

## 6.2.2 Birds and Bird Habitat

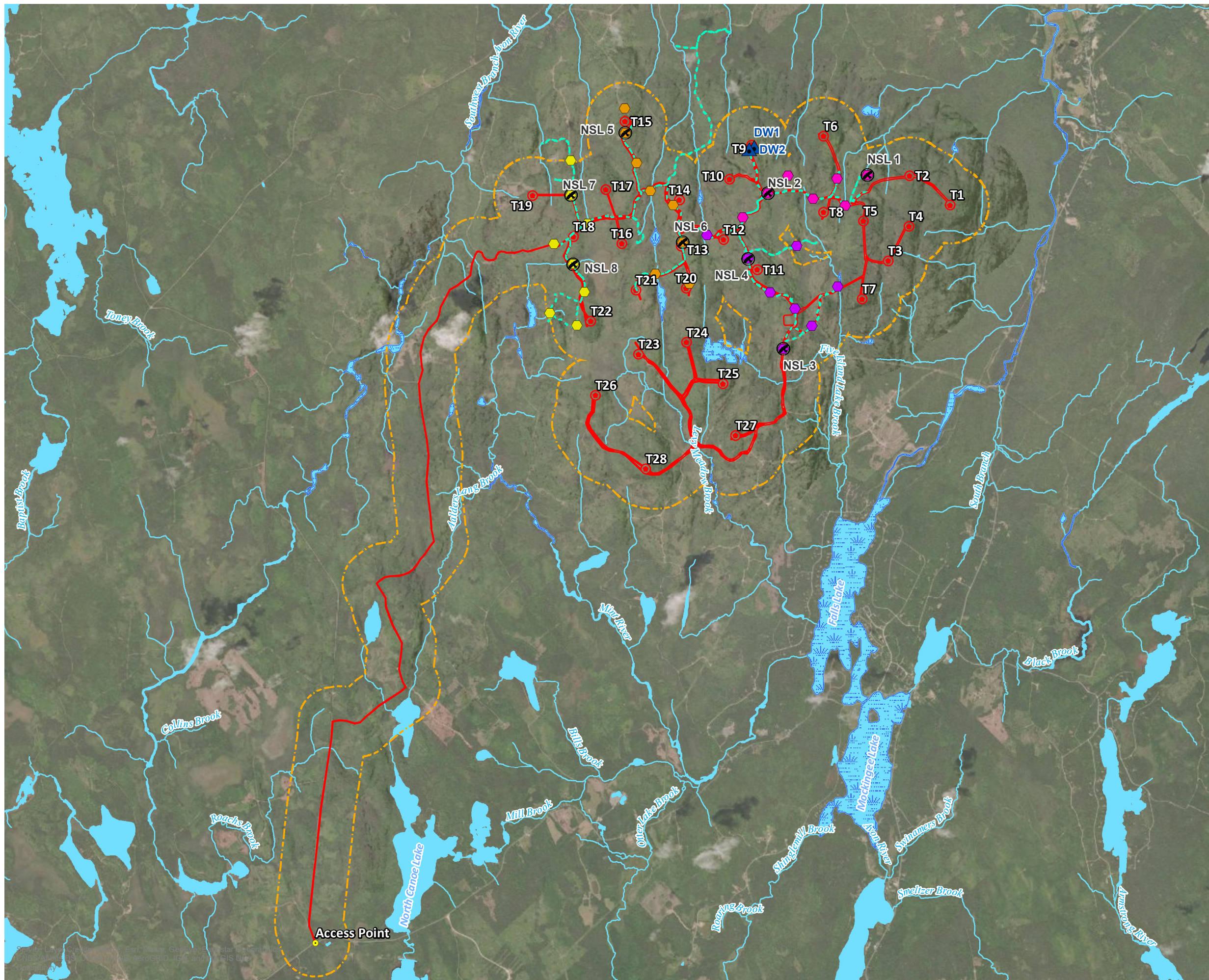
Nova Scotia’s extensive coastline and abundance of mud flats make it an important migration pathway for birds. Additionally, a designated Important Bird Area (IBA), the Southern Bight (NS020) of the Minas Basin is located approximately four kilometres from the nearest proposed WTG location. As such, a study design was proposed and discussed with the Nova Scotia Department of Natural Resources and Renewables biologists prior to being implemented with consideration for the ecological setting of the site and the nearby important bird habitats. The study included field surveys for breeding birds, migratory birds and resident bird populations with strategic timing designed to match breeding and migratory windows specific for the region. Although one late season winter survey was completed, additional winter surveys are planned for January and February 2022 to confirm resident winter birds in the area are accurately represented. An addendum will be issued to reflect the results.

Bird surveys were conducted throughout 2021 within the LAA for birds (i.e., 500 m buffer around all Project components, including the PDA). Bird survey location are shown on **Figure 10**. The methodology and results of the field surveys that were conducted in 2021 are detailed in **Appendix H**.

During the 2021 bird surveys, over 7,000 individual birds of over 90 different species were recorded within the local assessment area. The bird populations present in the assessment area were observed through the techniques of point counts, area searches/transects, and diurnal watch counts. A summary of the total number of species and individual birds by season is presented below in **Table 13**.

**TABLE 13: SUMMARY OF THE NUMBER OF BIRD SPECIES AND INDIVIDUAL BIRDS DETECTED DURING THE 2021 AVIAN FIELD SURVEYS**

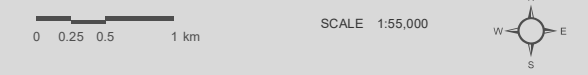
Season	Methods	Number of Species Observed (Diversity)	Number of Birds Detected (Abundance)
Late-Winter Surveys (April)	<ul style="list-style-type: none"> <li>• Area Searches</li> </ul>	29	288
Spring Surveys (April to June)	<ul style="list-style-type: none"> <li>• Transect-based Point Counts;</li> <li>• Diurnal Watch Counts; and</li> <li>• Breeding Nocturnal Owl Survey.</li> </ul>	83	3217
Summer Surveys (June to late July)	<ul style="list-style-type: none"> <li>• Transect-based Point Counts;</li> <li>• Observed Incidentally between Surveys; and,</li> <li>• Breeding Common Nighthawk Survey.</li> </ul>	74	1478
Fall Surveys (mid-August to late-October)	<ul style="list-style-type: none"> <li>• Transect-based Point Counts; and,</li> <li>• Diurnal Watch Counts.</li> </ul>	70	2604



BENJAMINS MILL WIND PROJECT

**SURVEY LOCATIONS AND LOCAL ASSESSMENT AREA FOR BIRDS**  
FIGURE 10

- Proposed Access Point
- Proposed Turbine Location
- Watercourse
- Waterbody
- Wetland
- Project Development Area
- Local Assessment Area
- ▲ Durnal Watch Counts
- ⦿ Nocturnal Survey Location
- Transect 1
- Transect 2
- Transect 3
- Transect 4
- - - Winter Area Search



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












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

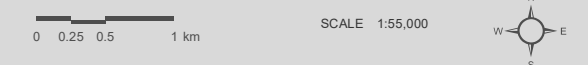


PROJECT: 21-1329  
STATUS: DRAFT  
DATE: 2022-01-10

**OBSERVATION LOCATIONS OF BIRD SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN**

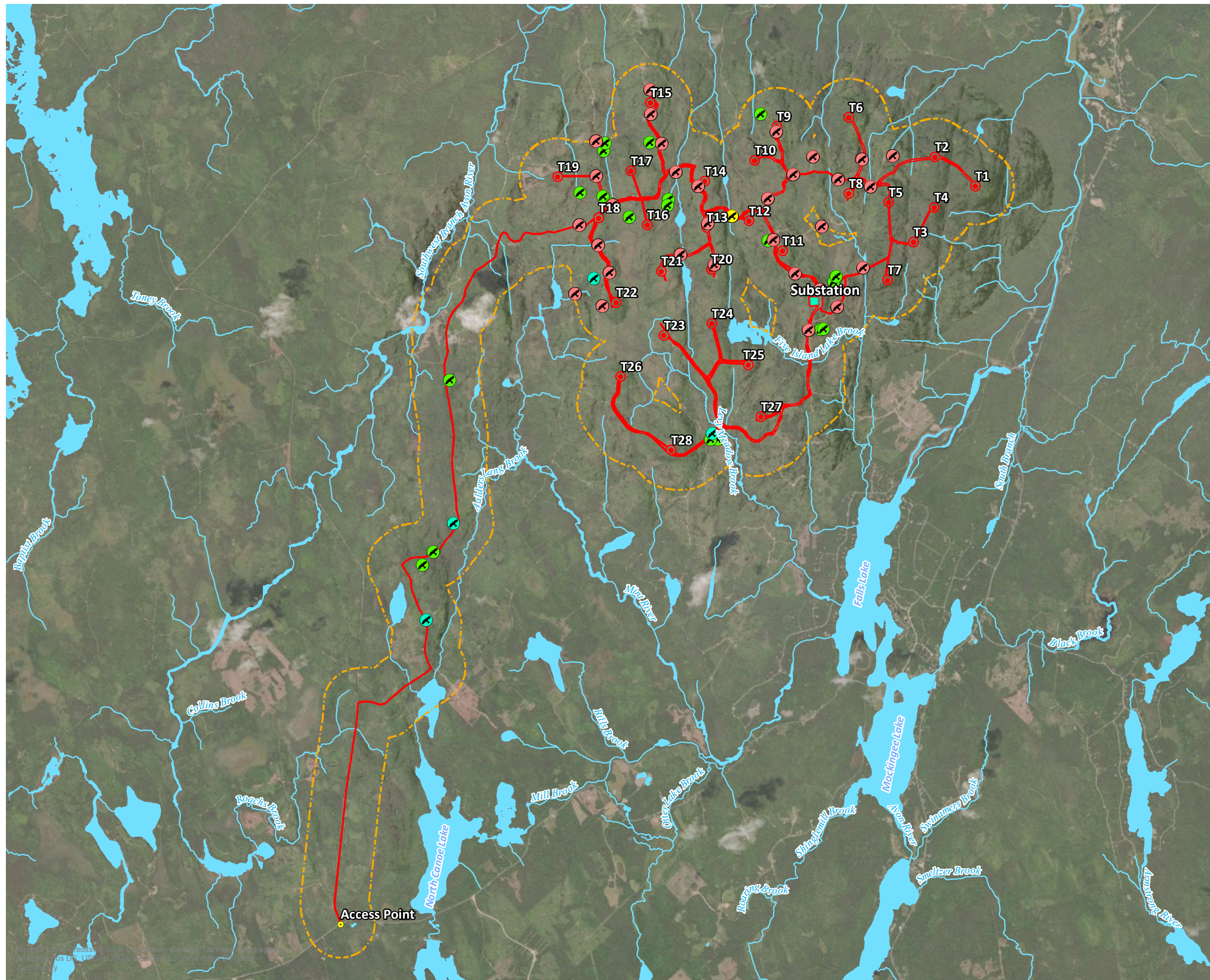
FIGURE 11

-  Proposed Access Point
  -  Proposed Turbine Location
  -  Substation
  -  Watercourse
  -  Waterbody
  -  Project Development Area
  -  Local Assessment Area
- Point Count Observation**
-  Species at Risk
  -  Species of Conservation Concern
- Incidental Bird Observation**
-  Species at Risk
  -  Species of Conservation Concern



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

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



During the 2021 bird surveys, 8 SAR and 20 SoCC species were detected, their locations at the time of detection are presented on **Figure 11** (above) and the species are summarized below in **Table 14**. **Table 14** also includes the legal protection status and provincial rarity rankings by the ACCDC (S-ranks) and the season of which they were detected in. Descriptions of the bird SAR that were detected during the survey program and their preferential habitat is also provided in **Section 6.2.3**.

**TABLE 14: BIRD SAR AND SOCC IDENTIFIED WITHIN THE ASSESSMENT AREA DURING THE 2021 SURVEYS**

Common Name	Scientific Name	Status	ACCDC S-RANK**	2021 Season Species Detected In			
				Late Winter*	Spring	Summer	Fall
<b>Species At Risk</b>							
Peregrine Falcon anatum/tundrius	Falco peregrinus pop. 1	NSESA: V	S1B SNAM				X
Rusty Blackbird	Euphagus carolinus	SARA: SC NSESA: E	S2B			X	
Evening Grosbeak	Coccothraustes vespertinus	SARA: SC NSESA: V	S3S4B,S3N	X	X	X	X
Eastern Wood-Pewee	Contopus virens	SARA: SC NSESA: V	S3S4B		X		
Canada Warbler	Cardellina canadensis	SARA: T NSESA: E	S3B		X	X	
Olive-sided Flycatcher	Contopus cooperi	SARA: T NSESA: T	S2B		X	X	X
Common Nighthawk	Chordeiles minor	SARA: T NSESA: T	S2B		X	X	
Chimney Swift	Chaetura pelagica	SARA: T NSESA: E	S2B,S1M				X
<b>Species of Conservation Concern</b>							
Canada Jay	Perisoreus canadensis		S3	X	X	X	X
Red-breasted Nuthatch	Sitta canadensis		S3	X	X	X	X
American Kestrel	Falco sparverius		S3B		X	X	X
Gray Catbird	Dumetella carolinensis		S3B		X	X	X

Common Name	Scientific Name	Status	ACCDC S-RANK**	2021 Season Species Detected In			
				Late Winter*	Spring	Summer	Fall
Pine Siskin	<i>Spinus pinus</i>		S2S3			X	X
Red Crossbill	<i>Loxia curvirostra</i>		S3S4		X	X	X
Swainson's Thrush	<i>Catharus ustulatus</i>		S3S4B			X	X
Ruby-crowned Kinglet	<i>Regulus calendula</i>		S3S4B		X	X	X
Bay-breasted Warbler	<i>Setophaga castanea</i>		S3S4B		X	X	X
Veery	<i>Catharus fuscescens</i>		S3S4B		X	X	
Yellow-bellied Flycatcher	<i>Empidonax flaviventris</i>		S3S4B		X	X	
Boreal Chickadee	<i>Poecile hudsonicus</i>		S3		X	X	X
Northern Harrier	<i>Circus hudsonius</i>	NAR	S3S4B	X	X	X	X
American Robin	<i>Turdus migratorius</i>		S5B, S3N	X	X	X	X
Purple Finch	<i>Haemorhous purpureus</i>		S4S5B,S3S4N		X	X	X
Blackpoll Warbler	<i>Setophaga striata</i>		S3S4B		X		X
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>		S3B				X
Cape May Warbler	<i>Setophaga tigrina</i>		S2B			X	
Northern Goshawk	<i>Accipiter gentilis</i>		S3S4		X		
Turkey Vulture	<i>Cathartes aura</i>		S2S3B				X

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

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

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

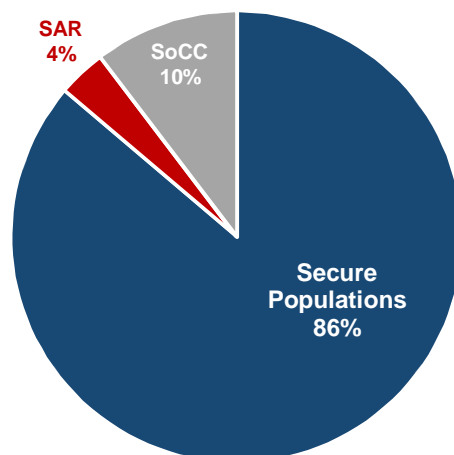
\*\*S-Ranks as of December 2021

### 6.2.2.1 Late Winter Survey Summary

Overwintering bird species were surveyed using transect-based area searches over the course of five days in April 2021. As April is outside of the typical window for winter bird surveys, the winter survey results are considered incomplete and will be supplemented by additional surveys planned for January and February 2022. The methods, including the details of the transect locations and results are presented in **Appendix H** and on **Figure 10**. One of four transects, averaging 9.4 km each, was surveyed on each survey day to maximize site coverage. During the 2021 late winter bird surveys at the Project

site, 22 resident bird species and seven early migratory bird species were detected. Of the 22 resident bird species detected, there was one SAR, Evening Grosbeak (*Coccothraustes vespertinus*), and four SoCC, Red-breasted Nuthatch (*Sitta canadensis*), Canada Jay (*Perisoreus canadensis*), American Robin (*Turdus migratorius*) and Northern Harrier (*Circus hudsonius*) detected. The most commonly detected resident species within the assessment area during the late winter survey program had secure or apparently secure populations within Nova Scotia (i.e., with an ACCDC provincial ranking of S4 or S5), as broken down in **Figure 12**. The most frequently detected species included:

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



**FIGURE 12: RESIDENT BIRD SPECIES DETECTED DURING 2021 LATE WINTER SURVEYS**

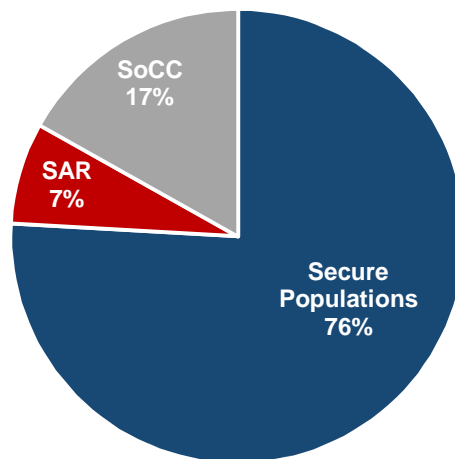
#### 6.2.2.2 Spring Survey Summary

The spring survey was comprised of five visits along four transect-based survey routes to conduct point count surveys, as well as diurnal watch counts and a breeding nocturnal owl survey. The survey methodology, including the details of the point-count and transect locations and results are presented in **Appendix H** and on **Figure 10**.

The highest period of migration was determined for each transect based on species diversity. This period occurred in mid to late May for two of the surveyed transects (Transect 2 and 4). However, along the remaining two transects (i.e., transect 1 and 3), species diversity was highest in late May, indicating that some migration likely continues into early June.

A total of 83 species were identified during the Spring Survey program, including two owl species that were detected during the breeding nocturnal owl survey (i.e., Great Horned Owl (*Bubo virginianus*) and Northern Saw-whet Owl (*Aegolius acadicus*)). Of the 83 bird species detected, six were identified as SAR and 16 were identified as SoCC. The most commonly detected species within the assessment area during the spring surveys had secure or apparently secure populations within Nova Scotia (i.e., with an ACCDC provincial ranking of S4 or S5), as broken down in **Figure 13**. The most frequently detected species included:

- White-throated Sparrow (*Zonotrichia albicollis*);
- Hermit Thrush (*Catharus guttatus*);
- Palm Warbler (*Setophaga palmarum*);
- Common Yellowthroat (*Geothlypis trichas*);
- Dark-eyed Junco (*Junco hyemalis*);
- Yellow-rumped Warbler (*Setophaga coronata*);
- Blue Jay (*Cyanocitta cristata*);
- Black-capped Chickadee;
- Northern Flicker (*Colaptes auratus*); and
- Mourning Dove (*Zenaida macroura*).



**FIGURE 13: BIRD SPECIES DETECTED DURING 2021 SPRING**

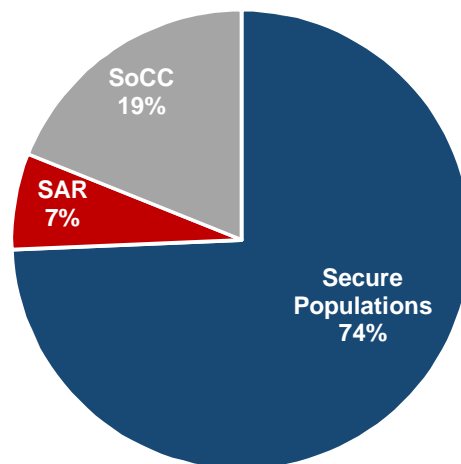
### 6.2.2.3 Summer Survey Summary

The Summer Survey program was comprised of two visits to the same four transect-based survey routes with point counts, and a breeding Common Nighthawk survey. The transect-based survey routes were conducted once each during both the early and late-breeding period.

The survey methods, including the details of the survey locations and timings of the diurnal watch counts, as well as the results, are presented in **Appendix H** and on **Figure 10**.

A total of 74 species were detected during the Summer Survey program. Of the 74 bird species detected, five were identified as SAR and 16 were identified as SoCC. The most commonly detected species within the assessment area during the summer surveys had secure or apparently secure populations within Nova Scotia (i.e., with an ACCDC provincial ranking of S4 or S5), as broken down in **Figure 14**. The most frequently detected species included:

- Common Yellowthroat (*Geothlypis trichas*);
- White-throated Sparrow (*Zonotrichia albicollis*);
- Hermit Thrush (*Catharus guttatus*);
- Magnolia Warbler (*Setophaga magnolia*);
- Palm Warbler (*Setophaga palmarum*);
- Ovenbird (*Seiurus aurocapilla*);
- Alder Flycatcher (*Empidonax alnorum*);
- Black-and-White Warbler (*Mniotilta varia*);
- Mourning Dove (*Zenaida macroura*); and
- Chestnut-sided Warbler (*Setophaga pensylvanica*).



**FIGURE 14: RESIDENT BIRD SPECIES DETECTED DURING THE 2021 SUMMER SURVEY PROGRAMS**

#### 6.2.2.4 Fall Survey Summary

The Fall Survey program was comprised of five visits, corresponding with the Spring Survey program, along point count surveys along transect-based survey routes, as well as diurnal watch counts.

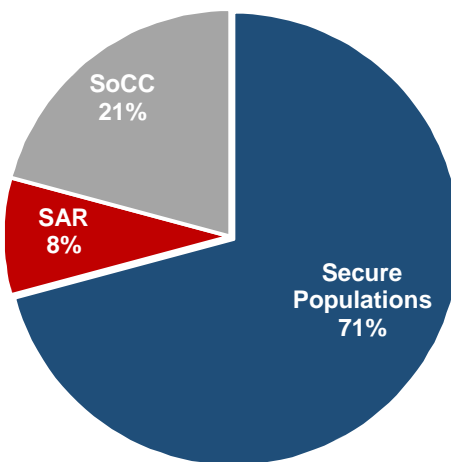
The survey methods, including the details of the survey locations and timings of the diurnal watch counts, as well as the results, are presented in **Appendix H** and on **Figure 10**.



The highest period of migration was determined for each transect based on species diversity, as was for the spring migration period. Generally, this period occurred between mid to late September and early October. The highest fall migration species diversity along of the two transects; however, occurred in late August.

A total of 70 species were identified during the Spring Survey program. Of the 70 bird species detected, 6 were identified as SAR and 17 were identified as SoCC. The most commonly detected species within the assessment area during the fall surveys had secure or apparently secure populations within Nova Scotia (i.e., with an ACCDC provincial ranking of S4 or S5), as broken down in **Figure 15**, with two exceptions; American Robin and Purple Finches. Although American Robins and Purple Finches have ACCDC S-ranks for of S5 and S4S5, respectively for breeding populations in Nova Scotia; the non-breeding populations of American Robin and Purple Finch are considered to be SoCC with ACCDC S-ranks of S3 and S3S4, respectively. The most commonly detected species within the assessment area during the fall surveys included:

- American Goldfinch (*Spinus tristis*);
- Blue Jay (*Cyanocitta cristata*);
- Dark-eyed Junco (*Junco hyemalis*);
- Palm Warbler (*Setophaga palmarum*);
- Yellow-rumped Warbler (*Setophaga coronata*);
- Black-capped Chickadee (*Poecile atricapillus*);
- American Robin (*Turdus migratorius*);
- Purple Finch (*Haemorhous purpureus*);
- Common Yellowthroat (*Geothlypis trichas*); and
- White-throated Sparrow (*Zonotrichia albicollis*).



**FIGURE 15: RESIDENT BIRD SPECIES DETECTED DURING 2021 FALL SURVEYS**

#### 6.2.2.5 Nocturnal Avian Migration

This section provides an overview of the nocturnal migration aspect of the avian VEC. **Appendix I** provides a detailed assessment of the radar and acoustic monitoring surveys conducted at the Project area in 2021.

Per the *Guide to Preparing an EA Registration Document for Wind Power Projects in Nova Scotia* (Nova Scotia Government 2021) avian radar and acoustic studies were completed at the Project during the spring and fall migration periods 2021. The location of the radar and acoustic equipment was chosen based on access to the Project area, site security and clear sight lines for the equipment. The radar was located approximately 635 m from the nearest proposed turbine and the acoustic sensors were placed near the radar location and throughout the Project area. This distribution of radar and acoustic sensors allowed for sampling of nocturnal migrants throughout the Project area and provided a representation of nocturnal avian movements at the Project area. Spring migration data were collected between May 10 and June 3, 2021 and fall data were collected between July 16 and October 31, 2021.

Avian radar data were collected using Furuno x-band marine radars. Due to limited available radar equipment at the time of initiating the spring migration season, different radar models were used at the Project during spring and fall. While the radar model and antenna orientation were different across seasons, both systems have been used in the past to assess migratory bird movements at proposed wind energy projects in the Maritimes and have been proven to provide an adequate representation of bird passage rates and flight heights.

Two types of acoustic monitoring devices were used consistently across the spring and fall seasons to detect nocturnal flight calls (NFCs) of migratory birds at the Project area. A 21c microphone system (Old Bird) (Old Bird Inc., Ithaca, New York, USA) was deployed in conjunction with the radar. In addition, a network of acoustic sensors (Audiomoths™) were deployed across the Project area to record NFCs. Acoustic sensors were programmed to start recording up to an hour prior to sunset, and to stop after sunrise. The exact range of each recording unit is unknown but thought to be approximately 200 m or more for the Old Bird system (i.e., the unit placed near the radar site) and approximately 100 m for the Audiomoth™ units (i.e., the units located at the radar site and across the Project area).

While some level of migration was observed on most nights, a large proportion of the migratory activity observed in each season was limited to a few nights. Also, most activity was observed when favourable tailwinds were present. These findings are typical to other radar and acoustic studies completed in Nova Scotia (e.g., Peckford and Taylor, 2008). When examining nights when large numbers of targets were detected (i.e., when most of the migration occurred) the bulk of the migratory movements were detected at around 500 m altitude and there tended to be fewer of targets at lower altitudes (i.e., within the Rotor Sweep Area [RSA]).

When examining differences in detections within nights, most activity was observed during the middle of the night, and secondarily during the early portion of the night. Fewer detections were observed near dawn, suggesting that migrants may not be using the Project area as a stopover location.

Overall, the observations made at the Project were in general alignment with radar and acoustic monitoring completed in other areas of Nova Scotia in that migration was focused on a few nights during the season when tailwinds were light to moderate.

### 6.2.3 Bats and Bat Habitat

Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*M. septentrionalis*), and the Tri-Colored bat (*Pipistrellus subflavus*) are known bat species that reside in Nova Scotia. All three are small-bodied bats typical of the plain-nosed bats and all three are listed provincially and federally as Endangered. The listing is the result of drastic bat population declines that have occurred due to a fungal infection (white nose syndrome) that appears to severely affect hibernating bats. It is believed that mortalities affecting up to 90% of populations result from interference with hibernation and starvation during the winter period. The syndrome was first observed in 2006 in New York and has been since confirmed in Ontario, Quebec, New Brunswick and Nova Scotia (EC 2014b). One other bat species, *Eptesicus fuscus*, commonly called the Big Brown Bat, is also known to reside in Nova Scotia however, few sightings have been recorded. The Hoary Bat (*Lasiurus cinereus*), Eastern Red Bat (*Lasiurus borealis*), and the Silver-haired Bat (*Lasionycteris noctivagans*) are migratory bat species that are less common in Nova Scotia, but are known to live in the province for a portion of the year (Moseley, 2007).

The Little Brown Myotis are distributed throughout much of Canada, with the exception of northern Canada. They are also found in southern Alaska, across the United States from coast to coast, and the higher elevation forested regions of Mexico. There is also a population of this species in Iceland; however, they are presumed to have been accidentally transported there on ships by humans. Mating occurs in the fall and they have litter sizes ranging from one to two pups, but most commonly one (Havens, A. 2006). Northern Myotis are distributed across southern Canada and as far north as Newfoundland. They also inhabit much of the United States, extending through to Florida. Mating occurs during the autumn months and they are known to only have one offspring (Ollendorff, J. 2002). The Tri-Colored Bat inhabits the southern edge of Canada, eastern United States, eastern edge of Mexico, extending as far south as northern Honduras. Mating occurs between August and October, and they are known to have one set of twins in each litter (Hamlin, M. 2004). The Big Brown Bat is known to reside as far north as southern Canada, as far south as northern South America, and the West Indies (Mulheisen, M. and K. Berry 2000).

Resident bats live in three different roosting sites: day roosts, night roosts, and hibernacula. Day and night roosts are used during the spring, summer and fall months whereas hibernacula sites are used during the winter months. Common hibernacula sites are typically caves and old mining shafts; whereas day and night roosts commonly include tree hollows, spaces between tree bark, rock crevices, buildings, and tree foliage.

The Hoary Bat (migratory) has been spotted as far north as Southampton Island in Nunavut as well as Iceland, and as far east as Bermuda and the Orkney Islands off Scotland, during the summer months. They commonly spend the winter months in California, southeastern United States, Mexico, and Guatemala. Hoary bats are thought to mate around the time of autumn migration, and their litter size can range from one to four, but are most commonly two (Anderson, S. 2002). The Eastern Red Bat