)
black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	145 (56)	10.44 (7.04)
boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	20 (9)	1.44 (1.13)
red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	22 (18)	1.58 (2.26)
brown creeper	<i>Certhia americana</i>	Landbirds	8 (8)	0.58 (1.01)
winter wren	<i>Troglodytes hiemalis</i>	Landbirds	4 (4)	0.29 (0.50)
golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	98 (48)	7.06 (60.4)
ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	6 (4)	0.43 (0.50)
Swainson's thrush	<i>Catharus ustulatus</i>	Landbirds	2 (2)	0.14 (0.25)
hermit thrush	<i>Catharus guttatus</i>	Landbirds	18 (14)	1.3 (1.76)
American robin	<i>Turdus migratorius</i>	Landbirds	32 (15)	2.3 (1.89)
cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	32 (10)	2.3 (1.26)
purple finch	<i>Haemorhous purpureus</i>	Landbirds	53 (31)	3.82 (3.90)
red crossbill	<i>Loxia curvirostra</i>	Landbirds	24 (5)	1.73 (0.63)
white-winged crossbill	<i>Loxia leucoptera</i>	Landbirds	8 (2)	0.58 (0.25)
pine siskin	<i>Spinus pinus</i>	Landbirds	9 (2)	0.65 (0.25)
American goldfinch	<i>Spinus tristis</i>	Landbirds	53 (16)	3.82 (2.01)
dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	102 (51)	7.34 (6.42)
white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	31 (26)	2.23 (3.27)
savannah sparrow	<i>Passerculus sandwichensis</i>	Landbirds	1 (1)	0.07 (0.13)
song sparrow	<i>Melospiza melodia</i>	Landbirds	8 (6)	0.58 (0.75)
Lincoln's sparrow	<i>Melospiza lincolni</i>	Landbirds	1 (1)	0.07 (0.13)
swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	3 (3)	0.22 (0.38)
ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	3 (2)	0.22 (0.25)
black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	24 (20)	1.73 (2.52)
Tennessee warbler	<i>Leiothlypis peregrina</i>	Landbirds	2 (2)	0.14 (0.25)
Nashville warbler	<i>Leiothlypis ruficapilla</i>	Landbirds	6 (6)	0.43 (0.75)
common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	45 (31)	3.24 (3.90)
American redstart	<i>Setophaga ruticilla</i>	Landbirds	2 (2)	0.14 (0.25)
Cape May warbler	<i>Setophaga tigrina</i>	Landbirds	1 (1)	0.07 (0.13)
northern parula	<i>Setophaga americana</i>	Landbirds	11 (10)	0.79 (1.26)



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Table 3.3 Species Diversity and Relative Abundance, Fall Stopover Migration Transect Surveys

Common Name	Scientific Name	Bird Group	Total	
			Abundance - Individuals (Observations)	Relative Abundance - %Individuals (%Observations)
magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	24 (17)	1.73 (2.14)
bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	12 (10)	0.86 (1.26)
blackburnian warbler	<i>Setophaga fusca</i>	Landbirds	6 (5)	0.43 (0.63)
chestnut-sided warbler	<i>Setophaga pensylvanica</i>	Landbirds	3 (3)	0.22 (0.38)
blackpoll warbler	<i>Setophaga striata</i>	Landbirds	28 (18)	2.02 (2.26)
black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	5 (4)	0.36 (0.50)
palm warbler	<i>Setophaga palmarum</i>	Landbirds	20 (13)	1.44 (1.64)
yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	85 (40)	6.12 (5.03)
black-throated green warbler	<i>Setophaga virens</i>	Landbirds	63 (32)	4.54 (4.03)
Wilson's warbler	<i>Cardellina pusilla</i>	Landbirds	2 (2)	0.14 (0.25)
rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	Landbirds	1 (1)	0.07 (0.13)
unidentified passerine	n/a	Landbirds	141 (71)	10.15 (8.93)

None of the species observed during the fall migration surveys were SAR. Ten SOCC were observed: black-billed cuckoo, turkey vulture, American kestrel, Canada jay, boreal chickadee, pine siskin, Cape May warbler, blackpoll warbler, Wilson's warbler, and rose-breasted grosbeak.

The most abundant identified species observed during fall migration were black-capped chickadee (145 individuals, 10.44% relative abundance), dark-eyed junco (102 individuals, 7.34% relative abundance), and golden-crowned kinglet (98 individuals, 7.06% relative abundance). These three species were also the most frequently detected species. Unidentified passerines made up 10.15% of birds observed.

Most birds were observed individually or in small groups, however some larger groups were observed. The largest single observation of a group of birds was of 30 American goldfinches seen flying over transect NBT-3 on October 19, 2021. The second largest observation was of 20 unidentified warblers (possibly a mixed species migratory group), seen flying over transect NBT-10 on September 1, 2022.

Three survey days in August of 2022 produced records of 282 individuals representing 39 species. Combined 2021 and 2022 surveys (two survey days in 2021 and five survey days in 2022) completed in September produced records 756 individuals representing 56 species. Three survey days in October of 2021 produced records of 351 individuals representing 29 species.

As with the spring data, the fall stopover migration data have been summarized according to seven bird groups as indicated in Table 3.3. The flying heights of these bird groups observed during the fall stopover migration transect surveys are summarized in Table 3.4. The height categories presented are the same as shown for the spring migration data.



Table 3.4 Relative Heights of Birds Observed during Fall Stopover Migration Transect Surveys

Bird Group	Height ¹				N ²
	L	M	H	VH	
Gamebirds	100.00 (100.00)	-	-	-	5 (6)
Landbirds	88.33 (87.33)	10.51 (11.56)	1.15 (1.10)	-	780 (1358)
Owls	100.00 (100.00)	-	-	-	1 (2)
Raptors	83.33 (83.33)	16.67 (16.67)	-	-	6 (6)
Shorebirds	100.00 (100.00)	-	-	-	1 (1)
Waterbirds	-	100.00 (100.00)	-	-	1 (1)
Waterfowl	-	100.00 (100.00)	-	-	1 (15)
TOTAL	88.18 (86.39)	10.69 (12.53)	1.13 (1.08)	-	795 (1,389)
Notes:					
1	Data presented are percentage of observations (percentage of individual birds) observed in each area. L=<10m; M=10-60m; H=60-120m; VH=>120				
2	Total number of observations (total number of individual birds).				

A greater number and variety of birds were observed during fall migration, and landbirds dominated the observations. Most birds (over 86% of individual birds) were observed within 10 m of the ground, with an additional 12.5% observed between 10-60 m of the ground. Out of a total 1,389 birds observed, less than 1.1% percent were observed flying at 60-120 m or above.

3.2 DIURNAL RAPTOR PASSAGE MONITORING SURVEYS

Raptors were observed in low numbers. Six raptor species were observed during the survey on October 20, 2022 (Table 3.5). Of these species, only sharp-shinned hawk was noted during stopover migration transect surveys.



AVIAN MIGRATION SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

Table 3.5 Raptor Species Observed during Diurnal Raptor Passage Monitoring Surveys

Survey Date	Raptor Species	Scientific Name	Number Observed	Distance and Direction from Observer	Behaviour	Highest Flight Height	Direction of Travel
2-Nov-21	northern goshawk	<i>Accipiter gentilis</i>	1	Overhead	Flyover	M	Local
2-Nov-21	red-tailed hawk	<i>Buteo jamaicensis</i>	1	Overhead	Soaring	H	Northwest
2-Nov-21	bald eagle	<i>Haliaeetus leucocephalus</i>	2	500 m, east	Soaring	H	Southwest
20-Oct-22	red-tailed hawk	<i>Buteo jamaicensis</i>	1	400 m, northwest	Soaring	H	Northeast
20-Oct-22	bald eagle	<i>Haliaeetus leucocephalus</i>	1	500 m, northwest	Soaring	H	Northeast
20-Oct-22	sharp-shinned hawk	<i>Accipiter striatus</i>	1	150 m, southwest	Flyover	M	Northwest
21-Oct-22	no raptors observed	-	-	-	-	-	-
28-Oct-22	bald eagle	<i>Haliaeetus leucocephalus</i>	9	1-3 km, northeast through west	Soaring	H	Northeast through west
28-Oct-22	northern harrier	<i>Circus hudsonius</i>	1	0 m, Overhead	Flyover	M	Northwest
28-Oct-22	osprey	<i>Pandion haliaetus</i>	1	3 km	Soaring	H	West
28-Oct-22	red-tailed hawk	<i>Buteo jamaicensis</i>	1	1.5 km	Soaring	H	East
28-Oct-22	sharp-shinned hawk	<i>Accipiter striatus</i>	1	1 km	Soaring	M	West

L = <10m; M = 10-60m; H = 60-120m; VH = >120m from ground level.



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Raptors noted during the surveys were flying at or above 10 m from the ground, with most of the species being observed flying at 60-120 m from the ground (high height). Raptors were observed singly or in small (fewer than 3) groups. No large kettles of raptors were observed.

The small numbers of raptors observed during the 2021/2022 monitoring program are consistent with results obtained during a raptor monitoring study performed in 2007 at the existing Nuttby Mountain wind farm (CBCL Limited 2007). This study, conducted in support of the existing wind farm facility completed over 72 hours of observation at Nuttby Mountain and recorded extremely low numbers of migrating raptors during the prime fall raptor migration window. The authors of the study concluded that significant fall raptor migration over the top of the Cobequid Mountains, particularly in the vicinity of Nuttby Mountain does not take place.

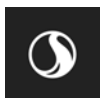
3.3 SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

Three SAR and six SOCC were observed during the spring migration monitoring period. An additional six SOCC were added to this list during the fall migration period (Table 3.6). SAR are discussed in more detail below.

Olive-sided flycatcher is a medium-sized passerine listed as *threatened* under Schedule 1 of the SARA and as *threatened* under the NS ESA. This species breeds throughout much of forested Canada and is most often associated with forest openings containing tall trees or snags for perching (Government of Canada 2022). Generally, forest habitat is either coniferous or mixed coniferous. Suitable habitat often occurs near wetland areas. Critical habitat has not yet been established for this species.

The evening grosbeak is a large finch listed as *special concern* under Schedule 1 of the SARA and as *vulnerable* under the NS ESA. This species breeds throughout much of Canada, primarily in mature coniferous forests, and feeds heavily on invertebrates, especially spruce budworm larvae (Government of Canada 2022). Critical habitat has not yet been established for this species.

The Canada warbler is listed as *threatened* under Schedule 1 of the SARA and *endangered* under the NS ESA. During the breeding season, 85% of the global breeding population can be found in Canada. This species breeds across the southeastern parts of the country and can be found in every province and territory, with the exceptions of Newfoundland and Labrador, and Nunavut. They can primarily be found nesting in areas with wet, mixed deciduous-coniferous forest that include a well-developed shrub layer (Government of Canada 2022). Critical habitat has not yet been established for this species.



AVIAN MIGRATION SURVEY PROGRAM FOR PROPOSED WIND PROJECT NEAR NUTTBY, NOVA SCOTIA

Table 3.6 SAR and SOCC Observed during the 2021/2022 Migration Monitoring Periods

Bird Group	Common Name	Scientific Name	Number Observed (Spring Migration)	Number Observed (Fall Migration)	SARA Rank	COSEWIC Rank	NSESA Rank	AC CDC Rank
Landbirds	black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	-	1	-	-	-	S3B
Raptors	turkey vulture	<i>Cathartes aura</i>	1	1	-	-	-	S2S3B,S4S5M
Raptors	American kestrel	<i>Falco sparverius</i>	-	1	-	-	-	S3B,S4S5M
Landbirds	olive-sided flycatcher	<i>Contopus cooperi</i>	1	-	Threatened	Special Concern	Threatened	S3B
Landbirds	Philadelphia vireo	<i>Vireo philadelphicus</i>	1	-	-	-	-	S2?B,SUM
Landbirds	Canada jay	<i>Perisoreus canadensis</i>	3	11	-	-	-	S3
Landbirds	boreal chickadee	<i>Poecile hudsonicus</i>	10	20	-	-	-	S3
Landbirds	evening grosbeak	<i>Coccothraustes vespertinus</i>	1	-	Special Concern	Special Concern	Vulnerable	S3B,S3N,S3M
Landbirds	pine grosbeak	<i>Pinicola enucleator</i>	2	-	-	-	-	S3B,S5N,S5M
Landbirds	pine siskin	<i>Spinus pinus</i>	-	9	-	-	-	S3
Landbirds	Cape May warbler	<i>Setophaga tigrina</i>	1	1	-	-	-	S3B,SUM
Landbirds	blackpoll warbler	<i>Setophaga striata</i>	-	28	-	-	-	S3B,S5M
Landbirds	Canada warbler	<i>Cardellina canadensis</i>	4	-	Threatened	Special Concern	Endangered	S3B
Landbirds	Wilson's warbler	<i>Cardellina pusilla</i>	-	2	-	-	-	S3B,S5M
Landbirds	rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	-	1	-	-	-	S3B

Note: SAR are presented in **bold** text

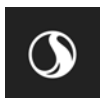


4.0 SUMMARY

More apparent migration activity was observed during the fall periods than during spring. Most birds recorded during the 2021/2022 surveys were observed singly or in small (fewer than 10) groups. Most birds were landbirds (typically passerines), and of these over 86% were recorded within 10 m of the ground, and most appeared to be locally breeding birds. No large concentrations of stopover migrant passerines were observed during the spring and fall migration surveys, suggesting the area may not be an important stopover location for migrating passerines. Shorebirds, waterbirds, and waterfowl were observed in very low numbers, and the Project Boundary provides proportionally little potential stopover habitat for these groups. Similarly, and consistent with past nearby studies at the existing Nuttby Mountain wind farm, relatively small numbers of migrating raptors were noted, suggesting the area may not be a location of substantial diurnal raptor movement during fall migration.

5.0 CLOSURE

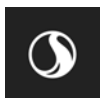
The information presented in this report represents the best technical judgment of Stantec based on information provided by NSPI and the data obtained from the work. Conclusions are based on site conditions observed by Stantec at the time the work was performed at the specific survey locations and cannot be extrapolated to other areas around these locations.



6.0 REFERENCES

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APPENDIX A

Survey Data

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/28/2021	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	10	Singing	Low	local
9/28/2021	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	15	Calling	Low	local
9/28/2021	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	20	Calling	Low	local
9/28/2021	NBT-12	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	100	Calling	Low	local
9/28/2021	NBT-12	Swainson's thrush	<i>Catharus ustulatus</i>	Landbirds	1	100	Calling	Low	local
9/28/2021	NBT-12	pileated woodpecker	<i>Dryocopus pileatus</i>	Landbirds	1	50	Foraging	Low	local
9/28/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	10	Foraging	Low	local
9/28/2021	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	80	Calling	Low	local
9/28/2021	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	local
9/28/2021	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	60	Calling	Low	local
9/28/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	5	20	Foraging	Low	local
9/28/2021	NBT-12	unidentified passerine	na	Landbirds	2	50	Flyover	Low	northwest
9/28/2021	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Calling	Low	local
9/28/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	4	20	Calling	Low	local
9/28/2021	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	70	Singing	Low	local
9/28/2021	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	10	Calling	Low	local
9/28/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	3	20	Calling	Low	local
9/28/2021	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	10	Calling	Low	local
9/28/2021	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	100	Flyover	Low	north
9/28/2021	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	50	Singing	Low	local
9/28/2021	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Calling	Low	local
9/28/2021	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	10	Foraging	Low	local
9/28/2021	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	20	Calling	Low	local
9/28/2021	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	50	Flyover	Low	southwest
9/28/2021	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	2	10	Calling	Low	local
9/28/2021	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	50	Calling	Low	local
9/28/2021	NBT-13	white-winged crossbill	<i>Loxia leucoptera</i>	Landbirds	5	40	Foraging	Low	local
9/28/2021	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	20	Calling	Low	local
9/28/2021	NBT-3	northern parula	<i>Setophaga americana</i>	Landbirds	1	10	Calling	Low	local
9/28/2021	NBT-3	common raven	<i>Corvus corax</i>	Landbirds	1	300	Calling	Low	n/a
9/28/2021	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	30	Foraging	Low	local
9/28/2021	NBT-3	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	100	Calling	Low	local
9/28/2021	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	20	Calling	Low	local
9/28/2021	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	15	Calling	Low	local
9/28/2021	NBT-7	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	50	Calling	Low	local
9/28/2021	NBT-7	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	200	Calling	Low	local
9/28/2021	NBT-7	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	150	Calling	Low	local
9/28/2021	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	30	Calling	Low	local

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/28/2021	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	20	Calling	Low	local
9/28/2021	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	local
9/28/2021	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	6	50	Calling	Low	local
9/28/2021	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	20	Foraging	Low	local
9/28/2021	NBT-7	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	10	Foraging	Low	local
9/28/2021	NBT-7	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	50	Flyover	Low	west
9/28/2021	NBT-7	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	100	Foraging	Low	local
9/28/2021	NBT-11	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Flyover	Low	northwest
9/28/2021	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	2	20	Flyover	Low	northwest
9/28/2021	NBT-11	common raven	<i>Corvus corax</i>	Landbirds	1	200	Flyover	Medium	northeast
9/28/2021	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	50	Calling	Low	local
9/28/2021	NBT-6	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	100	Flyover	Low	west
10/4/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	5	Calling	Low	local
10/4/2021	NBT-12	common raven	<i>Corvus corax</i>	Landbirds	1	200	Calling	Medium	local
10/4/2021	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Calling	Low	local
10/4/2021	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	15	Calling	Low	local
10/4/2021	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	50	Calling	Low	local
10/4/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	30	Calling	Low	local
10/4/2021	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	2	n/a	Flyover	Medium	northeast
10/4/2021	NBT-12	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	n/a	Flyover	Medium	south
10/4/2021	NBT-12	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	40	Calling	Low	local
10/4/2021	NBT-12	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	20	Calling	Low	local
10/4/2021	NBT-12	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	2	75	Calling	Low	southeast
10/4/2021	NBT-12	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	n/a	Flyover	Medium	southeast
10/4/2021	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Calling	Low	local
10/4/2021	NBT-13	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	50	Calling	Low	local
10/4/2021	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	n/a	Flyover	Medium	northeast
10/4/2021	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	n/a	Flyover	Medium	northeast
10/4/2021	NBT-13	red crossbill	<i>Loxia curvirostra</i>	Landbirds	11	10	Calling	Low	local
10/4/2021	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	3	5	Foraging	Low	local
10/4/2021	NBT-13	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	30	Foraging	Low	local
10/4/2021	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	10	Foraging	Low	local
10/4/2021	NBT-13	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	10	Calling	Low	local
10/4/2021	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	7	n/a	Foraging	Low	local
10/4/2021	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	n/a	Flyover	Medium	northeast
10/4/2021	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	5	Foraging	Low	local
10/4/2021	NBT-11	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	5	Foraging	Low	local
10/4/2021	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	5	Foraging	Low	local

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
10/4/2021	NBT-7	sharp-shinned hawk	<i>Accipiter striatus</i>	Raptors	1	n/a	Foraging	Low	local
10/4/2021	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	10	Calling	Low	local
10/4/2021	NBT-7	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	10	Calling	Low	local
10/4/2021	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Calling	Low	local
10/4/2021	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	n/a	Flyover	Medium	south
10/4/2021	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	30	Flyover	Medium	n/a
10/4/2021	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Calling	Low	local
10/4/2021	NBT-7	brown creeper	<i>Certhia americana</i>	Landbirds	1	10	Calling	Low	local
10/4/2021	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	10	Calling	Low	local
10/4/2021	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	70	Calling	Low	local
10/4/2021	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	3	25	Foraging	Low	local
10/4/2021	NBT-10	brown creeper	<i>Certhia americana</i>	Landbirds	1	15	Calling	Low	local
10/4/2021	NBT-10	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	25	Calling	Low	local
10/4/2021	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	n/a	Foraging	Low	local
10/4/2021	NBT-6	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	70	Calling	Low	local
10/4/2021	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Foraging	Low	local
10/4/2021	NBT-3	common raven	<i>Corvus corax</i>	Landbirds	1	200	Calling	low	local
10/4/2021	NBT-3	pileated woodpecker	<i>Dryocopus pileatus</i>	Landbirds	1	100	Calling	Low	local
10/4/2021	NBT-3	brown creeper	<i>Certhia americana</i>	Landbirds	1	30	Calling	Low	local
10/4/2021	NBT-3	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	30	Calling	Low	local
10/12/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	10	Calling	Low	local
10/12/2021	NBT-12	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	30	Calling	Low	local
10/12/2021	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	10	Calling	Low	local
10/12/2021	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Calling	Low	local
10/12/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Calling	Low	local
10/12/2021	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	n/a	Calling	Low	local
10/12/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	10	Calling	Low	local
10/12/2021	NBT-12	purple finch	<i>Haemorhous purpureus</i>	Landbirds	9	n/a	Flyover	Medium	south
10/12/2021	NBT-12	common raven	<i>Corvus corax</i>	Landbirds	1	100	Calling	Low	local
10/12/2021	NBT-13	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	4	50	Calling	Low	local
10/12/2021	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	40	Flyover	Medium	n/a
10/12/2021	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	40	Calling	Low	local
10/12/2021	NBT-13	pine siskin	<i>Spinus pinus</i>	Landbirds	7	50	Foraging	Low	local
10/12/2021	NBT-13	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	20	Flyover	Medium	n/a
10/12/2021	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	25	Calling	Low	local
10/12/2021	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	20	Calling	Low	local
10/12/2021	NBT-13	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	2	30	Calling	Low	local
10/12/2021	NBT-13	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	n/a	Flyover	Medium	northwest

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
10/12/2021	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	70	Calling	Low	local
10/12/2021	NBT-13	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	50	Calling	Low	local
10/12/2021	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	30	Calling	Low	local
10/12/2021	NBT-13	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	50	Calling	Low	local
10/12/2021	NBT-13	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	10	10	Calling	Low	local
10/12/2021	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	10	Calling	Low	local
10/12/2021	NBT-13	red crossbill	<i>Loxia curvirostra</i>	Landbirds	1	30	Singing	Low	local
10/12/2021	NBT-13	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	2	n/a	Calling	Low	local
10/12/2021	NBT-11	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	20	Calling	Low	local
10/12/2021	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	50	Flyover	Medium	n/a
10/12/2021	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	2	n/a	Foraging	Low	local
10/12/2021	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	10	Calling	Low	local
10/12/2021	NBT-11	American robin	<i>Turdus migratorius</i>	Landbirds	2	n/a	Flyover	Medium	north
10/12/2021	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	n/a	Flyover	Medium	south
10/12/2021	NBT-11	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	50	Calling	Low	local
10/12/2021	NBT-7	Canada goose	<i>Branta canadensis</i>	Waterfowl	15	n/a	Flyover	Medium	southwest
10/12/2021	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	50	Flyover	Medium	n/a
10/12/2021	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	4	5	Foraging	Low	local
10/12/2021	NBT-7	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	5	Calling	Low	local
10/12/2021	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Foraging	Low	local
10/12/2021	NBT-7	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	n/a	Foraging	Low	local
10/12/2021	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	5	Foraging	Low	local
10/12/2021	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	40	Flyover	Medium	n/a
10/12/2021	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	5	Foraging	Low	local
10/12/2021	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	70	Flyover	Medium	n/a
10/12/2021	NBT-7	blue jay	<i>Cyanocitta cristata</i>	Landbirds	2	100	Calling	Low	local
10/12/2021	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Calling	Low	local
10/12/2021	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	30	Calling	Low	local
10/12/2021	NBT-10	white-winged crossbill	<i>Loxia leucoptera</i>	Landbirds	3	n/a	Flyover	Medium	east
10/12/2021	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	10	Calling	Low	local
10/12/2021	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	40	Flyover	Medium	east
10/12/2021	NBT-10	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	2	30	Calling	Low	local
10/12/2021	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	4	40	Foraging	Low	local
10/12/2021	NBT-10	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	20	Flyover	Medium	northwest
10/12/2021	NBT-10	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	2	30	Foraging	Low	local
10/12/2021	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	20	Calling	Low	local
10/12/2021	NBT-10	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	1	5	Foraging	Low	local
10/12/2021	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	5	Flyover	Medium	east

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
10/12/2021	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	10	Foraging	Low	local
10/12/2021	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	3	n/a	Foraging	Low	local
10/12/2021	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	60	Calling	Low	local
10/12/2021	NBT-10	savannah sparrow	<i>Passerculus sandwichensis</i>	Landbirds	1	n/a	Foraging	Low	local
10/19/2021	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Calling	Low	local
10/19/2021	NBT-12	common raven	<i>Corvus corax</i>	Landbirds	1	200	Calling	Low	local
10/19/2021	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	3	n/a	Flyover	Medium	northeast
10/19/2021	NBT-12	pine siskin	<i>Spinus pinus</i>	Landbirds	2	60	Flyover	Medium	n/a
10/19/2021	NBT-12	common raven	<i>Corvus corax</i>	Landbirds	1	300	Calling	Low	local
10/19/2021	NBT-12	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	70	Calling	Low	local
10/19/2021	NBT-12	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	100	Calling	Low	local
10/19/2021	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	30	Calling	Low	local
10/19/2021	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	4	10	Calling	Low	local
10/19/2021	NBT-13	red crossbill	<i>Loxia curvirostra</i>	Landbirds	2	10	Foraging	Low	local
10/19/2021	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	8	n/a	Foraging	Low	local
10/19/2021	NBT-13	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	60	Calling	Low	local
10/19/2021	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	3	15	Foraging	Low	local
10/19/2021	NBT-13	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	80	Calling	Low	local
10/19/2021	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	20	Foraging	Low	local
10/19/2021	NBT-13	red crossbill	<i>Loxia curvirostra</i>	Landbirds	8	60	Flyover	Low	local
10/19/2021	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	4	n/a	Flyover	Medium	southeast
10/19/2021	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	40	Calling	Low	local
10/19/2021	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	10	Calling	Low	local
10/19/2021	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	4	n/a	Foraging	Low	local
10/19/2021	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	80	Flyover	Medium	n/a
10/19/2021	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	6	n/a	Foraging	Low	local
10/19/2021	NBT-7	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	3	n/a	Foraging	Low	local
10/19/2021	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	3	n/a	Flyover	Medium	east
10/19/2021	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	n/a	Calling	Low	local
10/19/2021	NBT-7	pileated woodpecker	<i>Dryocopus pileatus</i>	Landbirds	1	n/a	Foraging	Low	local
10/19/2021	NBT-7	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	2	20	Foraging	Low	local
10/19/2021	NBT-7	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	40	Flyover	Medium	n/a
10/19/2021	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	5	10	Calling	Low	local
10/19/2021	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	8	n/a	Foraging	Low	local
10/19/2021	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	30	Flyover	Medium	southwest
10/19/2021	NBT-7	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	3	10	Calling	Low	local
10/19/2021	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	20	Calling	Low	local
10/19/2021	NBT-10	red crossbill	<i>Loxia curvirostra</i>	Landbirds	2	30	Flyover	Medium	n/a

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
10/19/2021	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	n/a	Foraging	Low	local
10/19/2021	NBT-10	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	50	Calling	Low	local
10/19/2021	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	30	Calling	Low	local
10/19/2021	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	4	20	Foraging	Low	local
10/19/2021	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	3	20	Foraging	Low	local
10/19/2021	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	100	Calling	Low	local
10/19/2021	NBT-3	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	1	n/a	Foraging	Low	local
10/19/2021	NBT-3	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	n/a	Foraging	Low	local
10/19/2021	NBT-3	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	n/a	Calling	Low	local
10/19/2021	NBT-3	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	n/a	Flyover	Medium	northwest
10/19/2021	NBT-3	American goldfinch	<i>Spinus tristis</i>	Landbirds	30	10	Foraging	Low	local
10/19/2021	NBT-3	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	20	Calling	Low	local
10/19/2021	NBT-6	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	5	Calling	Low	local
9/22/2021	NBT-12	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	3	n/a	Calling	Low	local
9/22/2021	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-12	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	3	n/a	Calling	Low	local
9/22/2021	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-12	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-12	unidentified passerine	na	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-12	common raven	<i>Corvus corax</i>	Landbirds	2	100	Calling	Low	local
9/22/2021	NBT-11	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	100	Calling	Low	local
9/22/2021	NBT-11	unidentified passerine	na	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-10	unidentified passerine	na	Landbirds	1	50	Calling	Low	local
9/22/2021	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	3	n/a	Calling	Low	local
9/22/2021	NBT-10	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-10	brown creeper	<i>Certhia americana</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-10	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-10	Nashville warbler	<i>Leiothlypis ruficapilla</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-13	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-13	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-13	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-6	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	n/a	Calling	Low	local

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/22/2021	NBT-6	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	5	n/a	Calling	Low	local
9/22/2021	NBT-6	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	50	Calling	Low	local
9/22/2021	NBT-6	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-7	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-7	unidentified passerine	na	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-7	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	3	n/a	Calling	Low	local
9/22/2021	NBT-7	brown creeper	<i>Certhia americana</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	6	n/a	Calling	Low	local
9/22/2021	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	n/a	Calling	Low	local
9/22/2021	NBT-7	Nashville warbler	<i>Leiothlypis ruficapilla</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-7	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	3	n/a	Calling	Low	local
9/22/2021	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-7	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-7	common raven	<i>Corvus corax</i>	Landbirds	1	n/a	Calling	Low	local
9/22/2021	NBT-9	unidentified passerine	na	Landbirds	2	n/a	Calling	Low	local
9/22/2021	NBT-8	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	n/a	Calling	Low	local
8/25/2022	NBT-21	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	2	<100		Low	n/a
8/25/2022	NBT-21	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-21	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-21	palm warbler	<i>Setophaga palmarum</i>	Landbirds	3	<100		Low	n/a
8/25/2022	NBT-21	Nashville warbler	<i>Leiothlypis ruficapilla</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-21	swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-21	blue jay	<i>Cyanocitta cristata</i>	Landbirds	2	>100		Low	n/a
8/25/2022	NBT-23	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-23	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-23	unidentified passerine	na	Landbirds	3	<100	Flyover	Medium	southwest
8/25/2022	NBT-23	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-23	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-23	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-22	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	north
8/25/2022	NBT-22	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-22	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	2	<100		Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
8/25/2022	NBT-22	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-22	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-22	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-22	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	southeast
8/25/2022	NBT-22	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100	Flyover	Low	east
8/25/2022	NBT-22	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-22	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	<100		Low	n/a
8/25/2022	NBT-22	American robin	<i>Turdus migratorius</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-22	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	2	<100		Low	n/a
8/25/2022	NBT-22	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	n/a
8/25/2022	NBT-22	unidentified passerine	na	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-22	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100	Flyover	Low	east
8/25/2022	NBT-24	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-24	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	6	<100		Low	n/a
8/25/2022	NBT-24	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	3	<100		Low	n/a
8/25/2022	NBT-24	unidentified passerine	na	Landbirds	1	<100	Flyover	Low	southeast
8/25/2022	NBT-24	blackburnian warbler	<i>Setophaga fusca</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-24	northern parula	<i>Setophaga americana</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-24	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	2	<100		Low	n/a
8/25/2022	NBT-24	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	2	<100		Low	n/a
8/25/2022	NBT-24	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a
8/25/2022	NBT-24	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-24	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	<100		Low	n/a
8/25/2022	NBT-24	Nashville warbler	<i>Leiothlypis ruficapilla</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-24	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-24	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-24	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100	Flyover	Low	west
8/25/2022	NBT-24	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	<100	Flyover	Low	west
8/25/2022	NBT-24	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	2	<100		Low	n/a
8/25/2022	NBT-24	unidentified passerine	na	Landbirds	2	<100	Flyover	Low	n/a
8/25/2022	NBT-16	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	3	<100		Low	n/a
8/25/2022	NBT-16	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100	Flyover	Medium	n/a
8/25/2022	NBT-16	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	n/a
8/25/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-16	northern flicker	<i>Colaptes auratus</i>	Landbirds	4	<100		Low	n/a
8/25/2022	NBT-16	American robin	<i>Turdus migratorius</i>	Landbirds	4	<100		Low	n/a
8/25/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-16	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	<100	Flyover	Medium	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
8/25/2022	NBT-16	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-16	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	>100		Low	n/a
8/25/2022	NBT-17	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-17	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-17	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	north
8/25/2022	NBT-17	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/25/2022	NBT-17	unidentified passerine	na	Landbirds	1	<100	Flyover	Low	n/a
8/25/2022	NBT-17	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	>100		Low	n/a
8/26/2022	NBT-12	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	<100		Low	n/a
8/26/2022	NBT-12	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	11	<100		Low	n/a
8/26/2022	NBT-12	Swainson's thrush	<i>Catharus ustulatus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	2	<100		Low	n/a
8/26/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	blackburnian warbler	<i>Setophaga fusca</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-12	unidentified passerine	na	Landbirds	1	<100	Flyover	High	n/a
8/26/2022	NBT-12	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	<100		Low	n/a
8/26/2022	NBT-13	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	<100	Flyover	Low	n/a
8/26/2022	NBT-13	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	4	<100		Low	n/a
8/26/2022	NBT-13	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	west
8/26/2022	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-13	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-13	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-11	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-11	black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
8/26/2022	NBT-11	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-11	northern parula	<i>Setophaga americana</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	<100	Flyover	Low	south
8/26/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	<100		Low	n/a
8/26/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	unidentified passerine	na	Landbirds	1	<100	Flyover	Low	southwest
8/26/2022	NBT-7	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	n/a
8/26/2022	NBT-7	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	2	<100		Low	n/a
8/26/2022	NBT-7	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	chestnut-sided warbler	<i>Setophaga pensylvanica</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	5	<100		Low	n/a
8/26/2022	NBT-7	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	Tennessee warbler	<i>Leiothlypis peregrina</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	3	<100		Low	n/a
8/26/2022	NBT-7	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-7	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	west
8/26/2022	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	<100	Flyover	Medium	north
8/26/2022	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	<100	Flyover	Medium	north
8/26/2022	NBT-7	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	north
8/26/2022	NBT-7	spotted sandpiper	<i>Actitis macularius</i>	Shorebirds	1	<100	Flyover	Low	n/a
8/26/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-10	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-9	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-9	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	7	<100		Low	n/a
8/26/2022	NBT-9	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-9	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-9	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-3	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-3	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-3	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	1	<100		Low	n/a

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
8/26/2022	NBT-3	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	<100		Low	n/a
8/26/2022	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
8/26/2022	NBT-3	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	n/a
8/31/2022	NBT-21	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-21	Nashville warbler	<i>Leiostyris ruficapilla</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-21	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-21	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	4	<100		Low	n/a
8/31/2022	NBT-21	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-21	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	2	<100		Low	n/a
8/31/2022	NBT-21	song sparrow	<i>Melospiza melodia</i>	Landbirds	2	<100		Low	n/a
8/31/2022	NBT-21	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-21	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-21	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	n/a
8/31/2022	NBT-21	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100	Flyover	Medium	n/a
8/31/2022	NBT-21	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-21	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100	Flyover	Low	n/a
8/31/2022	NBT-21	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-21	great blue heron	<i>Ardea herodias</i>	Waterbirds	1	<100	Flyover	Medium	northeast
8/31/2022	NBT-23	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-23	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-23	unidentified passerine	na	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-23	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	southwest
8/31/2022	NBT-23	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-23	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-23	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-23	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-23	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-23	unidentified passerine	na	Landbirds	1	<100	Flyover	Low	northwest
8/31/2022	NBT-22	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-22	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	south
8/31/2022	NBT-22	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-22	unidentified passerine	na	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-22	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	east
8/31/2022	NBT-22	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-22	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-22	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100	Flyover	Medium	n/a
8/31/2022	NBT-22	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-22	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	1	<100		Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
8/31/2022	NBT-22	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	4	<100		Low	n/a
8/31/2022	NBT-22	black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-22	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	2	<100		Low	n/a
8/31/2022	NBT-22	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	<100		Low	n/a
8/31/2022	NBT-22	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-22	northern parula	<i>Setophaga americana</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-24	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-24	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-24	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-24	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100	Flyover	Medium	north
8/31/2022	NBT-24	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-16	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-16	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	south
8/31/2022	NBT-17	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	northwest
8/31/2022	NBT-17	ruby-throated hummingbird	<i>Archilochus colubris</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-9	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100	Flyover	Medium	n/a
8/31/2022	NBT-9	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	2	<100		Low	n/a
8/31/2022	NBT-9	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a
8/31/2022	NBT-9	chestnut-sided warbler	<i>Setophaga pensylvanica</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-9	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-9	unidentified passerine	na	Landbirds	4	<100		Low	n/a
8/31/2022	NBT-9	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	<100		Low	n/a
8/31/2022	NBT-9	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-9	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-9	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	<100		Low	n/a
8/31/2022	NBT-9	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-12	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-12	unidentified passerine	na	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/1/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-13	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-13	unidentified passerine	na	Landbirds	1	<100	Flyover	Low	north
9/1/2022	NBT-11	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-11	unidentified passerine	na	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-7	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-10	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-10	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-10	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	5	<100		Low	n/a
9/1/2022	NBT-10	blackburnian warbler	<i>Setophaga fusca</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-10	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-10	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-10	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-10	northern parula	<i>Setophaga americana</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-10	sharp-shinned hawk	<i>Accipiter striatus</i>	Raptors	1	<100		Low	n/a
9/1/2022	NBT-10	unidentified passerine	na	Landbirds	20	<100	Flyover	Medium	west
9/1/2022	NBT-6	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-6	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-6	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	12	<100		Low	n/a
9/1/2022	NBT-6	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-6	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-6	ruby-throated hummingbird	<i>Archilochus colubris</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-6	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-6	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-6	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100	Flyover	Medium	west
9/1/2022	NBT-6	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	<100	Flyover	Medium	southwest

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/1/2022	NBT-6	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	west
9/1/2022	NBT-6	unidentified passerine	na	Landbirds	5	<100	Flyover	Medium	west
9/1/2022	NBT-6	ruby-throated hummingbird	<i>Archilochus colubris</i>	Landbirds	1	<100	Flyover	Low	southwest
9/1/2022	NBT-6	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	<100	Flyover	Low	n/a
9/1/2022	NBT-6	Wilson's warbler	<i>Cardellina pusilla</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-6	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-6	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	3	<100		Low	n/a
9/1/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	3	<100		Low	n/a
9/1/2022	NBT-6	black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	unidentified passerine	na	Landbirds	4	<100	Flyover	Medium	south
9/1/2022	NBT-3	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	3	<100		Low	n/a
9/1/2022	NBT-3	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	chestnut-sided warbler	<i>Setophaga pensylvanica</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	red-shouldered hawk	<i>Buteo lineatus</i>	Raptors	1	<100	Flyover	Medium	north
9/1/2022	NBT-3	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	Wilson's warbler	<i>Cardellina pusilla</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	northern parula	<i>Setophaga americana</i>	Landbirds	2	<100		Low	n/a
9/1/2022	NBT-3	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	<100		Low	n/a
9/1/2022	NBT-3	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-21	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-21	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-21	unidentified passerine	na	Landbirds	2	<100	Flyover	High	northeast
9/6/2022	NBT-21	unidentified passerine	na	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-21	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-21	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	>100		Low	n/a
9/6/2022	NBT-21	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-21	unidentified passerine	na	Landbirds	2	<100	Flyover	High	east
9/6/2022	NBT-21	unidentified passerine	na	Landbirds	2	<100	Flyover	Low	north
9/6/2022	NBT-21	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-21	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-21	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-21	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-21	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	>100		Low	n/a
9/6/2022	NBT-21	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	>100		Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/6/2022	NBT-21	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-23	unidentified passerine	na	Landbirds	1	<100	Flyover	High	northwest
9/6/2022	NBT-23	unidentified passerine	na	Landbirds	1	<100	Flyover	Low	east
9/6/2022	NBT-23	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	4	<100		Low	n/a
9/6/2022	NBT-23	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-23	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	south
9/6/2022	NBT-23	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-23	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	unidentified passerine	na	Landbirds	2	<100	Flyover	High	southwest
9/6/2022	NBT-22	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-22	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	cape may warbler	<i>Setophaga tigrina</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	unidentified passerine	na	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-22	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	American goldfinch	<i>Spinus tristis</i>	Landbirds	3	<100	Flyover	Medium	northwest
9/6/2022	NBT-22	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-22	unidentified passerine	na	Landbirds	1	<100	Flyover	High	northwest
9/6/2022	NBT-22	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-22	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-22	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	3	<100		Low	n/a
9/6/2022	NBT-22	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	<100		Low	n/a
9/6/2022	NBT-22	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-24	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-24	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-24	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-24	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-24	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-24	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-16	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-16	unidentified passerine	na	Landbirds	1	<100	Flyover	High	n/a
9/6/2022	NBT-16	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	2	<100		Low	n/a

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/6/2022	NBT-16	unidentified passerine	na	Landbirds	2	<100	Flyover	Low	north
9/6/2022	NBT-16	unidentified passerine	na	Landbirds	3	<100	Flyover	Medium	east
9/6/2022	NBT-16	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100	Flyover	Medium	northwest
9/6/2022	NBT-16	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	northwest
9/6/2022	NBT-16	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-16	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	north
9/6/2022	NBT-17	black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-17	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-17	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-17	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	6	<100		Low	n/a
9/6/2022	NBT-17	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-17	Nashville warbler	<i>Leiostyris alpestris</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-17	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-17	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-17	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	6	<100		Low	n/a
9/6/2022	NBT-17	brown creeper	<i>Certhia americana</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-17	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-17	blue jay	<i>Cyanocitta cristata</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-17	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-17	blackburnian warbler	<i>Setophaga fusca</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-17	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	north
9/6/2022	NBT-17	blue jay	<i>Cyanocitta cristata</i>	Landbirds	3	<100	Flyover	Low	southwest
9/6/2022	NBT-17	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-17	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-9	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
9/6/2022	NBT-9	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	<100		Low	n/a
9/6/2022	NBT-9	sharp-shinned hawk	<i>Accipiter striatus</i>	Raptors	1	<100		Low	n/a
9/6/2022	NBT-9	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	4	<100		Low	n/a
9/9/2022	NBT-12	barred owl	<i>Strix varia</i>	Owls	2	>100		Low	n/a
9/9/2022	NBT-12	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	4	<100		Low	n/a
9/9/2022	NBT-12	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-12	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-12	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	>100		Low	n/a
9/9/2022	NBT-12	unidentified passerine	na	Landbirds	3	<100	Flyover	High	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/9/2022	NBT-12	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-12	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	>100		Low	n/a
9/9/2022	NBT-12	unidentified passerine	na	Landbirds	2	<100	Flyover	High	n/a
9/9/2022	NBT-12	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	>100		Low	n/a
9/9/2022	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	>100		Low	n/a
9/9/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-13	swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-13	unidentified passerine	na	Landbirds	5	<100		Low	n/a
9/9/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-13	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	northwest
9/9/2022	NBT-13	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	east
9/9/2022	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100	Flyover	Low	n/a
9/9/2022	NBT-13	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	<100	Flyover	Medium	southeast
9/9/2022	NBT-13	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	northwest
9/9/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-13	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-13	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	>100		Low	n/a
9/9/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-11	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-11	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-11	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-11	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-11	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-11	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-7	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	2	<100		Low	n/a
9/9/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	<100		Low	n/a
9/9/2022	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	2	<100		Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/9/2022	NBT-7	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	3	<100		Low	n/a
9/9/2022	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-7	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-7	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	Tennessee warbler	<i>Leiothlypis peregrina</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	blackburnian warbler	<i>Setophaga fusca</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-7	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	<100	Flyover	Medium	n/a
9/9/2022	NBT-10	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-10	unidentified passerine	na	Landbirds	1	<100	Flyover	Medium	n/a
9/9/2022	NBT-10	unidentified passerine	na	Landbirds	3	<100	Flyover	Medium	southwest
9/9/2022	NBT-10	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	<100	Flyover	Medium	southeast
9/9/2022	NBT-10	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	<100		Low	east
9/9/2022	NBT-6	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-6	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-6	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-6	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	<100		Low	n/a
9/9/2022	NBT-6	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	4	<100		Low	n/a
9/9/2022	NBT-6	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-6	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	3	<100		Low	n/a
9/9/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-3	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	<100	Flyover	Medium	west
9/9/2022	NBT-3	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-3	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-3	unidentified passerine	na	Landbirds	2	<100	Flyover	Medium	n/a
9/9/2022	NBT-3	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	<100		Low	n/a
9/9/2022	NBT-3	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	<100	Flyover	Medium	northeast
9/15/2022	NBT-21	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	2	50	Calling	Low	n/a
9/15/2022	NBT-21	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	4	n/a	Calling	Low	n/a
9/15/2022	NBT-21	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	3	n/a	Calling	Low	n/a
9/15/2022	NBT-21	American robin	<i>Turdus migratorius</i>	Landbirds	2	100	Calling	Low	n/a
9/15/2022	NBT-21	Lincoln's sparrow	<i>Melospiza lincolni</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-21	palm warbler	<i>Setophaga palmarum</i>	Landbirds	3	n/a	Calling	Low	n/a

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/15/2022	NBT-21	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	50	Singing	Low	n/a
9/15/2022	NBT-21	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	100	Calling	Low	n/a
9/15/2022	NBT-21	blue jay	<i>Cyanocitta cristata</i>	Landbirds	2	100	Calling	Low	n/a
9/15/2022	NBT-21	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-21	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-21	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-21	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-21	swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-21	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-21	common raven	<i>Corvus corax</i>	Landbirds	2	500	Calling	Low	n/a
9/15/2022	NBT-21	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	50	Singing	Low	n/a
9/15/2022	NBT-23	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	100	Calling	Low	n/a
9/15/2022	NBT-23	northern parula	<i>Setophaga americana</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-23	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	50	Singing	Low	southwest
9/15/2022	NBT-23	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-23	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-23	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	2	n/a	Calling	Low	northwest
9/15/2022	NBT-23	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-23	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	1	n/a	Singing	Low	n/a
9/15/2022	NBT-23	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	n/a	Foraging	Low	n/a
9/15/2022	NBT-23	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	n/a	Foraging	Low	n/a
9/15/2022	NBT-23	hermit thrush	<i>Catharus guttatus</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-23	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	50	Calling	Low	n/a
9/15/2022	NBT-22	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-22	hermit thrush	<i>Catharus guttatus</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-22	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	5	n/a	Calling	Low	n/a
9/15/2022	NBT-22	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-22	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	n/a	Flyover	Low	n/a
9/15/2022	NBT-22	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-22	northern parula	<i>Setophaga americana</i>	Landbirds	1	n/a	Foraging	Low	n/a
9/15/2022	NBT-22	American robin	<i>Turdus migratorius</i>	Landbirds	6	100	Flyover	Low	southwest
9/15/2022	NBT-22	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-22	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	3	n/a	Calling	Low	n/a
9/15/2022	NBT-22	unidentified passerine	na	Landbirds	3	n/a	Flyover	Low	n/a
9/15/2022	NBT-22	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-24	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	4	n/a	Calling	Low	n/a
9/15/2022	NBT-24	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-24	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	n/a	Calling	Low	n/a

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9/15/2022	NBT-24	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-24	American crow	<i>Corvus brachyrhynchos</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-24	unidentified passerine	na	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-24	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-24	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-24	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	3	n/a	Calling	Low	n/a
9/15/2022	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	n/a	Calling	Low	n/a
9/15/2022	NBT-12	American kestrel	<i>Falco sparverius</i>	Raptors	1	50	Flyover	Low	west
9/15/2022	NBT-16	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	3	n/a	Calling	Low	n/a
9/15/2022	NBT-16	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-16	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	3	n/a	Calling	Low	n/a
9/15/2022	NBT-16	unidentified passerine	na	Landbirds	3	n/a	Flyover	Low	n/a
9/15/2022	NBT-16	turkey vulture	<i>Cathartes aura</i>	Raptors	1	100	Flyover	Low	northwest
9/15/2022	NBT-16	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	18	n/a	Flyover	Low	north
9/15/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-16	palm warbler	<i>Setophaga palmarum</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-17	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-17	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-17	northern parula	<i>Setophaga americana</i>	Landbirds	1	n/a	Calling	Low	n/a
9/15/2022	NBT-17	blue jay	<i>Cyanocitta cristata</i>	Landbirds	2	50	Calling	Low	n/a
9/15/2022	NBT-17	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	2	n/a	Flyover	Low	n/a
9/15/2022	NBT-17	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-17	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	n/a	Calling	Low	n/a
9/15/2022	NBT-17	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-9	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	1	n/a	Flyover	Low	n/a
9/17/2022	NBT-9	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-9	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	3	n/a	Calling	Low	n/a
9/17/2022	NBT-9	brown creeper	<i>Certhia americana</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-9	spruce grouse	<i>Falci pennis canadensis</i>	Gamebirds	1	n/a	Foraging	Low	n/a
9/17/2022	NBT-9	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-9	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-9	unidentified passerine	na	Landbirds	4	n/a	Calling	Low	n/a
9/17/2022	NBT-9	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	n/a	Flyover	Low	n/a
9/17/2022	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-11	northern parula	<i>Setophaga americana</i>	Landbirds	1	n/a	Foraging	Low	n/a

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
9/17/2022	NBT-11	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	2	n/a	Foraging	Low	n/a
9/17/2022	NBT-11	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	n/a	Foraging	Low	n/a
9/17/2022	NBT-11	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	2	n/a	Foraging	Low	n/a
9/17/2022	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	n/a	Foraging	Low	n/a
9/17/2022	NBT-13	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	50	Calling	Low	n/a
9/17/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-7	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-7	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	n/a	Foraging	Low	n/a
9/17/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	n/a	Foraging	Low	n/a
9/17/2022	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-7	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-7	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	n/a	Foraging	Low	n/a
9/17/2022	NBT-7	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	n/a	Foraging	Low	n/a
9/17/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-7	brown creeper	<i>Certhia americana</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-7	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	3	n/a	Calling	Low	n/a
9/17/2022	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-10	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-10	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-10	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-10	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	3	n/a	Calling	Low	n/a
9/17/2022	NBT-6	blackpoll warbler	<i>Setophaga striata</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-6	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	2	n/a	Calling	Low	n/a
9/17/2022	NBT-6	unidentified passerine	na	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-3	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-3	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-3	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	n/a	Calling	Low	n/a
9/17/2022	NBT-3	unidentified passerine	na	Landbirds	1	n/a	Calling	Low	n/a
3/31/2022	NBB	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	200	Calling	Low	n/a
3/31/2022	NBB	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	5	Foraging	Low	n/a
3/31/2022	NBB	Canada goose	<i>Branta canadensis</i>	Waterfowl	1	300	Flyover	Low	north

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
3/31/2022	NBB	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	5	Foraging	Low	n/a
3/31/2022	NBB	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	n/a	Flyover	Low	east
3/31/2022	NBB	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	10	Foraging	Low	n/a
3/31/2022	NBB	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	1	5	Foraging	Low	n/a
3/31/2022	NBT-3	common raven	<i>Corvus corax</i>	Landbirds	1	100	Flyover	High	north
3/31/2022	NBT-3	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	50	Calling	Low	n/a
3/31/2022	NBT-3	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	2	20	Foraging	Low	n/a
3/31/2022	NBT-3	common raven	<i>Corvus corax</i>	Landbirds	1	100	Flyover	Medium	south
3/31/2022	NBT-3	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	100	Flyover	Low	n/a
3/31/2022	NBT-3	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	50	Foraging	Low	n/a
3/31/2022	NBT-3	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	n/a	Foraging	Low	n/a
3/31/2022	NBT-3	song sparrow	<i>Melospiza melodia</i>	Landbirds	2	5	Foraging	Low	n/a
3/31/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	10	Calling	Low	n/a
3/31/2022	NBT-6	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	100	Calling	Low	n/a
3/31/2022	NBT-6	American crow	<i>Corvus brachyrhynchos</i>	Landbirds	1	500	Calling	Low	n/a
3/31/2022	NBT-6	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	2	50	Foraging	Low	n/a
3/31/2022	NBT-6	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	50	Foraging	Low	n/a
3/31/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	40	Calling	Low	n/a
3/31/2022	NBT-6	common raven	<i>Corvus corax</i>	Landbirds	1	n/a	Flyover	Medium	n/a
3/31/2022	NBT-6	white-winged crossbill	<i>Loxia leucoptera</i>	Landbirds	15	n/a	Flyover	Low	west
3/31/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	200	Calling	Low	n/a
3/31/2022	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	60	Calling	Low	n/a
3/31/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	70	Calling	Low	n/a
3/31/2022	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	30	Calling	Low	n/a
3/31/2022	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	100	Calling	Low	n/a
3/31/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	80	Calling	Low	n/a
3/31/2022	NBT-10	American crow	<i>Corvus brachyrhynchos</i>	Landbirds	1	400	Calling	Low	n/a
3/31/2022	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	100	Calling	Low	n/a
3/31/2022	NBT-10	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	200	Singing	Low	n/a
4/14/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a
4/14/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Foraging	Low	n/a
4/14/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	40	Calling	Low	n/a
4/14/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	20	Foraging	Low	n/a
4/14/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	100	Singing	Low	n/a
4/14/2022	NBT-12	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	120	Singing	Low	n/a
4/14/2022	NBT-12	pileated woodpecker	<i>Dryocopus pileatus</i>	Landbirds	1	200	Singing	Low	n/a
4/14/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Singing	Low	n/a
4/14/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	40	Calling	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
4/14/2022	NBT-12	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	120	Singing	Low	n/a
4/14/2022	NBT-12	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	50	Singing	Low	n/a
4/14/2022	NBT-12	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	n/a	Flyover	Low	west
4/14/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	40	Calling	Low	n/a
4/14/2022	NBA	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	2	5	Foraging	Low	n/a
4/14/2022	NBA	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	100		Low	n/a
4/14/2022	NBA	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	150	Singing	Low	n/a
4/14/2022	NBA	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	1	2	Foraging	Low	n/a
4/14/2022	NBA	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	80	Singing	Low	n/a
4/14/2022	NBA	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	100	Singing	Low	n/a
4/14/2022	NBA	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	40	Singing	Low	n/a
4/14/2022	NBA	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Foraging	Low	n/a
4/14/2022	NBA	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	n/a	Foraging	Low	n/a
4/14/2022	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	20	Agitated	Low	n/a
4/14/2022	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	40	Singing	Low	n/a
4/14/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a
4/14/2022	NBT-13	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	100	Singing	Low	n/a
4/14/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Foraging	Low	n/a
4/14/2022	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	20	Foraging	Low	n/a
4/14/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	60	Singing	Low	n/a
4/14/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	1	40	Foraging	Low	n/a
4/14/2022	NBT-13	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	30	Foraging	Low	n/a
4/14/2022	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	50	Singing	Low	n/a
4/14/2022	NBT-11	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	2	5	Foraging	Low	n/a
4/14/2022	NBT-11	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	80	Calling	Low	n/a
4/14/2022	NBT-11	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	60	Foraging	Low	n/a
4/14/2022	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	100	Singing	Low	n/a
4/14/2022	NBT-11	American crow	<i>Corvus brachyrhynchos</i>	Landbirds	1	400	Calling	Low	n/a
4/14/2022	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	50	Calling	Low	n/a
4/14/2022	NBT-11	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	15	Foraging	Low	n/a
4/14/2022	NBT-11	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	100	Singing	Low	n/a
4/14/2022	NBT-11	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	2	Foraging	Low	n/a
4/14/2022	NBT-11	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	40	Singing	Low	n/a
4/14/2022	NBT-11	turkey vulture	<i>Cathartes aura</i>	Raptors	1	n/a	Flyover	Medium	east
4/14/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	40	Foraging	Low	n/a
4/14/2022	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	50	Singing	Low	n/a
4/14/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	10	Foraging	Low	n/a
4/14/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Calling	Low	n/a

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
4/14/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	2	Foraging	Low	n/a
4/14/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Foraging	Low	n/a
4/14/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	10	Calling	Low	n/a
4/14/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Calling	Low	n/a
4/15/2022	NBT-6	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Calling	Low	n/a
4/15/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	20	Foraging	Low	n/a
4/15/2022	NBT-6	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	20	Foraging	Low	n/a
4/15/2022	NBT-6	northern flicker	<i>Colaptes auratus</i>	Landbirds	2	30	Foraging	Low	n/a
4/15/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	20	Foraging	Low	n/a
4/15/2022	NBT-6	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Flyover	Low	east
4/15/2022	NBT-6	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	n/a	Flyover	Low	local
4/21/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	40	Singing	Low	n/a
4/21/2022	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	15	Calling	Low	n/a
4/21/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
4/21/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
4/21/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	200	Singing	Low	n/a
4/21/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	n/a	Flyover	Low	north
4/21/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	2	Resting	Low	n/a
4/21/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Resting	Low	n/a
4/21/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	40	Calling	Low	n/a
4/21/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Singing	Low	n/a
4/21/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	40	Singing	Low	n/a
4/21/2022	NBT-12	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	30	Calling	Low	n/a
4/21/2022	NBT-12	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	30	Singing	Low	n/a
4/21/2022	NBT-12	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	150	Singing	Low	n/a
4/21/2022	NBT-12	American crow	<i>Corvus brachyrhynchos</i>	Landbirds	1	n/a	Flyover	Low	southeast
4/21/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	10	Calling	Low	n/a
4/21/2022	NBT-12	unidentified passerine	<i>na</i>	Landbirds	2	25	Foraging	Low	n/a
4/21/2022	NBT-7	common raven	<i>Corvus corax</i>	Landbirds	1	400	Flyover	Low	n/a
4/21/2022	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Calling	Low	n/a
4/21/2022	NBT-7	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	60	Singing	Low	n/a
4/21/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	10	Foraging	Low	n/a
4/21/2022	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Singing	Low	n/a
4/21/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	40	Singing	Low	n/a
4/21/2022	NBT-7	pine grosbeak	<i>Pinicola enucleator</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	n/a	Flyover	Low	n/a
4/21/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Singing	Low	n/a
4/21/2022	NBT-7	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	100	Singing	Low	n/a

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Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
4/21/2022	NBT-7	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	60	Calling	Low	n/a
4/21/2022	NBT-7	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	30	Calling	Low	n/a
4/21/2022	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBT-6	American robin	<i>Turdus migratorius</i>	Landbirds	2	5	Foraging	Low	n/a
4/21/2022	NBT-6	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	30	Calling	Low	n/a
4/21/2022	NBT-6	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Calling	Low	n/a
4/21/2022	NBT-6	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Resting	Low	n/a
4/21/2022	NBT-6	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	n/a	Flyover	Low	n/a
4/21/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	20	Singing	Low	n/a
4/21/2022	NBT-6	unidentified passerine	na	Landbirds	1	10	Flyover	Low	east
4/21/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	n/a	Flyover	Low	northeast
4/21/2022	NBT-6	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	15	Flyover	Low	south
4/21/2022	NBT-6	American robin	<i>Turdus migratorius</i>	Landbirds	1	n/a	Flyover	Low	southwest
4/21/2022	NBT-6	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	30	Calling	Low	n/a
4/21/2022	NBT-6	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	30	Singing	Low	n/a
4/21/2022	NBT-6	American robin	<i>Turdus migratorius</i>	Landbirds	2	5	Foraging	Low	n/a
4/21/2022	NBT-6	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	n/a	Flyover	Low	southwest
4/21/2022	NBT-6	common raven	<i>Corvus corax</i>	Landbirds	1	400	Flyover	Medium	southwest
4/21/2022	NBT-3	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	30	Singing	Low	n/a
4/21/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	1	40	Calling	Low	n/a
4/21/2022	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	n/a	Flyover	Low	east
4/21/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	2	5	Foraging	Low	n/a
4/21/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	2	n/a	Foraging	Low	n/a
4/21/2022	NBT-3	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	2	Foraging	Low	n/a
4/21/2022	NBT-3	common raven	<i>Corvus corax</i>	Landbirds	1	300	Flyover	High	east
4/21/2022	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	n/a	Flyover	Low	northwest
4/21/2022	NBT-3	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	10	Calling	Low	n/a
4/21/2022	NBT-3	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBT-3	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	80	Calling	Low	n/a
4/21/2022	NBT-3	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	40	Singing	Low	n/a
4/21/2022	NBT-3	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	50	Flyover	Medium	west
4/21/2022	NBT-3	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	30	Singing	Low	n/a
4/21/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Calling	Low	n/a
4/21/2022	NBT-11	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	4	n/a	Flyover	Low	west
4/21/2022	NBT-11	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	100	Singing	Low	n/a
4/21/2022	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	n/a	Singing	Low	n/a
4/21/2022	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	60	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
4/21/2022	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	4	60	Calling	Low	n/a
4/21/2022	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	5	Resting	Low	n/a
4/21/2022	NBT-11	American robin	<i>Turdus migratorius</i>	Landbirds	2	n/a	Flyover	Low	east
4/21/2022	NBT-11	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	120	Singing	Low	n/a
4/21/2022	NBT-11	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	n/a	Flyover	Medium	east
4/21/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Calling	Low	n/a
4/21/2022	NBT-10	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	20	Foraging	Low	n/a
4/21/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	5	Calling	Low	n/a
4/21/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Calling	Low	n/a
4/21/2022	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	n/a	Singing	Low	n/a
4/21/2022	NBT-10	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	2	15	Foraging	Low	n/a
4/21/2022	NBT-10	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	30	Flyover	Low	west
4/21/2022	NBT-10	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	100	Calling	Low	n/a
4/21/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Calling	Low	n/a
4/21/2022	NBA	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	30	Singing	Low	n/a
4/21/2022	NBA	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Singing	Low	n/a
4/21/2022	NBA	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	2	30	Singing	Low	n/a
4/21/2022	NBA	American robin	<i>Turdus migratorius</i>	Landbirds	1	100	Singing	Low	n/a
4/21/2022	NBA	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBA	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Singing	Low	n/a
4/21/2022	NBA	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	4	5	Foraging	Low	n/a
4/21/2022	NBA	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	5	Foraging	Low	n/a
4/21/2022	NBA	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	5	Agitated	Low	n/a
4/21/2022	NBA	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	30	Calling	Low	n/a
4/21/2022	NBA	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	120	Singing	Low	n/a
4/21/2022	NBA	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBA	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	5	Singing	Low	n/a
4/21/2022	NBA	American robin	<i>Turdus migratorius</i>	Landbirds	2	10	Flyover	Low	east
4/21/2022	NBA	American robin	<i>Turdus migratorius</i>	Landbirds	1	40	Calling	Low	n/a
4/21/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	200	Singing	Low	n/a
4/21/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	50	Singing	Low	n/a
4/21/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBT-13	common grackle	<i>Quiscalus quiscula</i>	Landbirds	2	100	Flyover	Medium	north
4/21/2022	NBT-13	unidentified passerine	<i>na</i>	Landbirds	1	n/a	Flyover	Medium	east
4/21/2022	NBT-13	unidentified passerine	<i>na</i>	Landbirds	1	n/a	Flyover	Low	west
4/21/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	100	Flyover	Low	north
4/21/2022	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	40	Calling	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
4/21/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	10	Singing	Low	n/a
4/21/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	15	Singing	Low	n/a
4/21/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
4/21/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	60	Singing	Low	n/a
4/21/2022	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Flyover	Low	local
4/21/2022	NBT-13	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	150	Singing	Low	n/a
4/26/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	90	Calling	Low	n/a
4/26/2022	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	20	Singing	Low	n/a
4/26/2022	NBT-10	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a
4/26/2022	NBT-10	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	60	Calling	Low	n/a
4/26/2022	NBT-10	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	20	Singing	Low	n/a
4/26/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	5	Foraging	Low	n/a
4/26/2022	NBT-10	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	60	Calling	Low	n/a
4/26/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	2	20	Foraging	Low	n/a
4/26/2022	NBT-3	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	30	Calling	Low	n/a
4/26/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	3	15	Foraging	Low	n/a
4/26/2022	NBT-3	American goldfinch	<i>Spinus tristis</i>	Landbirds	8	60	Flyover	Medium	south
4/26/2022	NBT-3	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	80	Calling	Low	n/a
4/26/2022	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	120	Calling	Low	n/a
4/26/2022	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	40	Calling	Low	n/a
4/26/2022	NBT-3	common raven	<i>Corvus corax</i>	Landbirds	1	30	Flyover	Low	north
4/26/2022	NBT-11	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	70	Calling	Low	n/a
4/26/2022	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	50	Singing	Low	n/a
4/26/2022	NBT-11	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	1	10	Calling	Low	n/a
4/26/2022	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	10	Singing	Low	n/a
4/26/2022	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	60	Singing	Low	n/a
4/26/2022	NBT-11	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	1	40	Singing	Low	n/a
4/26/2022	NBT-11	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a
4/26/2022	NBT-11	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	15	Calling	Low	n/a
4/26/2022	NBT-11	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	120	Singing	Low	n/a
4/26/2022	NBT-11	cedar waxwing	<i>Bombycilla cedrorum</i>	Landbirds	3	50	Flyover	Medium	southwest
4/26/2022	NBT-11	common grackle	<i>Quiscalus quiscula</i>	Landbirds	2	60	Flyover	Medium	east
4/26/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	30	Singing	Low	n/a
4/26/2022	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Calling	Low	n/a
4/26/2022	NBT-7	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	40	Singing	Low	n/a
4/26/2022	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Singing	Low	n/a
4/26/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	10	Calling	Low	n/a
4/26/2022	NBT-16	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
4/26/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	70	Singing	Low	n/a
4/26/2022	NBT-16	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	30	Singing	Low	n/a
4/26/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Singing	Low	n/a
4/26/2022	NBT-16	eastern phoebe	<i>Sayornis phoebe</i>	Landbirds	1	40	Singing	Low	n/a
4/26/2022	NBT-16	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	50	Calling	Low	n/a
4/26/2022	NBT-16	American robin	<i>Turdus migratorius</i>	Landbirds	1	40	Calling	Low	n/a
4/26/2022	NBT-16	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	100	Calling	Low	n/a
4/26/2022	NBT-16	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	30	Singing	Low	n/a
4/26/2022	NBT-16	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	50	Singing	Low	n/a
4/26/2022	NBT-16	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	60	Singing	Low	n/a
4/26/2022	NBT-16	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	5	Foraging	Low	n/a
4/26/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	3	30	Singing	Low	n/a
4/26/2022	NBT-13	hermit thrush	<i>Catharus guttatus</i>	Landbirds	2	25	Singing	Low	n/a
4/26/2022	NBT-12	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	40	Singing	Low	n/a
4/26/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	60	Singing	Low	n/a
4/26/2022	NBT-12	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	80	Calling	Low	n/a
4/26/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	30	Calling	Low	n/a
4/26/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	3	20	Singing	Low	n/a
4/26/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	2	30	Singing	Low	n/a
4/26/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	40	Singing	Low	n/a
4/26/2022	NBT-12	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	10	Calling	Low	n/a
4/26/2022	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	2	50	Singing	Low	n/a
4/26/2022	NBT-12	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	1	30	Singing	Low	n/a
4/26/2022	NBT-12	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	50	Calling	Low	n/a
4/26/2022	NBT-12	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	55	Singing	Low	n/a
4/26/2022	NBT-12	palm warbler	<i>Setophaga palmarum</i>	Landbirds	2	60	Singing	Low	n/a
4/26/2022	NBT-12	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	20	Singing	Low	n/a
4/26/2022	NBT-12	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	40	Calling	Low	n/a
4/26/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	3	40	Singing	Low	n/a
4/26/2022	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	30	Singing	Low	n/a
4/26/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	1	100	Singing	Low	n/a
4/26/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	20	Singing	Low	n/a
4/26/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	80	Calling	Low	n/a
4/26/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Calling	Low	n/a
4/26/2022	NBT-13	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	1	>100	Singing	Low	n/a
4/26/2022	NBT-13	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	80	Singing	Low	n/a
4/26/2022	NBT-13	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	90	Singing	Low	n/a
4/26/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	30	Calling	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
4/26/2022	NBT-13	swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	2	40	Singing	Low	n/a
4/26/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	3	20	Singing	Low	n/a
4/26/2022	NBT-13	hermit thrush	<i>Catharus guttatus</i>	Landbirds	3	50	Singing	Low	n/a
4/26/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	2	80	Singing	Low	n/a
4/26/2022	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	10	Calling	Low	n/a
5/3/2022	NBT-16	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	1	15	Calling	Low	n/a
5/3/2022	NBT-16	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	40	Singing	Low	n/a
5/3/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-16	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	1	20	Calling	Low	n/a
5/3/2022	NBT-16	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	1	5	Foraging	Low	n/a
5/3/2022	NBT-16	American robin	<i>Turdus migratorius</i>	Landbirds	1	2	Foraging	Low	n/a
5/3/2022	NBT-16	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	5	Foraging	Low	n/a
5/3/2022	NBT-16	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	150	Calling	Low	n/a
5/3/2022	NBT-16	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-16	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	40	Singing	Low	n/a
5/3/2022	NBT-16	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	40	Calling	Low	n/a
5/3/2022	NBT-16	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	n/a
5/3/2022	NBT-16	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	15	Foraging	Low	n/a
5/3/2022	NBT-16	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-16	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	60	Flyover	Low	local
5/3/2022	NBT-6	northern goshawk	<i>Accipiter gentilis</i>	Raptors	1	n/a	Flyover	Low	northwest
5/3/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	30	Singing	Low	n/a
5/3/2022	NBT-6	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	2	15	Calling	Low	n/a
5/3/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Calling	Low	n/a
5/3/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	30	Singing	Low	n/a
5/3/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	2	60	Singing	Low	n/a
5/3/2022	NBT-6	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-6	American robin	<i>Turdus migratorius</i>	Landbirds	1	90	Calling	Low	n/a
5/3/2022	NBT-6	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	70	Foraging	Low	n/a
5/3/2022	NBT-6	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Calling	Low	n/a
5/3/2022	NBT-6	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	70	Singing	Low	n/a
5/3/2022	NBT-6	purple finch	<i>Haemorhous purpureus</i>	Landbirds	2	n/a	Flyover	Low	southwest
5/3/2022	NBT-6	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	30	Flyover	Low	local
5/3/2022	NBT-6	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-6	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	1	30	Calling	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/3/2022	NBT-10	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-10	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	50	Calling	Low	n/a
5/3/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Foraging	Low	n/a
5/3/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	10	Foraging	Low	n/a
5/3/2022	NBT-10	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	5	Foraging	Low	n/a
5/3/2022	NBT-10	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	40	Singing	Low	n/a
5/3/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Calling	Low	n/a
5/3/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Calling	Low	n/a
5/3/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Calling	Low	n/a
5/3/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	5	Calling	Low	n/a
5/3/2022	NBT-10	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-10	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	50	Singing	Low	n/a
5/3/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	5	Foraging	Low	n/a
5/3/2022	NBT-3	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	40	Singing	Low	n/a
5/3/2022	NBT-3	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	40	Singing	Low	n/a
5/3/2022	NBT-3	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	50	Calling	Low	n/a
5/3/2022	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	100	Singing	Low	n/a
5/3/2022	NBT-3	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	60	Singing	Low	n/a
5/3/2022	NBT-3	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	100	Singing	Low	n/a
5/3/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	2	n/a	Foraging	Low	n/a
5/3/2022	NBT-3	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-3	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	1	120	Singing	Low	n/a
5/3/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	1	90	Calling	Low	n/a
5/3/2022	NBT-3	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-3	common raven	<i>Corvus corax</i>	Landbirds	7	100	Flyover	Medium	northwest
5/3/2022	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	n/a	Flyover	Medium	southwest
5/3/2022	NBT-3	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	30	Singing	Low	n/a
5/3/2022	NBT-3	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-3	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	150	Calling	Low	n/a
5/3/2022	NBT-3	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	60	Flyover	Medium	local
5/3/2022	NBT-11	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	30	Calling	Low	n/a
5/3/2022	NBT-11	red crossbill	<i>Loxia curvirostra</i>	Landbirds	1	n/a	Flyover	Medium	northwest
5/3/2022	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	40	Calling	Low	n/a
5/3/2022	NBT-11	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	5	Foraging	Low	n/a
5/3/2022	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-11	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	n/a	Flyover	Low	southeast

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/3/2022	NBT-11	blue jay	<i>Cyanocitta cristata</i>	Landbirds	4	n/a	Flyover	Low	northwest
5/3/2022	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	70	Foraging	Low	n/a
5/3/2022	NBT-11	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-11	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-11	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	100	Singing	Low	n/a
5/3/2022	NBT-11	downy woodpecker	<i>Dryobates pubescens</i>	Landbirds	1	30	Singing	Low	n/a
5/3/2022	NBT-11	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	40	Singing	Low	n/a
5/3/2022	NBT-11	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	n/a	Flyover	Medium	n/a
5/3/2022	NBT-7	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	40	Singing	Low	n/a
5/3/2022	NBT-7	common raven	<i>Corvus corax</i>	Landbirds	1	200	Flyover	Low	n/a
5/3/2022	NBT-7	evening grosbeak	<i>Coccothraustes vespertinus</i>	Landbirds	1	80	Flyover	Medium	n/a
5/3/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	30	Calling	Low	n/a
5/3/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	10	Singing	Low	n/a
5/3/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	30	Calling	Low	n/a
5/3/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	10	Singing	Low	n/a
5/3/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	5	Calling	Low	n/a
5/3/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Foraging	Low	n/a
5/3/2022	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	90	Singing	Low	n/a
5/3/2022	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Calling	Low	n/a
5/3/2022	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	1	40	Calling	Low	n/a
5/3/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	40	Singing	Low	n/a
5/3/2022	NBT-7	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	40	Flyover	Medium	n/a
5/3/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	5	Calling	Low	n/a
5/3/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	40	Singing	Low	n/a
5/3/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	50	Singing	Low	n/a
5/3/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-13	swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	1	30	Singing	Low	n/a
5/3/2022	NBT-13	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Calling	Low	n/a
5/3/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	60	Flyover	Low	north
5/3/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	70	Singing	Low	n/a
5/3/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	15	Foraging	Low	n/a
5/3/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	150	Resting	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/3/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	n/a	Flyover	Low	northeast
5/3/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	n/a	Flyover	Low	southeast
5/3/2022	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	2	10	Foraging	Low	n/a
5/3/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	30	Singing	Low	n/a
5/3/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	100	Singing	Low	n/a
5/3/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	90	Singing	Low	n/a
5/3/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	70	Singing	Low	n/a
5/3/2022	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	5	Singing	Low	n/a
5/3/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Calling	Low	n/a
5/3/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/3/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-12	purple finch	<i>Haemorhous purpureus</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-12	Canada goose	<i>Branta canadensis</i>	Waterfowl	2	150	Flyover	Low	n/a
5/3/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	20	Singing	Low	n/a
5/3/2022	NBT-12	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	30	Singing	Low	n/a
5/3/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	2	Foraging	Low	n/a
5/3/2022	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	100	Singing	Low	n/a
5/3/2022	NBT-12	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	1	100	Singing	Low	n/a
5/3/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-12	Canada goose	<i>Branta canadensis</i>	Waterfowl	50	n/a	Flyover	Low	north
5/3/2022	NBT-12	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	30	Calling	Low	n/a
5/3/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	60	Calling	Low	n/a
5/3/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/3/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	15	Foraging	Low	n/a
5/3/2022	NBT-12	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	150	Singing	Low	n/a
5/3/2022	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	2	120	Singing	Low	n/a
5/3/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	2	Foraging	Low	n/a
5/3/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-7	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-7	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-7	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	90	Singing	Low	n/a
5/18/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	50	Calling	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/18/2022	NBT-7	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	2	n/a	Foraging	Low	n/a
5/18/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	5	Calling	Low	n/a
5/18/2022	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-7	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	5	Foraging	Low	n/a
5/18/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	n/a	Foraging	Low	n/a
5/18/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	5	Foraging	Low	n/a
5/18/2022	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	10	Foraging	Low	n/a
5/18/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-7	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	120	Singing	Low	n/a
5/18/2022	NBT-7	common raven	<i>Corvus corax</i>	Landbirds	1	200	Calling	Low	n/a
5/18/2022	NBT-7	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-7	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	10	Foraging	Low	n/a
5/18/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	n/a	Flyover	Low	northeast
5/18/2022	NBT-10	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	10	Foraging	Low	n/a
5/18/2022	NBT-10	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	5	Foraging	Low	n/a
5/18/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Foraging	Low	n/a
5/18/2022	NBT-10	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-10	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-10	least flycatcher	<i>Empidonax minimus</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-10	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-10	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-10	northern waterthrush	<i>Parkesia noveboracensis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-10	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-10	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	10	Foraging	Low	n/a
5/18/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	20	Calling	Low	n/a
5/18/2022	NBT-11	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	10	Calling	Low	n/a
5/18/2022	NBT-11	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-11	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-11	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-11	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-11	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-11	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-11	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	50	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/18/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-11	Swainson's thrush	<i>Catharus ustulatus</i>	Landbirds	1	10	Foraging	Low	n/a
5/18/2022	NBT-11	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-11	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	2	40	Foraging	Low	n/a
5/18/2022	NBT-11	Swainson's thrush	<i>Catharus ustulatus</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-3	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Foraging	Low	n/a
5/18/2022	NBT-3	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-3	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-3	brown creeper	<i>Certhia americana</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-3	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-3	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-3	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-3	least flycatcher	<i>Empidonax minimus</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-3	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-3	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-3	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	10	Flyover	Low	local
5/18/2022	NBT-3	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	10	Calling	Low	n/a
5/18/2022	NBT-3	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-3	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	10	Calling	Low	n/a
5/18/2022	NBT-13	Canada jay	<i>Perisoreus canadensis</i>	Landbirds	2	30	Foraging	Low	n/a
5/18/2022	NBT-13	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-13	Lincoln's sparrow	<i>Melospiza lincolni</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-13	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	150	Singing	Low	n/a
5/18/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Calling	Low	n/a
5/18/2022	NBT-13	Lincoln's sparrow	<i>Melospiza lincolni</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-13	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	2	20	Calling	Low	n/a
5/18/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	30	Flyover	Low	local

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/18/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Agitated	Low	n/a
5/18/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	15	Calling	Low	n/a
5/18/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	25	Singing	Low	n/a
5/18/2022	NBT-13	alder flycatcher	<i>Empidonax alnorum</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-13	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-13	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Foraging	Low	n/a
5/18/2022	NBT-13	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	10	Singing	Low	n/a
5/18/2022	NBT-13	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-13	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-13	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-13	hermit thrush	<i>Catharus guttatus</i>	Landbirds	2	30	Singing	Low	n/a
5/18/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-12	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-12	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	150	Singing	Low	n/a
5/18/2022	NBT-12	belted kingfisher	<i>Megasceryle alcyon</i>	Landbirds	1	n/a	Flyover	Low	n/a
5/18/2022	NBT-12	common raven	<i>Corvus corax</i>	Landbirds	1	200	Flyover	Low	n/a
5/18/2022	NBT-12	northern waterthrush	<i>Parkesia noveboracensis</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-12	blue jay	<i>Cyanocitta cristata</i>	Landbirds	3	80	Calling	Low	n/a
5/18/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-12	swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-12	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	50	Calling	Low	n/a
5/18/2022	NBT-12	pileated woodpecker	<i>Dryocopus pileatus</i>	Landbirds	1	200	Singing	Low	n/a
5/18/2022	NBT-12	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	1	150	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/18/2022	NBT-12	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-12	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-12	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	10	Singing	Low	n/a
5/18/2022	NBT-12	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	15	Calling	Low	n/a
5/18/2022	NBT-12	barred owl	<i>Strix varia</i>	Owls	1	300	Singing	Low	n/a
5/18/2022	NBT-12	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-12	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	60	Calling	Low	n/a
5/18/2022	NBT-16	northern waterthrush	<i>Parkesia noveboracensis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	120	Singing	Low	n/a
5/18/2022	NBT-16	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	10	Singing	Low	n/a
5/18/2022	NBT-16	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-16	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-16	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-16	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-16	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	120	Singing	Low	n/a
5/18/2022	NBT-16	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-16	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-16	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-16	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-16	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	200	Singing	Low	n/a
5/18/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-16	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-16	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-16	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-16	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-16	American robin	<i>Turdus migratorius</i>	Landbirds	1	90	Calling	Low	n/a
5/18/2022	NBT-16	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	100	Calling	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/18/2022	NBT-16	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	60	Calling	Low	n/a
5/18/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	90	Singing	Low	n/a
5/18/2022	NBT-16	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	200	Singing	Low	n/a
5/18/2022	NBT-16	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	40	Calling	Low	n/a
5/18/2022	NBT-16	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-17	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-17	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-17	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-17	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	15	Calling	Low	n/a
5/18/2022	NBT-17	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	15	Singing	Low	n/a
5/18/2022	NBT-17	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	10	Calling	Low	n/a
5/18/2022	NBT-17	American robin	<i>Turdus migratorius</i>	Landbirds	1	n/a	Flyover	Low	northwest
5/18/2022	NBT-17	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	50	Singing	Low	n/a
5/18/2022	NBT-17	American robin	<i>Turdus migratorius</i>	Landbirds	1	10	Flyover	Low	east
5/18/2022	NBT-17	northern waterthrush	<i>Parkesia noveboracensis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-17	barred owl	<i>Strix varia</i>	Owls	1	100	Singing	Low	n/a
5/18/2022	NBT-17	cape may warbler	<i>Setophaga tigrina</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-17	unidentified passerine	na	Landbirds	1	n/a	Flyover	Low	northwest
5/18/2022	NBT-17	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	30	Calling	Low	n/a
5/18/2022	NBT-17	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-17	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	30	Singing	Low	n/a
5/18/2022	NBT-17	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-17	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	20	Singing	Low	n/a
5/18/2022	NBT-17	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	80	Singing	Low	n/a
5/18/2022	NBT-17	American robin	<i>Turdus migratorius</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-17	unidentified passerine	na	Landbirds	1	n/a	Flyover	Low	southwest
5/18/2022	NBT-17	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	40	Singing	Low	n/a
5/18/2022	NBT-17	northern waterthrush	<i>Parkesia noveboracensis</i>	Landbirds	1	120	Singing	Low	n/a
5/18/2022	NBT-17	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	n/a
5/18/2022	NBT-17	American goldfinch	<i>Spinus tristis</i>	Landbirds	1	20	Calling	Low	n/a
5/18/2022	NBT-17	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	60	Singing	Low	n/a
5/18/2022	NBT-17	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-17	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	10	Calling	Low	n/a
5/18/2022	NBT-17	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	3	20	Calling	Low	n/a
5/18/2022	NBT-17	American robin	<i>Turdus migratorius</i>	Landbirds	2	n/a	Flyover	Low	northwest
5/18/2022	NBT-17	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	70	Singing	Low	n/a
5/18/2022	NBT-17	unidentified passerine	na	Landbirds	1	n/a	Flyover	Low	southeast
5/30/2022	NBT-16	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	20	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/30/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	5	Singing	Low	n/a
5/30/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	5	Calling	Low	n/a
5/30/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-16	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	3	5	Foraging	Low	n/a
5/30/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	5	Foraging	Low	n/a
5/30/2022	NBT-16	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-16	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	2	5	Foraging	Low	n/a
5/30/2022	NBT-16	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	n/a	Flyover	Low	north
5/30/2022	NBT-16	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-16	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-16	unidentified passerine	na	Landbirds	1	10	Calling	Low	n/a
5/30/2022	NBT-16	alder flycatcher	<i>Empidonax alnorum</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-16	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-16	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-16	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-16	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-16	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	15	Singing	Low	n/a
5/30/2022	NBT-16	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	60	Calling	Low	n/a
5/30/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-16	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-16	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-16	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-16	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-17	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-17	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	10	Singing	Low	n/a
5/30/2022	NBT-17	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-17	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-17	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-17	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-17	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	2	5	Foraging	Low	n/a
5/30/2022	NBT-17	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	20	Foraging	Low	n/a
5/30/2022	NBT-17	pine grosbeak	<i>Pinicola enucleator</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-17	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	2	20	Foraging	Low	n/a
5/30/2022	NBT-17	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	15	Singing	Low	n/a
5/30/2022	NBT-17	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	50	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/30/2022	NBT-17	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	5	Foraging	Low	n/a
5/30/2022	NBT-17	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-17	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-17	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-17	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-17	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-17	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-17	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-17	bay-breasted warbler	<i>Setophaga castanea</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-17	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-17	American robin	<i>Turdus migratorius</i>	Landbirds	1	40	Calling	Low	n/a
5/30/2022	NBT-12	ruby-throated hummingbird	<i>Archilochus colubris</i>	Landbirds	1	5	Foraging	Low	n/a
5/30/2022	NBT-12	common raven	<i>Corvus corax</i>	Landbirds	1	120	Flyover	Medium	northeast
5/30/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-12	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-12	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-12	mourning warbler	<i>Geothlypis philadelphia</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-12	olive-sided flycatcher	<i>Contopus cooperi</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-12	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	5	Singing	Low	n/a
5/30/2022	NBT-12	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-12	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-12	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-12	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	20	Foraging	Low	n/a
5/30/2022	NBT-12	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-12	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	5	Calling	Low	n/a
5/30/2022	NBT-12	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-12	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-12	American robin	<i>Turdus migratorius</i>	Landbirds	1	15	Calling	Low	n/a
5/30/2022	NBT-12	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-12	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-12	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-13	alder flycatcher	<i>Empidonax alnorum</i>	Landbirds	1	20	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/30/2022	NBT-13	alder flycatcher	<i>Empidonax alnorum</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-13	Canada warbler	<i>Cardellina canadensis</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-13	yellow-rumped warbler	<i>Setophaga coronata</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	10	Foraging	Low	n/a
5/30/2022	NBT-13	black-backed woodpecker	<i>Picoides arcticus</i>	Landbirds	1	10	Foraging	Low	n/a
5/30/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	15	Calling	Low	n/a
5/30/2022	NBT-13	Lincoln's sparrow	<i>Melospiza lincolni</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-13	swamp sparrow	<i>Melospiza georgiana</i>	Landbirds	1	10	Foraging	Low	n/a
5/30/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	70	Singing	Low	n/a
5/30/2022	NBT-13	ruby-throated hummingbird	<i>Archilochus colubris</i>	Landbirds	1	n/a	Foraging	Low	n/a
5/30/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-13	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-13	alder flycatcher	<i>Empidonax alnorum</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-13	yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	Landbirds	1	70	Singing	Low	n/a
5/30/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-13	American goldfinch	<i>Spinus tristis</i>	Landbirds	2	n/a	Flyover	Low	northeast
5/30/2022	NBT-13	Canada warbler	<i>Cardellina canadensis</i>	Landbirds	1	70	Singing	Low	n/a
5/30/2022	NBT-13	alder flycatcher	<i>Empidonax alnorum</i>	Landbirds	1	40	Calling	Low	n/a
5/30/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-13	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-13	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-13	boreal chickadee	<i>Poecile hudsonicus</i>	Landbirds	1	40	Calling	Low	n/a
5/30/2022	NBT-13	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-13	palm warbler	<i>Setophaga palmarum</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-13	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	3	5	Foraging	Low	n/a
5/30/2022	NBT-13	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-13	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	20	Foraging	Low	n/a
5/30/2022	NBT-13	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-13	song sparrow	<i>Melospiza melodia</i>	Landbirds	1	15	Agitated	Low	n/a
5/30/2022	NBT-13	alder flycatcher	<i>Empidonax alnorum</i>	Landbirds	1	10	Calling	Low	n/a
5/30/2022	NBT-13	Canada warbler	<i>Cardellina canadensis</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-13	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	30	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/30/2022	NBT-13	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-13	mourning warbler	<i>Geothlypis philadelphia</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-13	barred owl	<i>Strix varia</i>	Owls	1	500	Singing	Low	n/a
5/30/2022	NBT-13	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-13	blue jay	<i>Cyanocitta cristata</i>	Landbirds	1	80	Calling	Low	n/a
5/30/2022	NBT-13	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-13	ruby-crowned kinglet	<i>Regulus calendula</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-11	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	60		Low	n/a
5/30/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-11	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Calling	Low	n/a
5/30/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	30	Calling	Low	n/a
5/30/2022	NBT-11	American robin	<i>Turdus migratorius</i>	Landbirds	1	90	Singing	Low	n/a
5/30/2022	NBT-11	American robin	<i>Turdus migratorius</i>	Landbirds	1	5	Foraging	Low	n/a
5/30/2022	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	15	Foraging	Low	n/a
5/30/2022	NBT-11	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-11	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-11	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-11	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	2	5	Foraging	Low	n/a
5/30/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	5	Singing	Low	n/a
5/30/2022	NBT-11	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-11	American robin	<i>Turdus migratorius</i>	Landbirds	1	10	Flyover	Low	northeast
5/30/2022	NBT-11	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-7	Swainson's thrush	<i>Catharus ustulatus</i>	Landbirds	1	40	Calling	Low	n/a
5/30/2022	NBT-7	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-7	winter wren	<i>Troglodytes hiemalis</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Calling	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/30/2022	NBT-7	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-7	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	25	Singing	Low	n/a
5/30/2022	NBT-7	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-7	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-7	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-7	golden-crowned kinglet	<i>Regulus satrapa</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-7	yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	Landbirds	1	30	Calling	Low	n/a
5/30/2022	NBT-7	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	2	Resting	Low	n/a
5/30/2022	NBT-7	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	5	Flyover	Low	local
5/30/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	5	Foraging	Low	n/a
5/30/2022	NBT-7	American robin	<i>Turdus migratorius</i>	Landbirds	1	30	Calling	Low	n/a
5/30/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	70	Singing	Low	n/a
5/30/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-7	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	5	Singing	Low	n/a
5/30/2022	NBT-7	northern flicker	<i>Colaptes auratus</i>	Landbirds	1	90	Calling	Low	n/a
5/30/2022	NBT-7	blue-headed vireo	<i>Vireo solitarius</i>	Landbirds	1	5	Singing	Low	n/a
5/30/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	90	Singing	Low	n/a
5/30/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	70	Singing	Low	n/a
5/30/2022	NBT-7	ruffed grouse	<i>Bonasa umbellus</i>	Gamebirds	2	10	Foraging	Low	n/a
5/30/2022	NBT-7	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-7	black-capped chickadee	<i>Poecile atricapillus</i>	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-7	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-7	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-7	Canada warbler	<i>Cardellina canadensis</i>	Landbirds	1	70	Singing	Low	n/a
5/30/2022	NBT-7	common yellowthroat	<i>Geothlypis trichas</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-7	yellow-bellied flycatcher	<i>Empidonax flaviventris</i>	Landbirds	1	30	Calling	Low	n/a
5/30/2022	NBT-7	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	5	Singing	Low	n/a
5/30/2022	NBT-7	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-10	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-10	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-10	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-10	mourning warbler	<i>Geothlypis philadelphia</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-10	least flycatcher	<i>Empidonax minimus</i>	Landbirds	1	15	Calling	Low	n/a
5/30/2022	NBT-10	hermit thrush	<i>Catharus guttatus</i>	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-10	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	90	Singing	Low	n/a
5/30/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-10	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	10	Singing	Low	n/a

Table A.1 Migratory Bird Survey Data

Survey Date	Transect ID	Common Name	Scientific Name	Bird Group	Number Observed	Distance (m)	Behaviour	Height	Direction of Travel
5/30/2022	NBT-10	least flycatcher	<i>Empidonax minimus</i>	Landbirds	1	10	Calling	Low	n/a
5/30/2022	NBT-10	American robin	<i>Turdus migratorius</i>	Landbirds	1	60	Calling	Low	n/a
5/30/2022	NBT-10	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	70	Singing	Low	n/a
5/30/2022	NBT-10	least flycatcher	<i>Empidonax minimus</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-10	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-10	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-10	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-10	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	15	Singing	Low	n/a
5/30/2022	NBT-10	black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	1	10	Singing	Low	n/a
5/30/2022	NBT-10	black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	1	n/a	Flyover	Low	northeast
5/30/2022	NBT-10	mourning warbler	<i>Geothlypis philadelphia</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-10	dark-eyed junco	<i>Junco hyemalis</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-10	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-10	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-10	red-eyed vireo	<i>Vireo olivaceus</i>	Landbirds	1	80	Singing	Low	n/a
5/30/2022	NBT-10	black-throated blue warbler	<i>Setophaga caerulescens</i>	Landbirds	1	50	Singing	Low	n/a
5/30/2022	NBT-10	unidentified passerine	na	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-10	hairy woodpecker	<i>Dryobates villosus</i>	Landbirds	1	100	Singing	Low	n/a
5/30/2022	NBT-10	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	30	Flyover	Low	local
5/30/2022	NBT-10	red-breasted nuthatch	<i>Sitta canadensis</i>	Landbirds	1	20	Flyover	Low	local
5/30/2022	NBT-3	black-throated green warbler	<i>Setophaga virens</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-3	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	40	Singing	Low	n/a
5/30/2022	NBT-3	Philadelphia vireo	<i>Vireo philadelphicus</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	1	80	Calling	Low	n/a
5/30/2022	NBT-3	unidentified passerine	na	Landbirds	1	n/a	Flyover	Low	west
5/30/2022	NBT-3	Swainson's thrush	<i>Catharus ustulatus</i>	Landbirds	1	40	Calling	Low	n/a
5/30/2022	NBT-3	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-3	American redstart	<i>Setophaga ruticilla</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-3	unidentified passerine	na	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	1	10	Calling	Low	n/a
5/30/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	70	Singing	Low	n/a
5/30/2022	NBT-3	black-and-white warbler	<i>Mniotilta varia</i>	Landbirds	1	15	Singing	Low	n/a
5/30/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	20	Singing	Low	n/a
5/30/2022	NBT-3	American robin	<i>Turdus migratorius</i>	Landbirds	1	60	Singing	Low	n/a
5/30/2022	NBT-3	white-throated sparrow	<i>Zonotrichia albicollis</i>	Landbirds	1	20	Calling	Low	n/a
5/30/2022	NBT-3	ovenbird	<i>Seiurus aurocapilla</i>	Landbirds	1	30	Singing	Low	n/a
5/30/2022	NBT-3	magnolia warbler	<i>Setophaga magnolia</i>	Landbirds	1	40	Singing	Low	n/a

APPENDIX R
STANTEC NOCTURNAL MIGRATION RADAR AND
AVIAN ACOUSTIC SURVEY



**Nocturnal Migration Radar and
Avian Acoustic Survey for
Proposed Wind Site Near Nuttby,
Nova Scotia**

May 18, 2023

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NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

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Wayne Tucker



**NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE
NEAR NUTTBY, NOVA SCOTIA**

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1.0 INTRODUCTION

1.1 PROJECT BACKGROUND

Nova Scotia Power Incorporated (NSPI) is the Proponent for the proposed Nuttby Ridge Wind Project, near Nuttby, which is approximately 22 km northeast of Truro, Nova Scotia (the Project). The Project consists of the construction and operation of approximately 16 to 23 wind turbines, in the range of 4 to 6 MW, for a total project capacity of up to 98 MW.

The Nova Scotia Policy Division, Environmental Assessment Branch recommends that avian assessments apply standard protocols for bird monitoring specified for a given “Category” of project (NSPD 2021). Project categories are defined by Environment and Climate Change Canada (ECCC) and the Canadian Wildlife Service (CWS) (Environment Canada 2007). Updated guidance (Environment Canada 2018, 2022) indicate that any project with proposed wind turbines with heights greater than 150 meters are categorized as having Very High site sensitivity, which automatically classifies a project with turbines of this height as Category 4. According to Environment Canada guidance documents dated 2007, 2018, and 2022, Category 4 projects are strongly encouraged to conduct a nighttime radar survey of bird migration activity. As currently planned, the Project meets Category 4 categorization and requires nocturnal radar surveys. CWS guidance documents also recommend that avian migration acoustic surveys be conducted to supplement radar surveys.

To satisfy recommendations from the Nova Scotia Department of Natural Resources and Renewables (NS DNRR) and Environment Canada, Nova Scotia Power retained Stantec Consulting Services Inc. (Stantec) to undertake nocturnal radar and avian acoustic surveys during spring and fall 2022 migration. Surveys were designed to document the abundance, flight patterns, and flight altitudes of nocturnally migrating birds for the Project and to provide insight into the species migrating over the Project on nights when radar sampling occurred.

1.2 PROJECT BOUNDARY DESCRIPTION

The Project Boundary consists of one large irregularly shaped area that includes the existing Nuttby Mountain Wind Farm, and two small, disconnected areas (Figure 1). Together these areas total approximately 80 hectares (ha). The Project Boundary has changed multiple times since 2021, and all iterations are included on Figure 1.1.

The Project Boundary is located approximately 22 km northeast of Truro, Nova Scotia, and is situated in the Uplands Ecoregion of Nova Scotia. Most of the Project Boundary lies within the Cobequid Hills Ecodistrict, with southern parts of the Project Boundary within the Cobequid Slopes Ecodistrict.

The Uplands Ecoregion of Nova Scotia is characterized by a geographically complex band of rounded summits and plateaus separated by lower elevation uplands and lowlands that extend across northern mainland Nova Scotia (NS DNRR 2017). This ecoregion experiences more severe winters, greater precipitation, and shorter growing seasons than surrounding ecoregions, which has given rise to the



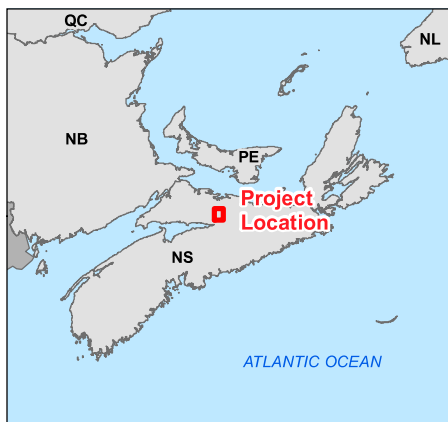
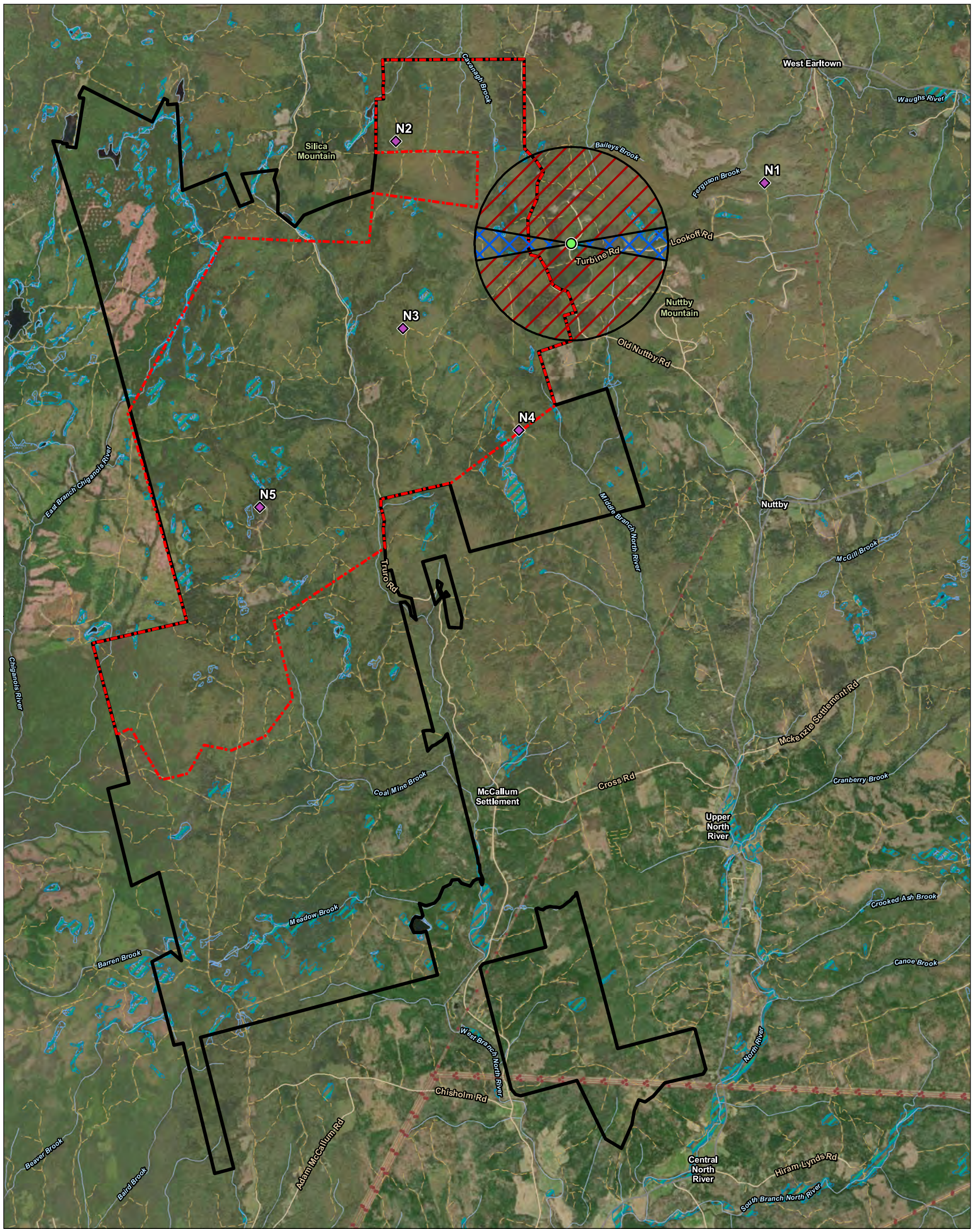
NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

dominant Acadian hardwood forest of sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*).

Most of the Project Boundary is within the Cobequid Hills Ecodistrict, which is a narrow upland extending approximately 150 km in an east-west direction between the towns of Pictou and Parrsboro. This Ecodistrict is characterized by large intact late-successional Acadian shade tolerant hardwood forests. Representative species include sugar maple, American beech, and yellow birch, with white ash (*Fraxinus americana*) and ironwood (*Ostrya virginiana*) on richer soils. At upper elevations, the hills give way to a level or hummocky plateau-like topography with forests of red spruce (*Picea rubens*) and black spruce (*P. mariana*) occurring on moderately-well to imperfectly drained soils.

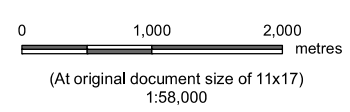
Southern portions of the Project Boundary lie within the Cobequid Slopes Ecodistrict. This Ecodistrict is characterized by a series of steep to moderate grades on the south side of the Cobequid Mountains. The climate is moderate and relatively humid. Red spruce forests occur on the middle to lower slopes of rounded hills. Sugar maple, yellow birch, and American beech are dominant on slopes or crests where soils are rich. Elsewhere, a shade tolerant mixedwood forest exists, usually dominated by red spruce, eastern hemlock (*Tsuga canadensis*), and yellow birch with occasional sugar maple, American beech, and white pine (*Pinus strobus*).





Notes
 1. Coordinate System: NAD 1983 CSRS UTM Zone 20N
 2. Data Sources: Government of NS, Client, Stantec
 3. Background: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

- ◆ Avian ARU Location
- Radar Location
- ▨ Horizontal Radar Detection
- ▩ Vertical Radar Sweep
- ▭ Project Boundary, February 2023
- ▭ Assessment Area, February 2023
- Collector Road
- Local Road
- Resource Road / Trail
- Transmission Line
- Watercourse
- ▨ Wetland (NSE)
- ▨ Wetland (NHN)
- Waterbody



Project Location: Nuttby Mountain, Nova Scotia
 Client/Project: Nova Scotia Power Inc., NSPI Wind EA Support Services
 Prepared on 2023-03-06
 121417191_025a

Figure No. 1.1

Radar and Avian ARU Survey Locations: Nuttby Project Boundary

2.0 METHODS

2.1 NOCTURNAL RADAR SURVEY

X-band marine surveillance radar, similar to that described by Cooper et al. (1991), was used for data collection. The radar unit was deployed near Turbine 9 at the existing Nuttby Mountain Wind Farm, at an elevation approximately 340 meters (m) above sea level (Photo 2.1).



Photo 2.1 Radar Installment for the for proposed Wind Site near Nuttby, Nova Scotia



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

The radar has a peak power output of 12 kilowatts (kW) and tracks small animals, including birds, bats, and even insects, based on settings selected for the radar functions. Insects are identifiable based on flight speed. However, radar cannot readily distinguish between different types of animals that are detected flying faster than an insect and therefore cannot reliably or consistently differentiate among avian species, or birds from bats. Consequently, animals observed on the radar screen (not including insects) are identified as 'targets'. The targets tracked by the radar are likely birds migrating at night or bats migrating and feeding throughout the night.

The radar has an 'echo trail' function that captures past echoes of flight trails, enabling determination of flight speed and direction. During operation, the radar's echo trail was set to 30 seconds. If these flight trails were sufficiently erratic, indicative of the flight pattern of a bat during feeding behavior, such targets were classified as a potential bat.

Objects on the ground detected by the radar cause returns on the radar screen (echoes) that appear as blotches known as ground clutter. Large amounts of ground clutter reduce the ability of the radar to track birds and bats flying over those areas. The radar was equipped with a two m waveguide antenna, deployed approximately five m above ground to improve the amount of airspace sampled and to reduce ground clutter interference. The antenna has a vertical beam width of 20° (10° above and below horizontal) and was operated with a horizontal range of 1.4 km to improve detection of small targets (Figure 2.1). When radar is operated at greater ranges, larger birds are detected but the echoes of small birds are reduced in size and restricted to a smaller portion of the radar screen, thus limiting the ability to observe the movement pattern of individual targets.

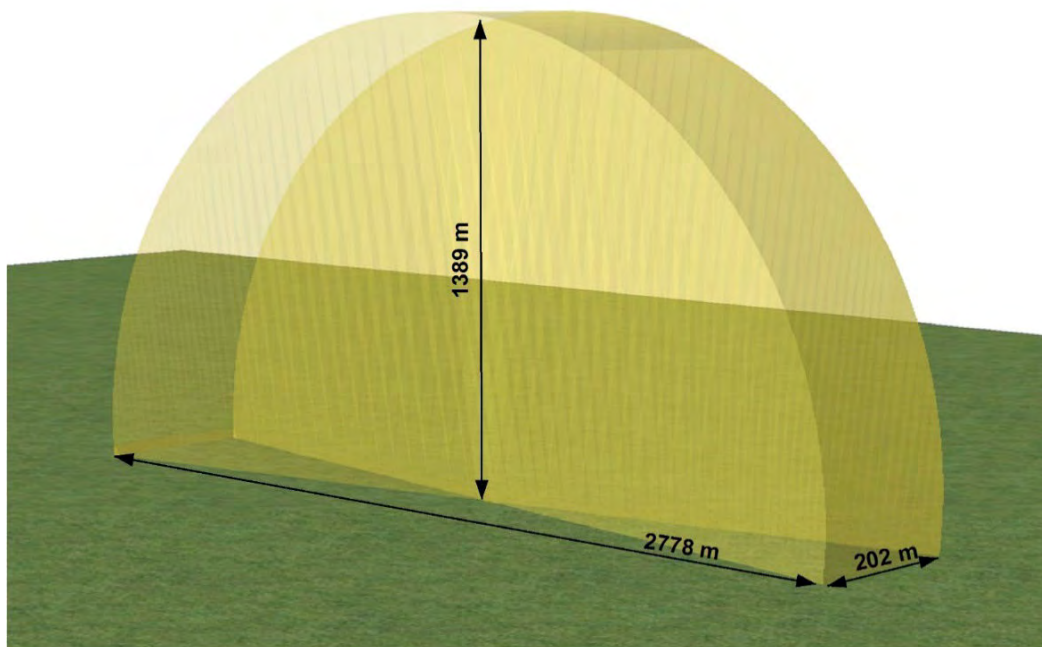


Figure 2.1 Detection Range of the Radar in Vertical Mode



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

Survey nights were selected based on weather forecast predictions. Because the anti-rain function of the radar must be turned down to detect small birds and bats, surveys could not be undertaken during active rainfall. Nights expected to be optimal for radar migration surveys (nights with no precipitation) were targeted for survey. Conversely, nights with intermittent precipitation, strong winds, and/or unusually high or low temperatures were sampled at a lower frequency than optimal nights.

The radar operated continuously during nighttime hours (sunset to sunrise) on survey nights, between mid-April and late May for spring migration, and between mid-August and late-October for fall migration. The radar was operated in two modes (surveillance [horizontal] mode and vertical mode) throughout each night in the spring and fall. In surveillance mode (horizontal mode), the antenna spins horizontally to survey the airspace around the radar and detects the number of targets and their flight direction as they pass through the radar's detection area. By analyzing the echo trail for each target, flight direction and flight speed was determined. In vertical mode, the radar unit is tilted 90° to vertically survey the airspace above the radar (Harmata et al. 1999). In vertical mode, target echoes do not provide direction or speed data but do provide information on the altitude of targets passing through the vertical radar beam. The radar operated in both modes (surveillance [horizontal] and vertical mode) during each survey hour, resulting in 30 minutes each of horizontal and vertical data collection. Videos produced by the radar were recorded and archived for subsequent analysis. Although the radar records three-dimensional space, it is translated by the radar screen into a two-dimensional representation. For this reason, ground clutter, if not reduced with proper site configuration, can cause targets to be obscured from view.

Figure 2.2 provides an example radar view of the surrounding airspace and targets as depicted on the video files. Distinct (red circles) and blurred (white circles) echoes from six wind turbines at the existing Nuttby Mountain Wind Farm can be seen in the horizontal video. Turbine 9 is located just to the left of the center of the display and isn't visible, but the strong reflection from the tower created the series of distinct dots extended into the left, upper quadrant of the display. During vertical operation, two turbines were visible on the radar display. Like the horizontal view, Turbine 9 is creating the strong echo to the upper left.

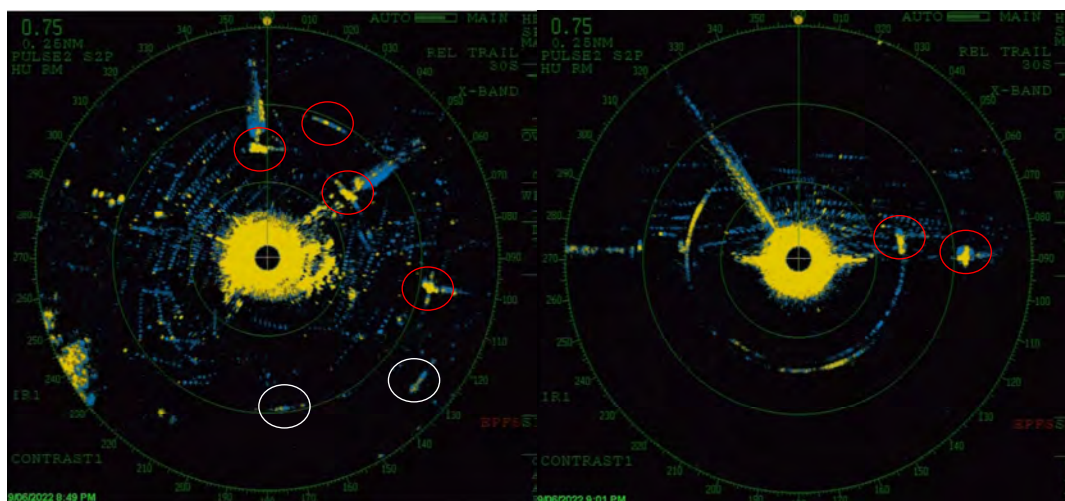


Figure 2.2 Example Radar Files for the Project in Horizontal (left) and Vertical (right) Mode



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

For each hour of radar operation, six 1-minute horizontal video samples and six 1-minute vertical video samples were randomly selected for visual analysis. For those hours with less than 60 minutes sampled (due to rain, equipment failure, or less than 60 minutes of nighttime), proportionally less but no fewer than three samples were selected. The videos were visually reviewed to identify and select targets (migrants) and their flight paths, resulting in location, flight height, and flight direction data for each target. Data were summarized using programs and macros designed by Stantec. Horizontal video samples were used to calculate mean hourly, nightly, and seasonal passage rates, as well as nightly and seasonal mean flight direction. Vertical video samples were used to calculate mean hourly, nightly, seasonal flight heights, and percent of targets flying below the potentially minimum and maximum turbine heights that may be utilized at the Project (180 m and 200 m, respectively).

To evaluate the distribution and representativeness of the site-specific radar data we compared our nightly sampling distribution to regional nocturnal migration radar maps. BirdCast migration forecast maps, created by the Cornell Lab of Ornithology (Dokter 2022), show the intensity of predicted nocturnal bird migration as detected by the United States (U.S.) weather surveillance radar network. These BirdCast migration forecast maps show the intensity of nightly migration with brighter colors indicating a higher migration traffic rate. The scale of migration intensity is continuous and is qualitatively categorized visually from no migration to low, medium, and high migration rates as the colors get brighter. There are two weather radar stations in Maine (Caribou and Gray) and these are the two stations nearest the Project (BirdCast does not incorporate weather radar stations from Canada), with the Caribou station approximately 396 km west-northwest of the Project and the Gray station approximately 585 km west-southwest. We compiled BirdCast migration forecast maps for every night of the spring migration period (approximately April 15 to May 31, 2022) and fall migration period (approximately August 10 to October 31, 2022). A single BirdCast forecast map image from approximately 3.5 hours after the eastern time zone sunset was collected for each night of each migration season.

Based on the color in the BirdCast migration forecast maps, we categorized the traffic rate (qualitative levels of none, low, low/medium, medium, medium/high, or high activity) for each night of the spring and fall seasons for the region using the forecast map signature around the Caribou station. On nights when the Caribou station was not operating, data from the Gray station were used to categorize the nightly migration activity for Maine. Once the BirdCast migration forecast maps were analyzed, these were compared with the nights of on-site surveys for the Project. BirdCast migration forecast maps from the remaining nights of the migration season (i.e., nights when radar data was not collected for the Project) were also summarized to identify the proportion of nights with low and heavy migration from the entire season that was sampled for the Project. Additionally, we compared results at the Project to publicly available nocturnal radar surveys with comparable survey methodology, all occurring in Maine.

Temperatures and wind speeds were collected in 10-minute increments from instrumentation on turbine nine at the existing Nuttby Mountain Wind Farm where the radar site is located. Wind direction was not available from turbine nine and were instead collected in 10-minute increments from the Nuttby Mountain Wind Farm 89N Substation, which averaged data across the site from instrumentation located at nacelle height (~85 meters above ground level) on all turbines. We calculated nightly averages for weather data for each survey night to compare weather parameters among survey nights with radar results.



2.2 AVIAN ACOUSTIC SURVEY

Stantec deployed five Wildlife Acoustics Song Meter SM4 avian acoustic recording units (ARUs) on trees approximately 2 m above ground level throughout the Project Boundary (Figure 1.1; Photo 2.2). The ARUs were deployed to acoustically monitor avian activity from approximately sunset to sunrise while spring and fall nocturnal radar sampling occurred at the Project. Each ARU was equipped with an omnidirectional microphone to sample the airspace around the microphone. With the detectors deployed near ground level, there is an inherent recording bias that birds vocalizing nearest the ARU microphones at ground level are more likely to be recorded than birds vocalizing further away from the microphones.



Photo 2.2 Example ARU setup at the proposed Wind Site near Nuttby, Nova Scotia

The ARUs were powered by D-cell alkaline batteries which were periodically changed by Stantec personnel. The ARUs were programmed using the Wildlife Acoustics SM4 Configurator software tool, programmed with a gain of 16 decibels (dB), no high-pass filter, 24 kilohertz (kHz) sampling rate, 1-hour maximum duration per file. Recorded data were saved as compressed .wav files on high-capacity SD cards inside the units.



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

Stantec downloaded data files from the data cards within the ARUs once during each survey period and at the end of each survey period. We segregated the files that were recorded during the nights when the radar was operating for further analysis and removed any files that were recorded outside of those sample nights from any further analysis. For those files recorded during the nights that the radar was operated, we converted these files from their compressed form into full spectrum .wav files. The data were processed using Cornell Lab's BirdNET acoustic identification program (available online at https://birdnet.cornell.edu/?trk=public_post-text). This tool is an artificial neural network designed to identify bird vocalizations. This application provides a highly accurate characterization of the bird species present within acoustic recordings of avian activity. This is particularly useful for vocalizations that occur in relatively low numbers. These less commonly occurring calls can be difficult to find using only traditional analysis methods because a low volume of a specific set of similar vocalizations may not be apparent when contained within a data set of several million signals of interest (SOIs). Recorded call files are defined as SOI's, not bird vocalizations, because non-bird audio recordings (e.g., equipment noise, splashing or dropping water, etc.) may also meet the processing parameters and would be included in the initial analysis results. BirdNET provides suggested species identifications, including less commonly observed species, resulting in more accurate results. The software is programmed to include all SOI's with durations from 0.05 seconds (s) to 3 s and with frequency levels between 250 Hertz (Hz) and 12,000 Hz. Once the preliminary analysis was complete, a Stantec biologist experienced with the analysis of acoustic avian calls reviewed the SOI's and verified each species group when possible and non-bird vocalizations when present.

Vocalizations were manually reviewed for accuracy using a combination of active listening to vocalizations and a visual comparison to the spectrograms of species that could potentially occur in the Project Boundary. SOIs that made it through the initial identification but were not determined to be bird vocalizations through qualitative review were removed from the dataset. Spectrograms of known or likely occurring species were obtained from the Macaulay Library at the Cornell Laboratory of Ornithology at <https://www.macaulaylibrary.org>.

BirdNET provides a ranking to each SOI identified during automated classification. The ranking ranges from 0.1 to 1.0, providing a measurement of how likely an SOI is to be the species that the application identifies the vocalization to be. Below a ranking of approximately 0.3, species' classifications typically become less accurate and reliable so a lower limit mask of 0.3 was used to remove false positive identifications from the dataset.

Once the initial analysis and species identifications were completed, a second Stantec biologist conducted a quality assurance/quality control review of the analyzed dataset. This quality review included an audio and visual review of a subset of call files for each identified species in the dataset, including those call files with the highest (near 1.0) and lowest (0.3) confidence rankings attributed by BirdNET. For species with a relatively low number of calls (less than 15 call files recorded), 90 to 100 percent of files were reviewed. For bird species recorded relatively frequently (i.e., 30 to 150 call files, sometimes many thousands), the review included approximately 10 to 20 percent of call files. For bird species of conservation concern (i.e., Canada Warbler or Eastern Wood-Pewee), 100 percent of files were reviewed.



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Results of the acoustic monitoring were summarized by species, and all species were combined to determine temporal trends. We also discuss any Species at Risk (SAR) and Species of Conservation Concern (SOCC), detected during surveys. SAR are here defined as those species listed as Extirpated, Endangered, Threatened, or Special Concern by the federal *Species at Risk Act* (SARA), the Nova Scotia *Endangered Species Act* (NSES), or by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). COSEWIC assesses and designates the status of species and recommends this designation for legal protection under SARA. SOCC are species not listed or protected by any legislation, but are considered rare in Nova Scotia, or their populations may not be considered sustainable. SOCC are here defined to include species that are not SAR, but are ranked S1 (critically imperiled), S2 (imperiled), or S3 (vulnerable) in Nova Scotia by the Atlantic Canada Conservation Data Centre (AC CDC) (AC CDC 2022).

3.0 RESULTS

3.1 NOCTURNAL RADAR SURVEY

Spring Surveys

The radar was operated during 20 nights between April 22 and May 29, 2022 (Appendix A Table 1). Nightly mean passage rates ranged from 5 ± 2^1 targets per kilometer per hour (t/km/hr) on April 24 to 989 ± 69 t/km/h on May 11. The mean nightly passage rate for the survey period was 230 ± 21 t/km/hr (Figure 3.1; Appendix A Table 2). Individual hourly passage rates varied among nights and throughout the season, ranging from 0 t/km/hr during multiple survey hours throughout the survey period to 1,221 t/km/hr during hour 8 on May 11 (Appendix A Table 2). For the entire season, passage rates increased after sunset, peaked 2 hours after sunset and then started to decline six hours after sunset until sunrise (Figure 3.2). Of the 10,984 targets identified during spring radar analysis, 255 (2%) flew with enough of an erratic flight pattern that they were classified as potential bat targets. Mean flight direction of spring nocturnal migrants was $78^\circ \pm 74^\circ$, east-northeast (Figure 3.3; Appendix A Table 3).

Average nightly temperatures for nights surveyed during the spring survey period ranged from -3°C to 16°C and average nightly wind speeds ranged from 4 m/s to 14 m/s (Appendix A Table 1). The night with the lowest passage rate (April 24) had a low nightly temperature of -1°C and a high nightly wind speed of 14 m/s from the north-northeast (Appendix A Table 1). The night with the highest passage rate (May 11) had a high nightly temperature of 15°C and a low nightly wind speed of 5 m/s from the southwest (Appendix A Table 1).

¹ \pm refers to standard error of the mean



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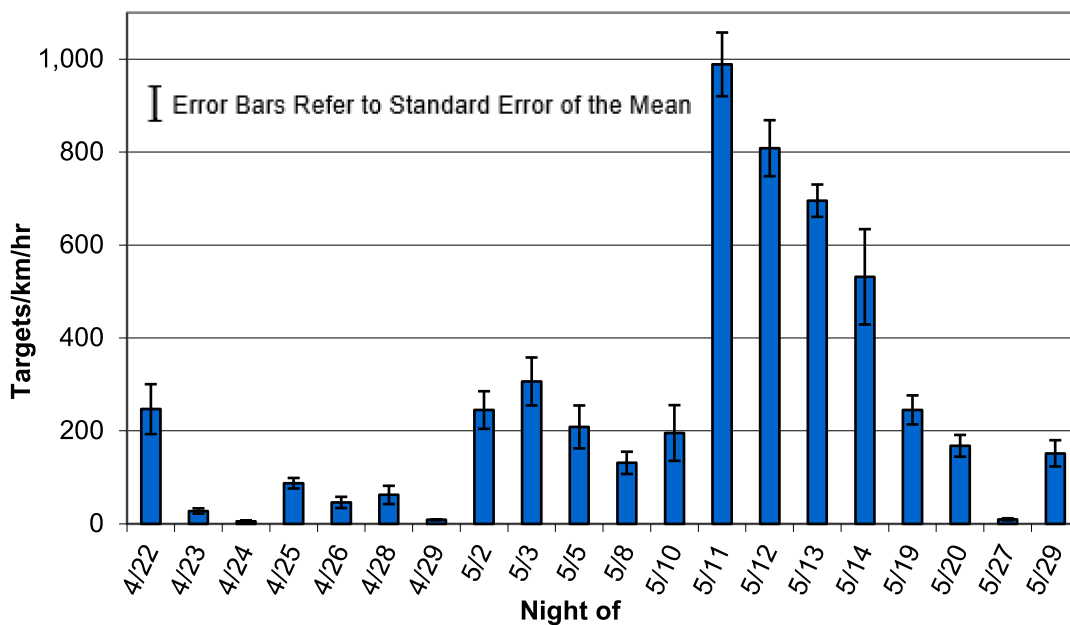


Figure 3.1 Nightly Passage Rates During Spring 2022 Nocturnal Radar Surveys

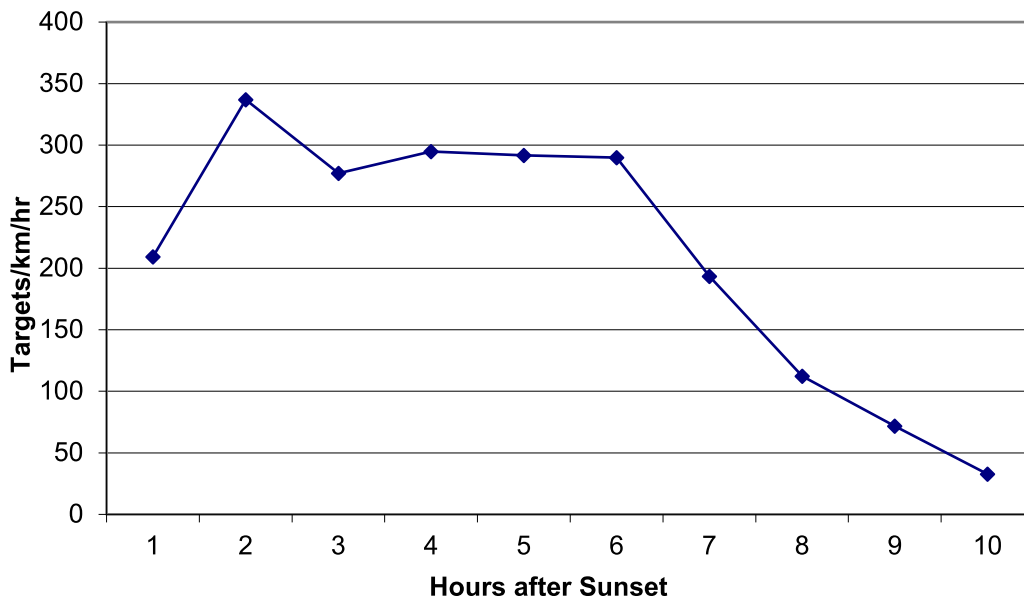


Figure 3.2 Hourly Passage Rates for the Season During Spring 2022 Nocturnal Radar Surveys



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

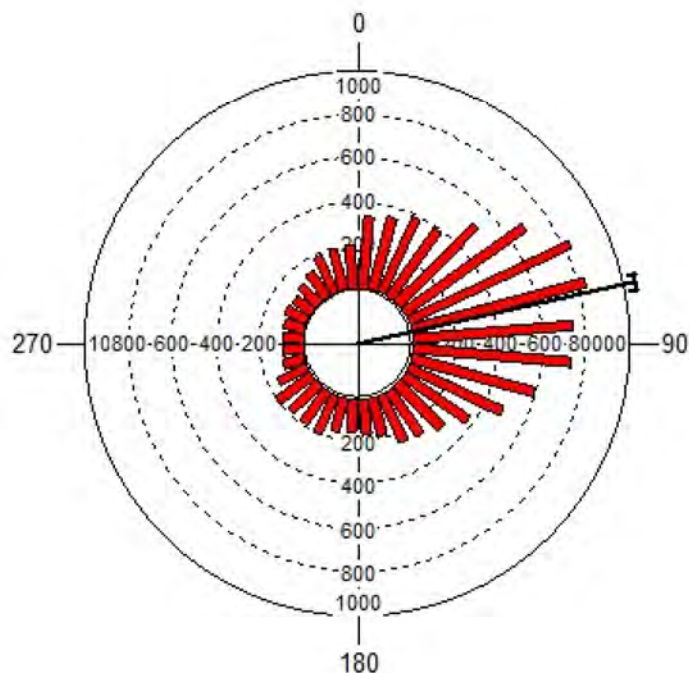


Figure 3.3 Mean Flight Direction During Spring 2022 Nocturnal Radar Surveys

The seasonal mean flight height of targets was $371 \text{ m} \pm 4 \text{ m}$ above the radar site. The mean nightly flight height ranged from $152 \text{ m} \pm 13 \text{ m}$ on April 22 to $610 \text{ m} \pm 34 \text{ m}$ on May 27 (Figure 3.4; Appendix A Table 4). In Figure 3.4 the seasonal mean is indicated by the green line; the nightly means are indicated by the blue squares, and error bars refer to the standard error of the mean. The percent of targets observed flying below 180 m and 200 m was 34% and 37% for the season, respectively, and varied nightly from 15% and 18% on May 11 to 78% and 80% on April 22 (Figure 3.5; Appendix A Table 4). For the season, mean hourly flight heights were variable throughout the night and but were lowest at 1 hour and 10 hours after sunset (Figure 3.6).



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

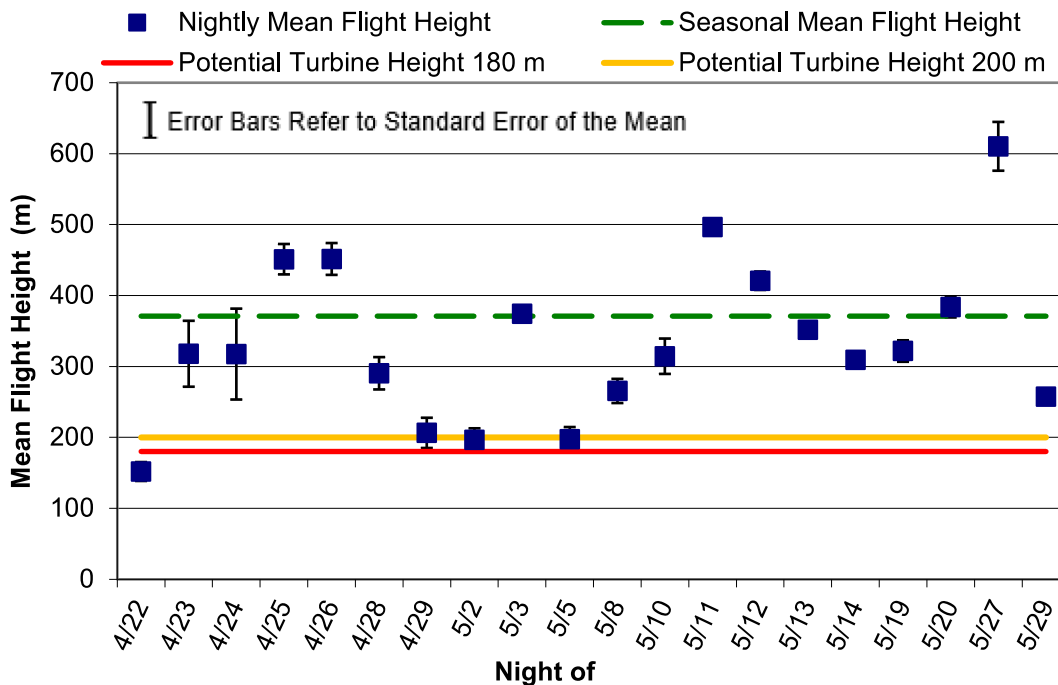


Figure 3.4 Seasonal Mean and Nightly Mean Flight Height of Targets During Spring 2022 Nocturnal Radar Surveys

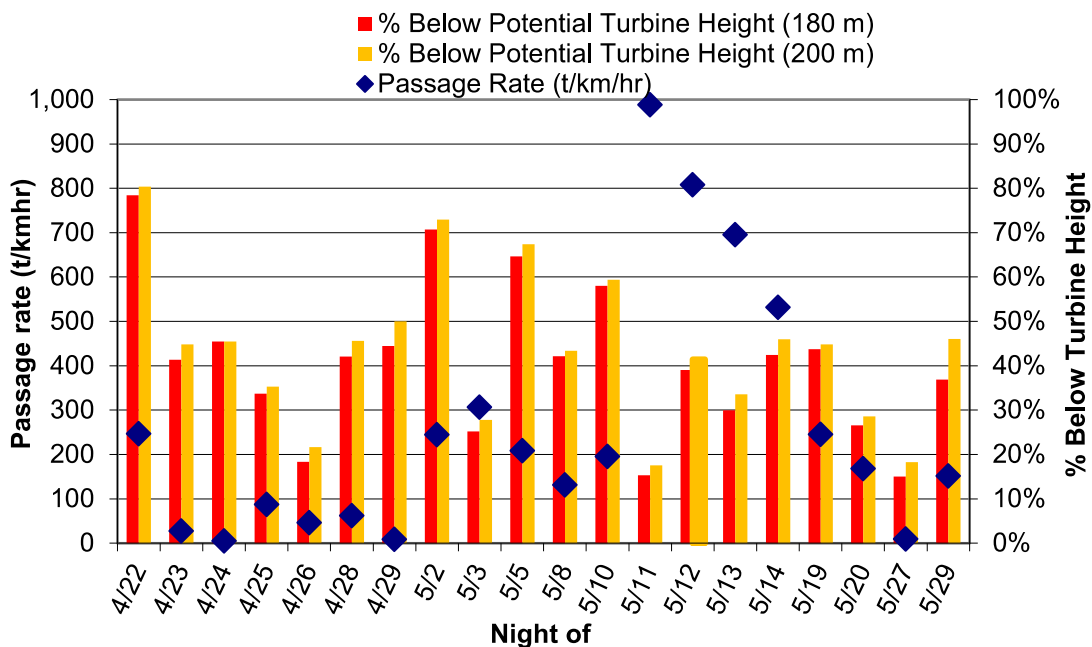


Figure 3.5 Percent of Targets Observed Flying Below Two Potential Turbine Heights During Spring 2022 Nocturnal Radar Surveys



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

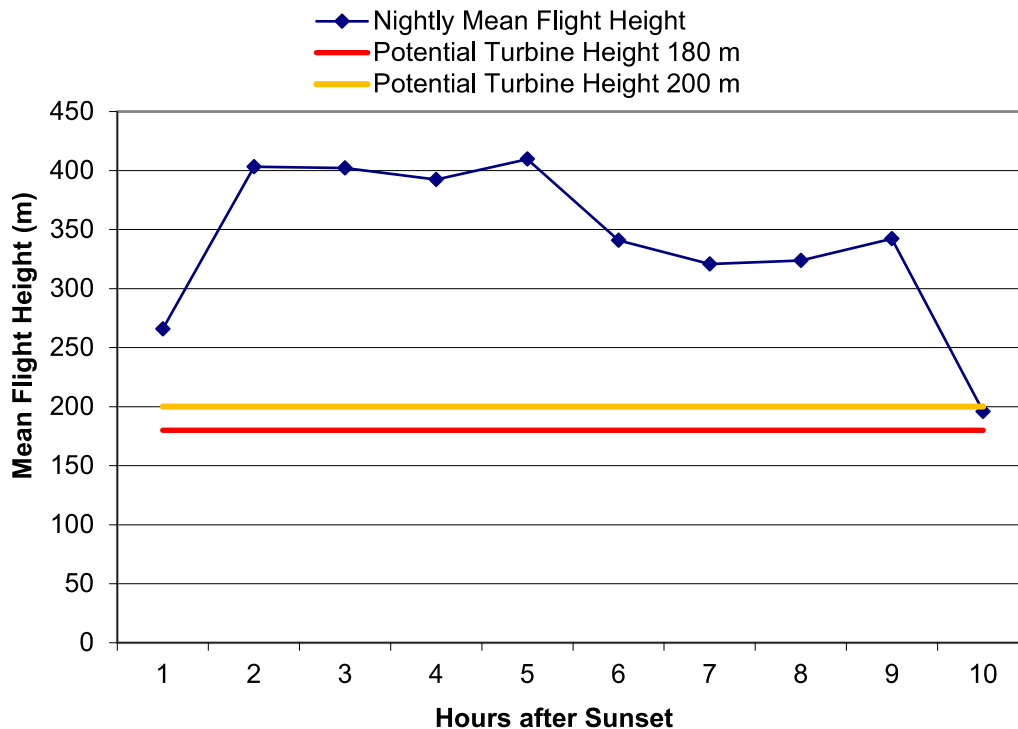


Figure 3.6 Hourly Target Flight Height Distribution During Spring 2022 Nocturnal Radar Surveys

Figure 3.7 shows the distribution of individual nightly flight heights of targets. The yellow boxes depict the middle 50% of targets. The error bars depict the statistical outliers, or 25% of targets above and below the middle 50% of targets. The horizontal line within each box represents the nightly median flight height value.



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

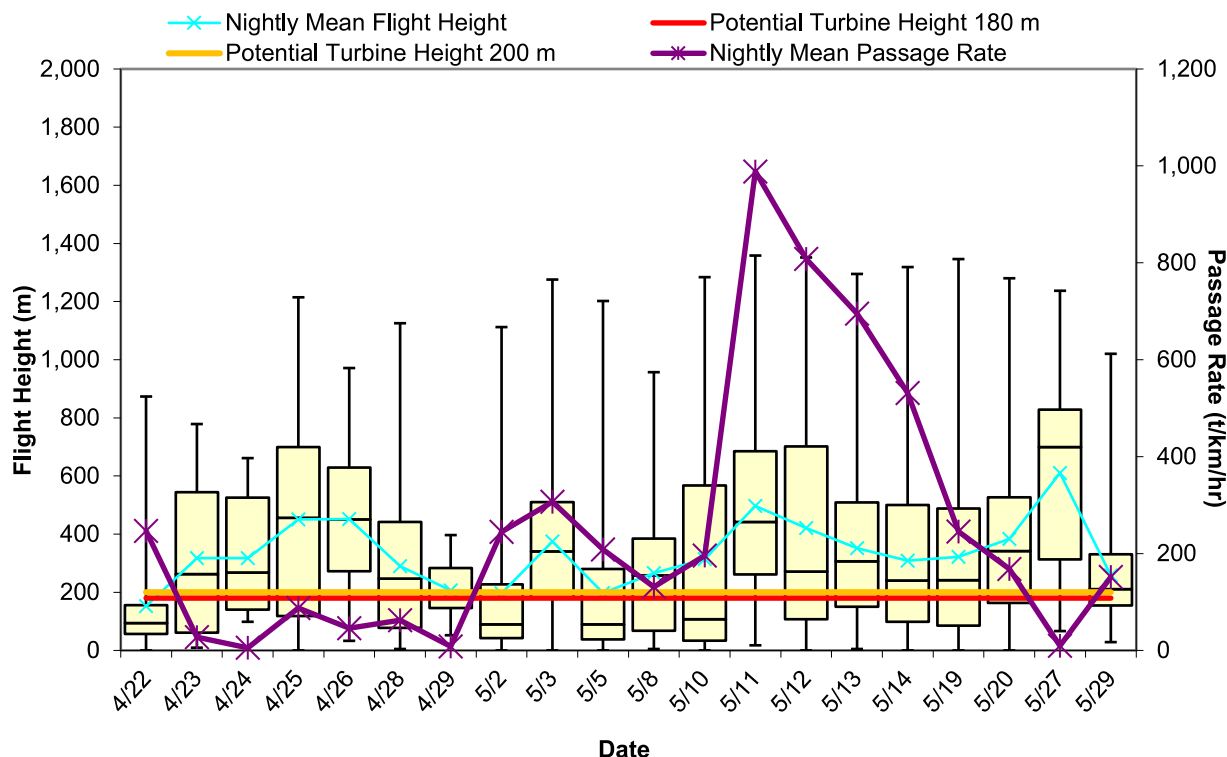


Figure 3.7 Flight Height Whisker Plot Depicting the Vertical Distribution of Targets for Each Survey Night During Spring 2022 Nocturnal Radar Surveys

There were 47 nights of BirdCast migration forecast maps analyzed for the spring migration period from the nearest site to the Project with available BirdCast migration forecast maps (Caribou, Maine). Observable migration activity occurred on 25 of those nights, and no observable migration activity occurred on 22 nights. There were four nights of low migration, 11 nights of low/medium migration, four nights of medium migration, and six nights of medium/high migration. No nights had a high level of migration from the Maine station according to the BirdCast migration rate scale. In general, the nights of on-site radar sampling at the Project occurred on nights with various migration rates and generally in proportion to those nights occurred over the entire migration season in Maine (Table 3.1).

Table 3.1 Summary of BirdCast and On-site Radar Data Collection During Spring 2022

Migration Rate Category	Number of Nights with BirdCast data	Proportion of Full Season	Number of nights in on-site radar data set	Proportion of on-site radar data set
None	22	47%	6	30%
Low	4	9%	2	10%
Low/Medium	11	23%	5	25%
Medium	4	9%	4	20%
Medium/High	6	13%	3	15%
High	0	0%	0	0%



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Fall Surveys

The radar was operational for 30 nights between August 20 and October 28, 2022 (Appendix A Table 5). Nightly mean passage rates ranged from 35 ± 9 t/km/hr on October 25 to $1,508 \pm 255$ t/km/h on September 6. The mean nightly passage rate for the survey period was 591 ± 36 t/km/hr (Figure 3.8; Appendix A Table 6). Individual hourly passage rates varied among nights and throughout the season, ranging from 0 t/km/hr during hour 11 on August 29 and during hour 12 on September 16 to 3,750 t/km/hr during hour four on October 14 (Appendix A Table 6). For the entire season, passage rates increased after sunset, peaked two hours after sunset, then declined until sunrise (Figure 3.9). Of the 50,731 targets identified during radar analysis, 2,476 (5%) flew with enough of an erratic flight pattern that we identified them as possible bat targets. Mean flight direction of fall nocturnal migrants was variable among survey nights and the seasonal mean was $281^\circ \pm 98^\circ$, west-northwest (Figure 3.10; Appendix A Table 7).

Average nightly temperatures for nights surveyed during the fall survey period ranged from 4°C to 24°C and average nightly wind speeds ranged from 2 m/s to 11 m/s (Appendix A Table 5). The night with the lowest passage rate (October 25) had an average nightly temperature of 16°C and an average nightly wind speed of 6 m/s from the southwest (Appendix A Table 5). The night with the highest passage rate (September 6) had an average nightly temperature of 13°C and a low nightly wind speed of 4 m/s from the north-northeast (Appendix A Table 5).

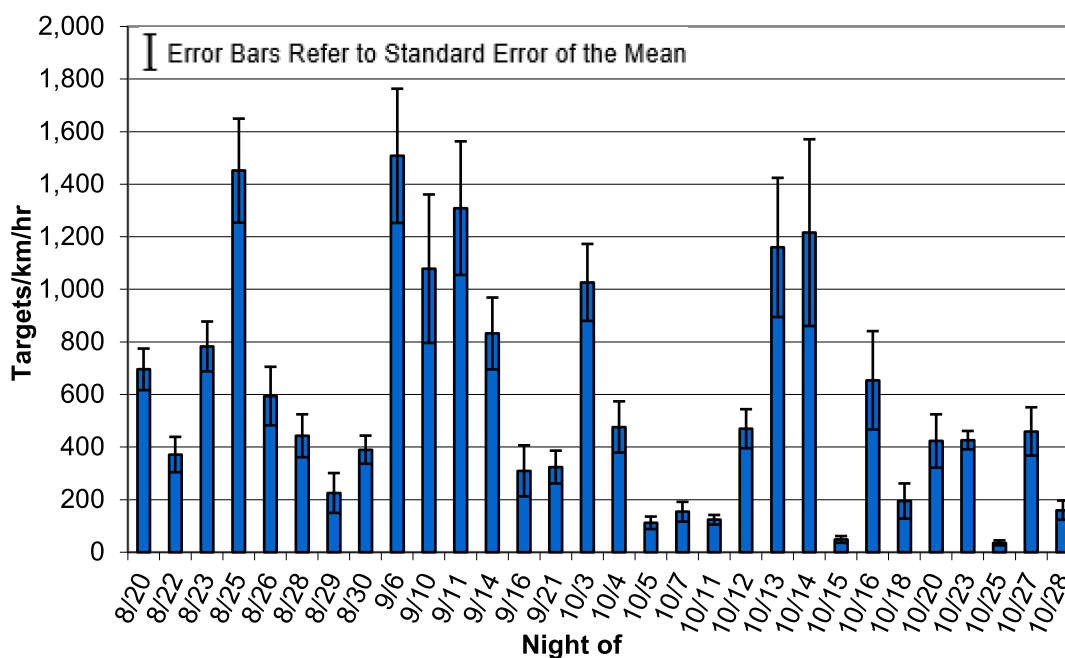


Figure 3.8 Nightly Passage Rates During Fall 2022 Nocturnal Radar Surveys



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

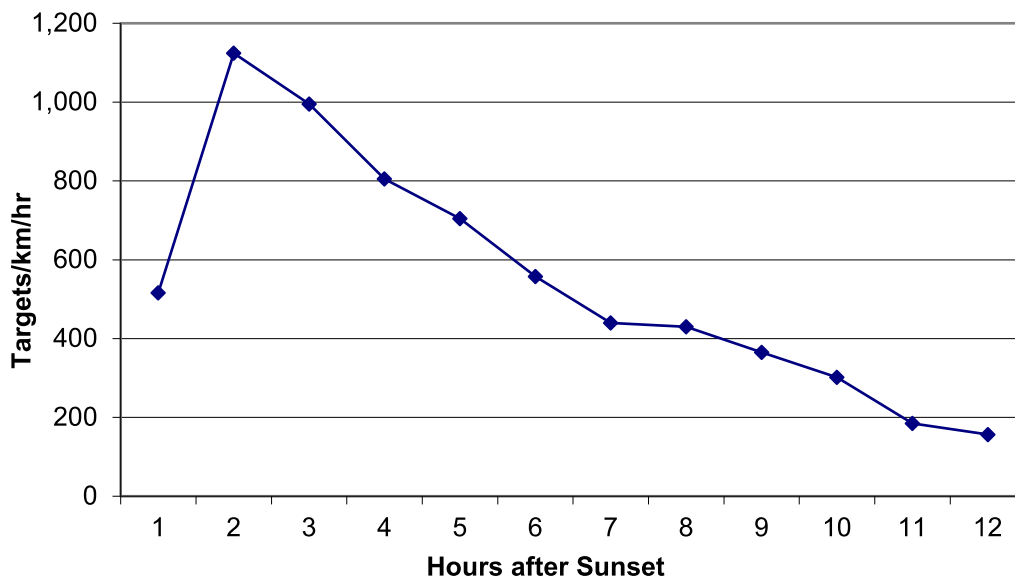


Figure 3.9 Hourly Passage Rates for the Season During Fall 2022 Nocturnal Radar Surveys

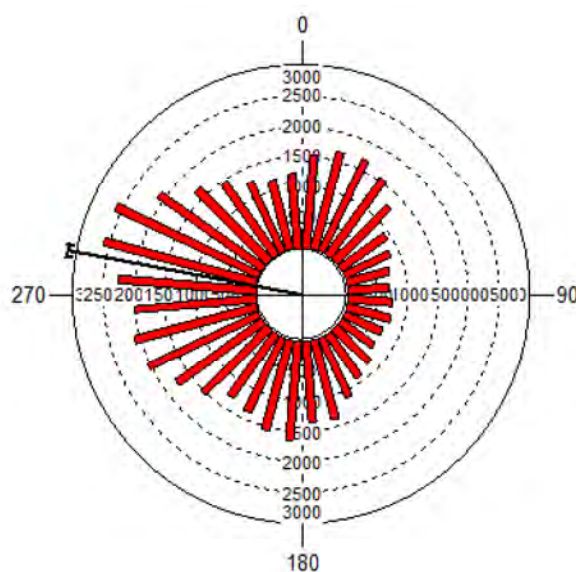


Figure 3.10 Mean Flight Direction During Fall 2022 Nocturnal Radar Surveys

The seasonal mean flight height of targets was $322 \text{ m} \pm 1 \text{ m}$ above the radar site. The mean nightly flight height ranged from $192 \text{ m} \pm 5 \text{ m}$ on August 30 to $694 \pm 9 \text{ m}$ on October 23 (Figure 3.11; Appendix A Table 8). In Figure 3.11 the seasonal mean is indicated by the green line; the nightly means are indicated by the blue squares, and error bars refer to standard error of the mean. The percent of targets observed



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flying below 180 m and 200 m was 41% and 44% for the season, respectively, and varied nightly from 12% and 14% on October 23 to 64% and 67% on October 14 (Figure 3.12; Appendix A Table 8). For the season, mean hourly flight heights were lowest at 1 hour and 12 hours after sunset (Figure 3.13).

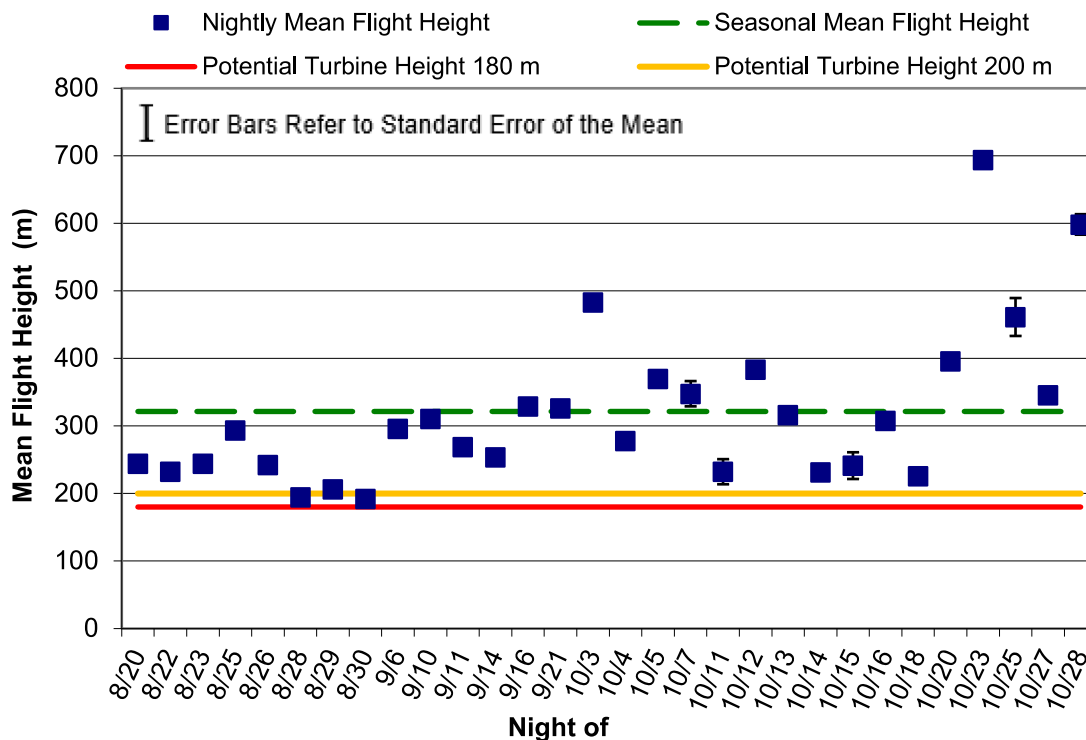


Figure 3.11 Seasonal Mean and Nightly Mean Flight Height of Targets During Fall 2022 Nocturnal Radar Surveys



NOCTURNAL MIGRATION RADAR AND AVIAN ACOUSTIC SURVEY FOR PROPOSED WIND SITE NEAR NUTTBY, NOVA SCOTIA

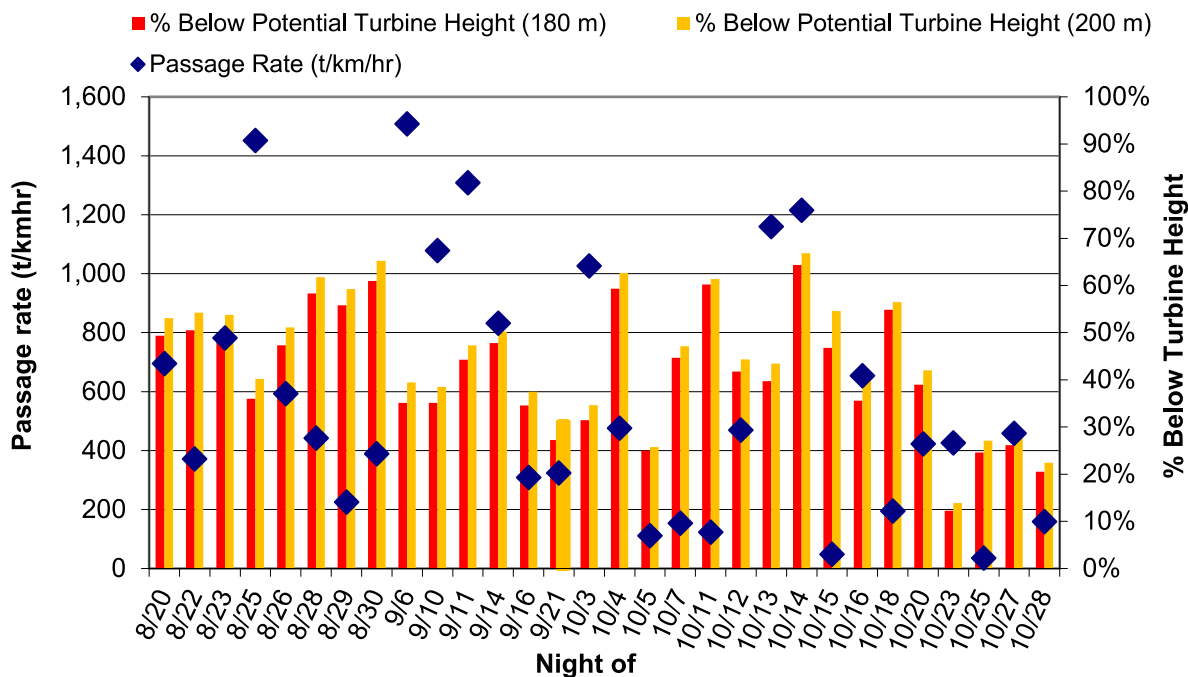


Figure 3.12 Percent of Targets Observed Flying Below Two Potential Turbine Heights During Fall 2022 Nocturnal Radar Surveys

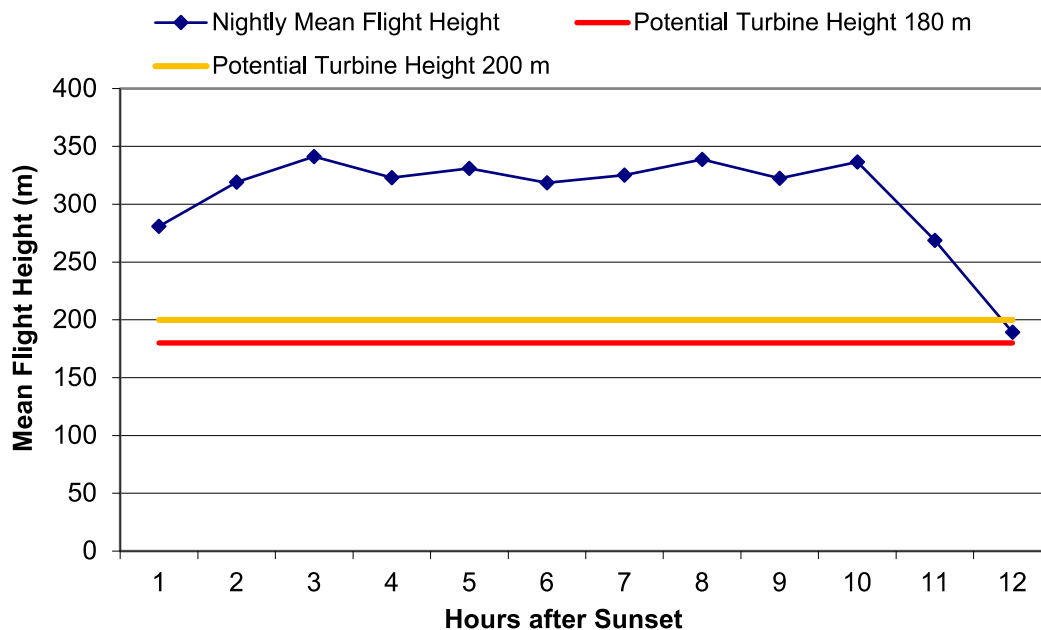


Figure 3.13 Hourly Target Flight Height Distribution During Fall 2022 Nocturnal Radar Surveys



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Figure 3.14 shows the distribution of individual nightly flight heights of targets. The yellow boxes depict the middle 50% of targets. The error bars depict the statistical outliers, or 25% of targets above and below the middle 50% of targets. The horizontal line within each box represents the nightly median flight height value.

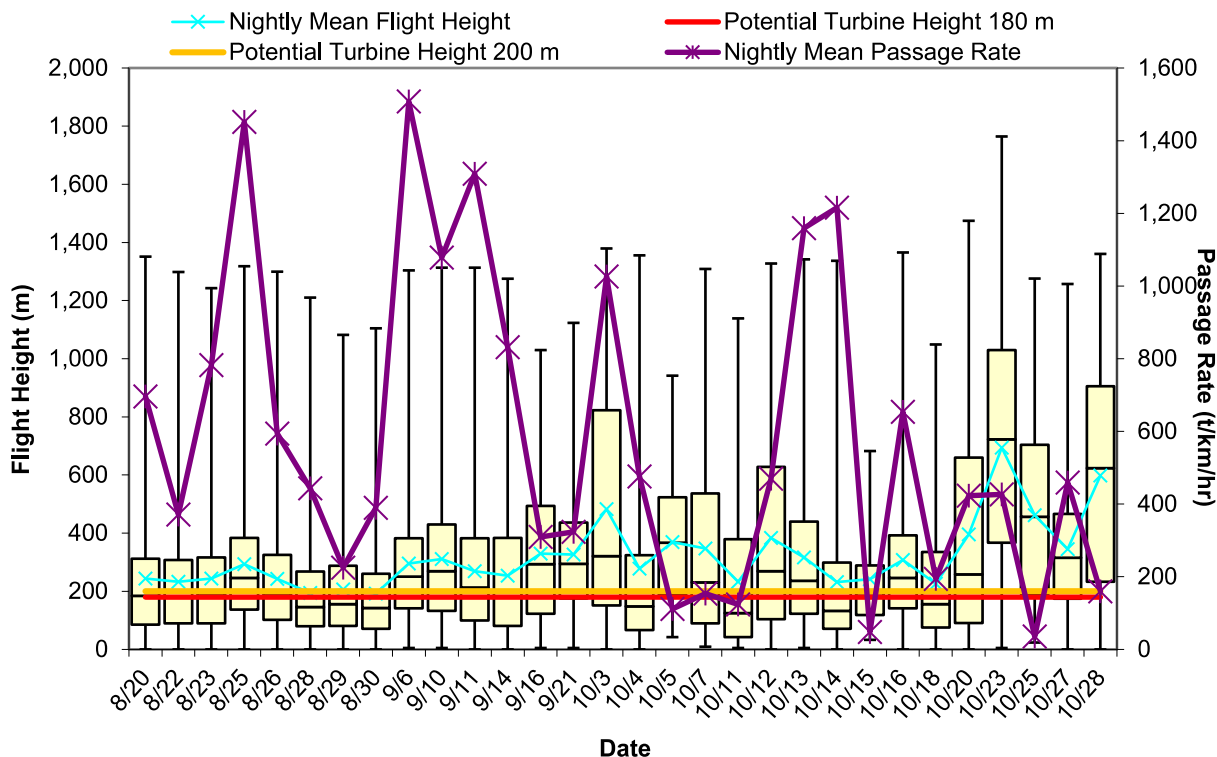


Figure 3.14 Flight Height Whisker Plot Depicting the Vertical Distribution of Targets for Each Survey Night During Fall 2022 Nocturnal Radar Surveys

There were 83 nights of BirdCast migration forecast maps analyzed for the fall migration period from the nearest site to the Project with available BirdCast migration forecast maps (Caribou, Maine). Observable migration activity occurred on 50 of those nights, with 33 nights of no observable migration. There were 11 nights of low migration, 20 nights of low/medium migration, nine nights of medium migration, eight nights of medium/high migration, and two nights of high migration. In general, the nights of sampling with on-site radar at the Project occurred on nights with various migration rates and generally in proportion to how those nights occurred over the entire migration season in Maine, with the exception that we did not collect on-site radar data on either of the two nights with high migration activity predicted by BirdCast (Table 3.2).



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Table 3.2 Summary of BirdCast and On-site Radar Data Collection During Fall 2022

Migration Rate Category	Number of Nights with BirdCast data	Proportion of Full Season	Number of nights in on-site radar data set	Proportion of on-site radar data set
None	33	40%	13	43%
Low	11	13%	4	13%
Low/Medium	20	24%	7	23%
Medium	9	11%	4	13%
Medium/High	8	10%	2	7%
High	2	2%	0	0%

3.2 AVIAN ACOUSTIC SURVEY

Spring Surveys

Overall, 96,857 vocalizations were identified as bird vocalizations in the spring and 96,797 (99.9%) of those were identified to species. A total of 77 species were identified, including waterfowl, raptors, gamebirds, shorebirds, and landbirds (Appendix B Table 1). Of these, 23 species are year-round residents, and the remaining 54 species are migrants. The most frequently recorded species was American Woodcock, representing 54% of recorded vocalizations (migrant; n = 51,964). Other commonly recorded species included Hermit Thrush (migrant; n = 7,682; 8%), and Winter Wren (migrant; n = 7,291; 8%). The most frequency occurring resident species was Black-capped Chickadee (n = 3,979; 4%).

Of the 77 species identified in spring acoustic surveys, 6 were SAR and 6 were SOCC. SAR included Canada Warbler (n = 1,446; 1% of total vocalizations), Chimney Swift (n = 1; <1%), Common Nighthawk (n = 2; <1%), Evening Grosbeak (n = 35; <1%), Olive-sided Flycatcher (n = 2; <1%), and Rusty Blackbird (n = 5; <1%). Ninety-nine percent of the Canada Warbler vocalizations (n = 1,433) were recorded at a single detector (N4) between the nights of May 19 and May 29, 2022. SOCC included Boreal Chickadee (n = 168; <1%), Boreal Owl (n = 3; <1%), Canada Jay (n = 5; <1%), Pine Siskin (n = 83; <1%), Red-breasted Nuthatch (n = 350; <1%), and Rose-breasted Grosbeak (n = 133; <1%).

Total vocalizations of all species are graphed against time after sunset in Figure 3.15. The average number of vocalizations per hour begin to gradually decrease from approximately sunset then pick up and are greatest during hours 6 through 9 after sunset, dropping off drastically afterwards. Timing of vocalizations was also mapped for individual species; these graphs are presented in Appendix B. Most species, besides owls which are nocturnal, show trends similar to the overall data.

