APPENDIX H
Bird Survey Report

Wedgeport Wind Farm Project - Bird Survey Report

Prepared for: AnaiaGlobal Renewable Energies

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1.0 Introduction

AnaiaGlobal Renewable Energies (Anaia), a joint venture between Membertou First Nations and GrupoGuascor from the Basque region of Spain, is proposing to construct and operate a wind energy facility located in the Municipality of the District of Argyle, Nova Scotia (the Wedgeport Wind Power Project; the "Project"). Anaia has retained Stantec Consulting Ltd. (Stantec) to assist in the environmental assessment (EA) process for this Project. To support the EA, Stantec has managed a bird field study to characterize the use of the Project Area by birds over four seasons.

1.1 PROJECT LOCATION

The proposed Project is located in the Municipality of the District of Argyle, Nova Scotia (Figure 1.1). The wind energy facility will be constructed on undeveloped land, approximately 1,132 ha (2,797 acres) in size (Project Study Area). The Project Study Area shown on Figure 1.1 includes the proposed site development area and surrounding lands where the bird study was focused.

1.1.1 Physiography and Topography

The Project is located on a peninsula approximately 2.4 km west of the rural community of Wedgeport, and immediately north of the rural community of Little River Harbor (Figure 1.1). The Project Study Area extends approximately 6 km north from Little River Harbor along the watershed divide between Little River Harbor on the west and Goose Bay on the east. (Figure 1.1). The Project Study Area is bounded on the north by Black Pond Road and Goose Lake, on the east by Highway 334, on the west by Comeaus Hill Road, and on the south by Little River Harbor and Comeaus Hill.

This area is characterized by rolling hills ranging in elevation from 45 m near Black Pond Road, to sea level, averaging about 15 m elevation along the center of the land package. Drainage is radial to the west, south and east from the center of the peninsula. The land use is a mixture of forest, wetland and exposed bedrock. The closest residences are distributed along Comeaus Hill Road on the west, Highway 334 near Wedgeport to the east (across Goose Bay), and a few sites along Black Pond Road and Goose Lake access Road to the north.

1.2 THE SURVEY PROGRAM

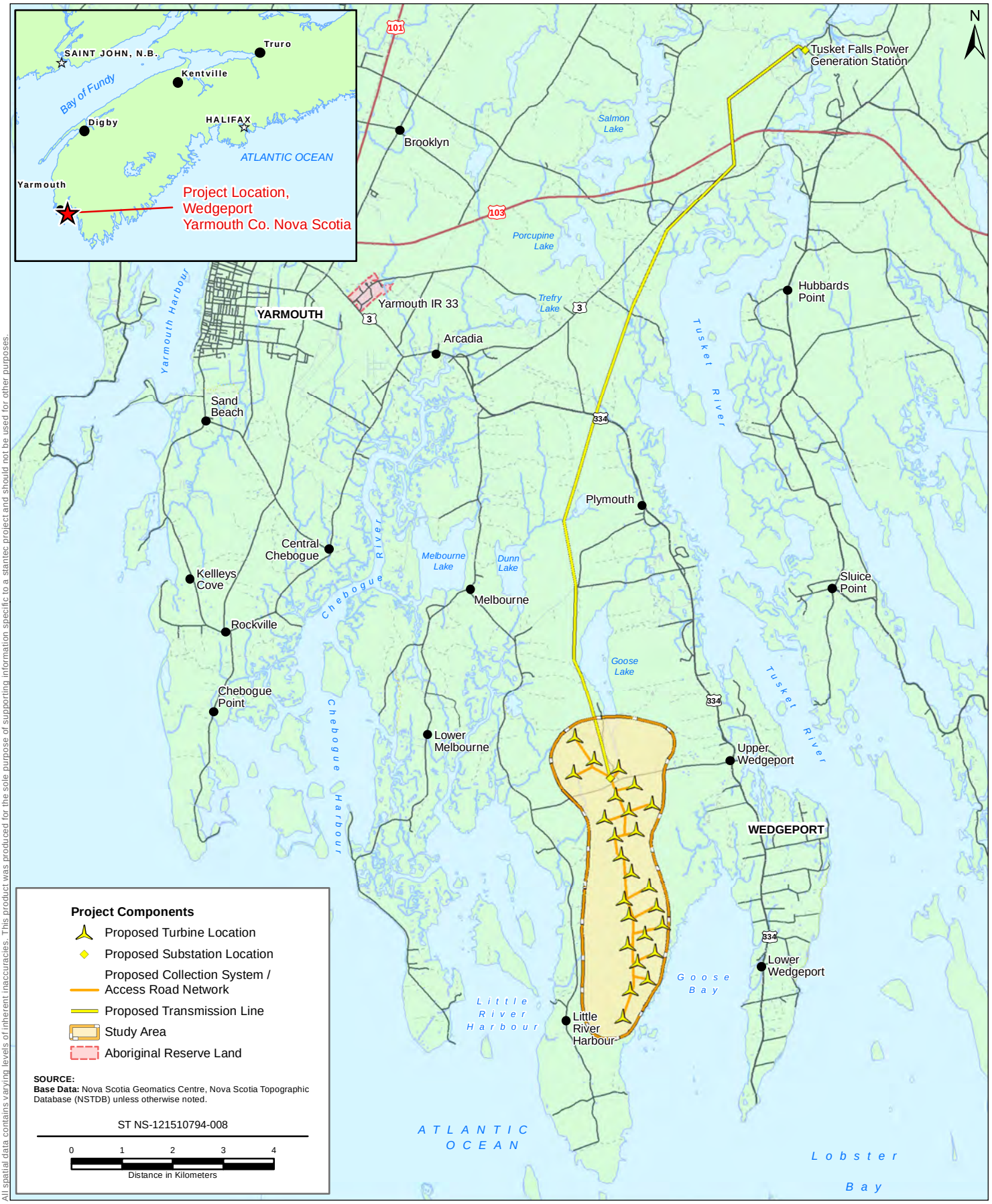
A bird monitoring protocol was developed based on previous protocols developed in consultation with the Canadian Wildlife Service (CWS), as well as Environment Canada's Recommended Protocols for Monitoring Impacts of Wind Turbines on Birds (Environment Canada 2007b). Important Birds Areas (IBAs) and other managed areas related to birds, and historical bird data available from the Maritimes Breeding Bird Atlas (MBBA) and the Atlantic Canada Conservation Data Centre (ACCDC) was were consulted to inform the preparation of the protocol.

Given the proposed facility size (up to 25 turbines) and site sensitivity ("Very High"), the Wedgeport Project is considered to be a Category 4 project based on Environment Canada's Guidance Document for Environmental Assessment (Environment Canada 2007a). The proposed sampling program and level of effort reflects the size and sensitivity of the site.

The bird monitoring program began in June 2011, and included:

- Breeding bird surveys (June 2011);
- Fall migration surveys (August-November 2011);
- Winter surveys (December 2011-March 2012);
- Owl surveys (March-April 2012); and
- Spring migration surveys (April-May 2012).

This draft report presents the results of the all five programs.



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PREPARED BY: R Sutcliffe	WEDGEPORT WIND PROJECT	FIGURE NO.: 1.1
REVIEWED BY: G. Asche	**Project Location**	DATE: Jun 07, 2012
CLIENT: AnaiaGlobal		Stantec

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2.0 Methods

The following subsections provide details on the timing and level of effort of the surveys described in the Protocol.

2.1 BREEDING BIRD SURVEYS

Breeding bird surveys were undertaken in early summer (June), at the peak of birdsong. Two visits were completed at each of 40 point count locations, one early in the period and one later in the period, separated by 5 days.

Sites were chosen to represent the two broad habitat types of forested and open. Twenty-five sites with forested habitat were surveyed, and 15 sites with open habitat were surveyed in late June. Of these 40 sites, 21 were close to (within 150 m) turbine locations, while others were located at various distances (150 m to 1.14 km) to the closest wind turbines (Figure 2.1). Surveys began at the site in the early morning, at or just after daybreak.

Unlimited distance point counts of ten minutes in duration (separated into two 5-minute periods) were conducted at each of the survey stations. All birds observed, either by sight or sound, were noted, including both species and number. Incidental observations of species flying over the survey sites, which would not normally breed in the habitats being surveyed were also recorded.

Three distance categories were used to note birds: 0-50 m from the observer, 50-100 m and greater than 100 m. The date, start time and weather were recorded at each survey station. Recorded weather data included approximate temperature, wind speed and direction, presence of precipitation, and visibility. Point counts were not done in heavy rain or in strong winds (e.g., greater than 20 km/h).

2.2 FALL MIGRATION SURVEYS

2.2.1 Transects (Stopover counts)

Seven transects, each 500 m long, (Table 2.1) were identified within the Study Area. Each transect contained five stops along their length (Figure 2.2). Birds were recorded in relation to the stops. All birds, both seen and heard were recorded during these surveys. The transect surveys typically began near sunrise, which occurred progressively later during the fall season. The date, start time and weather were recorded at each survey transect. Recorded weather data included approximate temperature, wind speed (Beaufort) and relative direction, presence of precipitation, and visibility. If a flying bird was observed, the height and direction of travel were also noted.

Table 2.1 Wedgeport Fall Migration Point Count Locations

Transect #	Start (UTM)*	End (UTM)	Description and Habitat Conditions
1	256466E , 4845626N	256903E , 4845696N	Primarily immature and young, with some mature softwood forest.
2	256527E , 4846709N	256922E , 4846977N	Partially non-forested, with some immature and mature softwood forest.
3	257695E , 4848188N	257775E , 4847691N	Primarily immature with some mature softwood forest.
4	257894E , 4848840N	258073E , 4849247N	Primarily young softwood, with some non-forested areas.
5	257226E , 4848616N	257116E , 4849102N	Primarily mature softwood, with some mature mixedwood areas.
6	256901E , 4845925N	257366E , 4846122N	Primarily mature softwood, with some non-forested areas.
7	257586E , 4846090N	258081E , 4846108N	Primarily non-forested, with some areas of young and immature mixedwood.

* NAD 83 UTM Zone 20

Surveys were scheduled to be conducted from mid-August to November, 2011. Surveys were generally conducted once weekly, with the exception of mid- to late-September, when they were conducted approximately twice weekly, to capture the core migration period.

2.2.2 Watch Counts

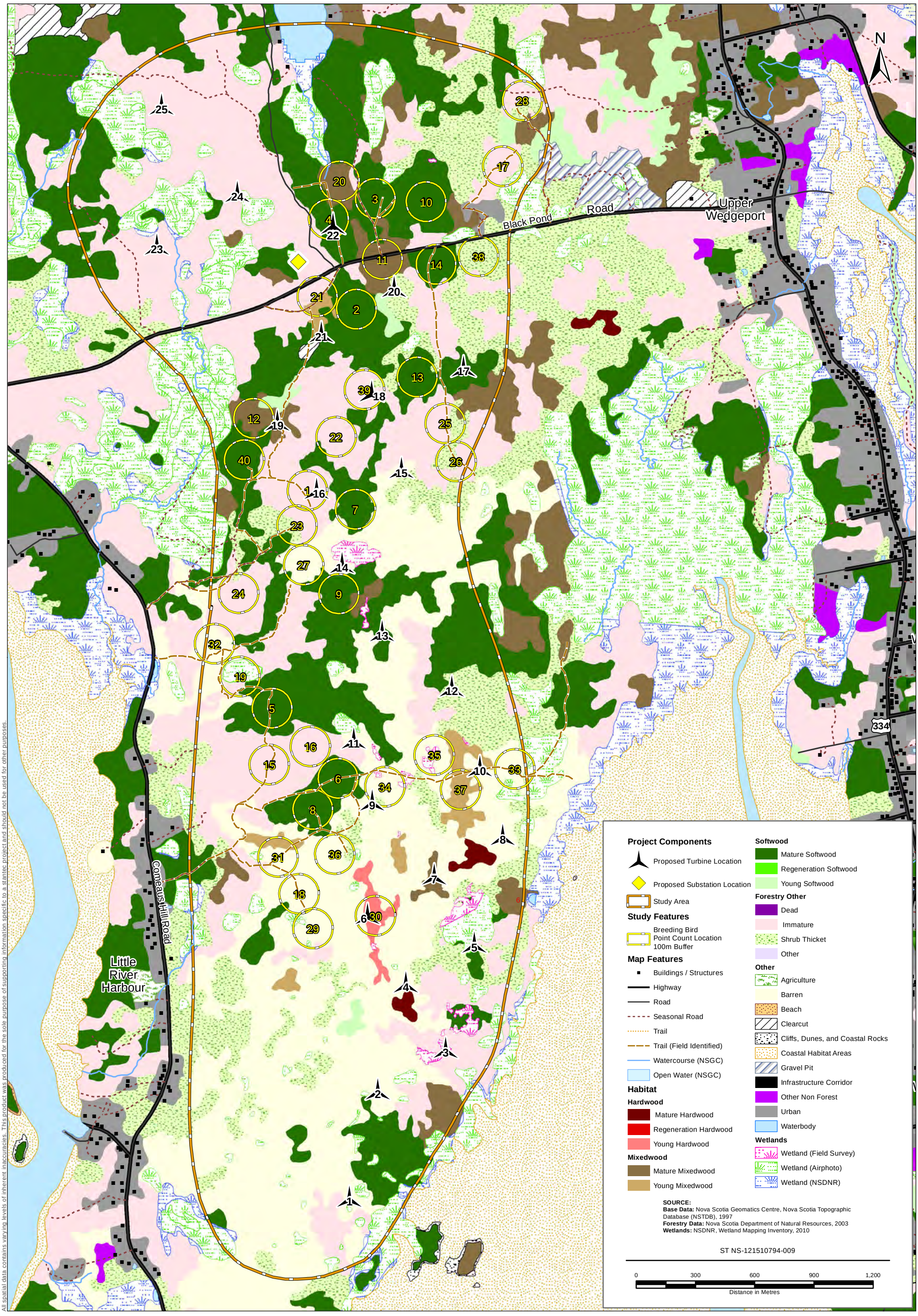
Watch count surveys were conducted weekly at each transect. One watch count station was established at each transect and was selected in the field to have a wide and clear view of the sky. The locations of the watch counts are shown on Figure 2.2. Each watch count survey was 10 minutes in duration. Flying birds were the focus during this survey, though all birds were recorded. The date, start time, weather, and height and direction of travel of each bird were noted.

2.2.3 Raptor Survey

During one survey visit, a two hour raptor watch, focusing on raptor migration was conducted 40 m south of transect 1, between stops 4 and 5, in open habitat that afforded a panoramic view of the sky. The watch began at noon, and continued until 2:00 pm. Data was collected using the same protocol as the migration surveys. All flying birds observed during this period were noted. The height and direction of flight of each bird was recorded, along with the distance of each bird from the observer.

2.3 WINTER SURVEYS

Winter surveys were conducted over two consecutive days in each of December, January and February, by walking the same seven transects surveyed during migration, including conducting watch counts at each transect.



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PREPARED BY: C. Shupe	WEDGEPORT WIND PROJECT	FIGURE NO.: 2.1
REVIEWED BY: Miranda Huskins-Shupe	**Breeding Bird Survey Locations**	DATE: Jun 18, 2012
AnaiaGlobal RENEWABLE ENERGIES www.anaiaenergy.com		Stantec

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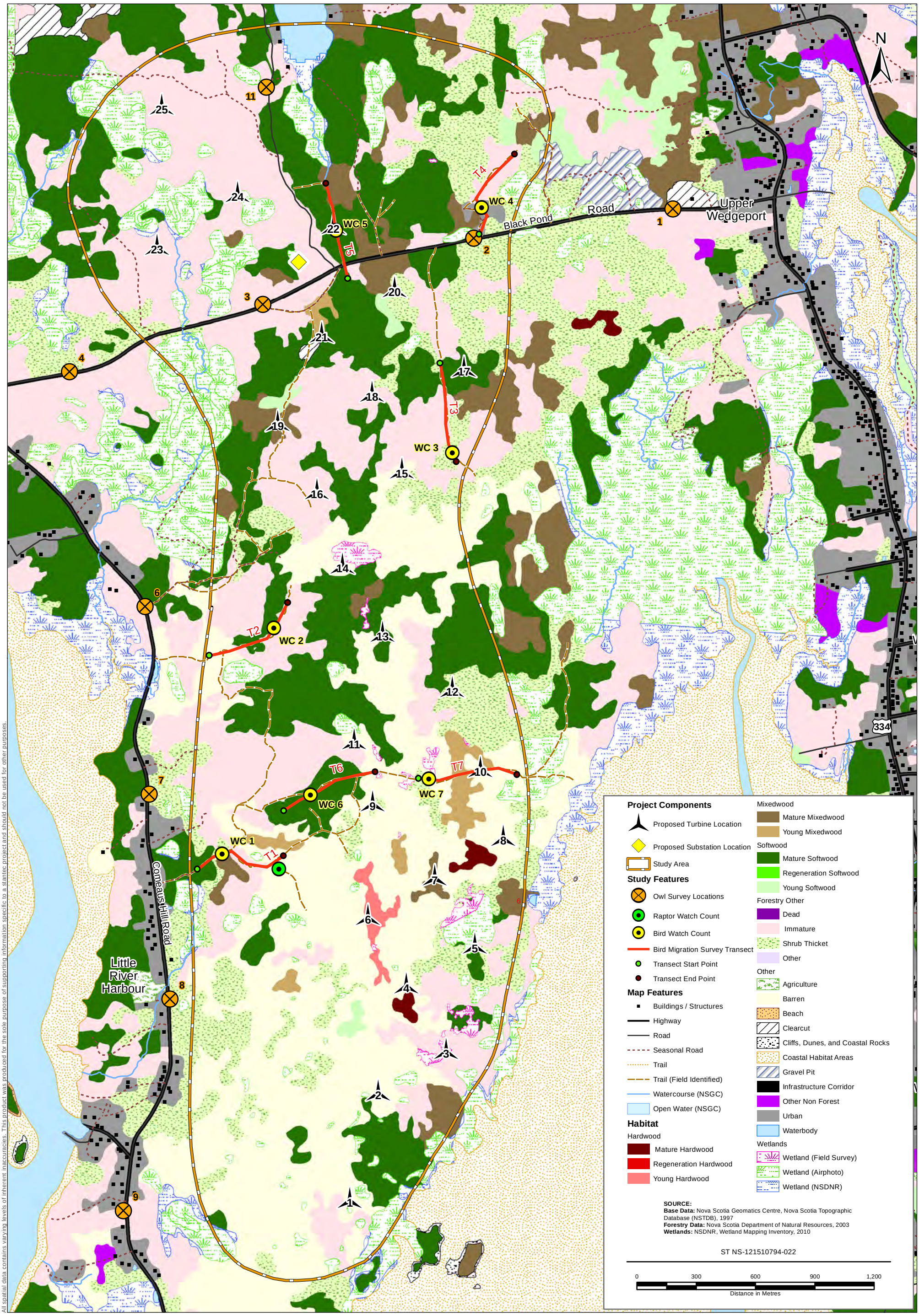

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PREPARED BY: C. Shupe REVIEWED BY: Miranda Huskins-Shupe AnaiaGlobal RENEWABLE ENERGIES www.anaiaenergy.com	WEDGEPORT WIND PROJECT **Owl and Migratory Bird Survey Locations**	FIGURE NO.: 2.2 DATE: Jun 18, 2012 Stantec

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2.4 OWL SURVEYS

Owl surveys were conducted at 11 sites, following the protocols set out in the Atlantic Canada Nocturnal Owl Survey (Bird Studies Canada 2007). Table 2.2 lists the coordinates of each survey station, and they are illustrated on Figure 2.2. Surveys were conducted twice at each location, on April 1 and May 2, 2012. Given the size of the site, the 11 survey locations were spread out along Black Pond Road and Comeaus Hill Road, spaced approximately 1 km apart, which is closer than the 2 km spacing used in the Atlantic Canada Nocturnal Owl Survey.

Table 2.2 Coordinates of Owl Survey Stations

Survey Station	UTM (NAD83 Zone 20)	
	Easting	Northing
1	258871.84	4848969.46
2	257863.90	4848822.47
3	256797.16	4848486.49
4	255818.62	4848146.31
5	254882.08	4848898.06
6	256200.80	4846957.78
7	256221.80	4846008.64
8	256326.79	4844971.30
9	256091.60	4843900.37
10	256574.58	4842875.63
11	256814.48	4849586.48

2.5 SPRING MIGRATION

Spring migration surveys included both transect and watch count surveys, and were conducted at the same locations as were surveyed in the fall, and followed the same protocol. Surveys were scheduled to be conducted from mid-April to late May, 2012. Surveys were generally conducted once weekly, with the exception of the first three weeks of May, when they were conducted twice weekly, to capture the core migration period.

3.0 Results and Discussion

3.1 BREEDING BIRDS

3.1.1 Breeding Bird Surveys

Breeding bird surveys were conducted between June 13th, and June 24th, 2011, which is within the recommended period of time for completing this type of survey. Point counts were only conducted on days when the weather conditions were suitable. Table 3.1 below summarizes the weather conditions encountered during field survey days.

Table 3.1 Weather Conditions Encountered during Breeding Bird Surveys in 2011

Date	Point Counts Completed	Surveyor(s)	Temperature (°C)	Wind Condition (Beaufort)	Cloud Cover (%)
6/13/2011	5, 6, 15, 16, 19, 32, 34	RWL	11	3	100
6/14/2011	2, 3, 4, 10, 11, 14, 17, 20, 21, 28, 38	MJC	10	3	100
6/16/2011	1, 7, 8, 12, 13, 18, 22, 23, 25, 26, 27, 29, 30, 32, 33, 35, 37, 39, 40	MJC/RWL	13	2	50
6/17/2011	9, 16, 24	RWL	14	2	100
6/22/2011	2, 3, 4, 7, 9, 10, 11, 13, 20, 21, 22, 25, 26, 39	FLL	12	1	50
6/23/2011	5, 6, 8, 15, 16, 18, 19, 29, 30, 31, 33, 34, 35, 36, 37	FLL	12	1	95
6/24/2011	1, 10, 12, 14, 17, 23, 27, 28 32, 40	RWL / FLL	14	3 to 4	100

Key:
RWL - Richard LaPaix
MJC - Michael Crowell
FLL - Fulton Lavender

The weather during morning surveys had skies that were mainly overcast, with an average temperature between 10°C and 14°C. In general wind conditions were light, typically 1-2 on the Beaufort scale. There were some instances where wind speed was higher, however, because forest breeding birds become less detectable when wind speeds rise, point counts were discontinued if the wind speed rose higher than 3 on the Beaufort scale.

A range of habitat types were sampled in the Study Area. These habitat types included softwood, mixedwood, and hardwood stands of various ages, along with additional barren-type

habitat. Given the patchy nature of the habitats within the Study Area, surveyed habitats were grouped into two habitat types, including “forested” and “open”.

A total of 54 bird species were observed during the 2011 breeding bird surveys, including incidentally observed and fly-over species. Of these, 48 could potentially breed within the available habitat within the Study Area, and 41 were recorded within 100 m of a point count. Table 3.2 presents all birds observed during the two breeding bird survey visits in 2012.

Table 3.2 Species Encountered during 2011 Breeding Bird Surveys

Common Name	Latin Name	General Status Rank	AC CDC S-Rank
Ring-necked Pheasant	*Phasianus colchicus*	Exotic	SNA
Ruffed Grouse	*Bonasa umbellus*	Secure	S4S5
Common Loon	*Gavia immer*	May Be At Risk	S3B,S4N
Great Blue Heron	*Ardea herodias*	Secure	S4B
Turkey Vulture	*Cathartes aura*	Sensitive	S2S3B
Willet	*Tringa semipalmata*	May Be At Risk	S2S3B
Wilson's Snipe	*Gallinago delicata*	Sensitive	S3S4B
Herring Gull	*Larus argentatus*	Secure	S4S5
Great Black-backed Gull	*Larus marinus*	Secure	S4
Mourning Dove	*Zenaida macroura*	Secure	S5
Whip-poor-will	*Caprimulgus vociferus*	At Risk	S1?B
Ruby-throated Hummingbird	*Archilochus colubris*	Secure	S5B
Downy Woodpecker	*Picoides pubescens*	Secure	S5
Hairy Woodpecker	*Picoides villosus*	Secure	S5
Northern Flicker	*Colaptes auratus*	Secure	S5B
Olive-sided Flycatcher	*Contopus cooperi*	At Risk	S3B
Eastern Wood-Pewee	*Contopus virens*	Sensitive	S3S4B
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Sensitive	S3S4B
Alder Flycatcher	*Empidonax alnorum*	Secure	S5B
Blue-headed Vireo	*Vireo solitarius*	Secure	S5B
Red-eyed Vireo	*Vireo olivaceus*	Secure	S5B
Gray Jay	*Perisoreus canadensis*	Sensitive	S3S4
Blue Jay	*Cyanocitta cristata*	Secure	S5
American Crow	*Corvus brachyrhynchos*	Secure	S5
Common Raven	*Corvus corax*	Secure	S5
Black-capped Chickadee	*Poecile atricapillus*	Secure	S5
Boreal Chickadee	*Poecile hudsonica*	Sensitive	S3
Red-breasted Nuthatch	*Sitta canadensis*	Secure	S4S5
Brown Creeper	*Certhia americana*	Secure	S5

Table 3.2 Species Encountered during 2011 Breeding Bird Surveys

Common Name	Latin Name	General Status Rank	AC CDC S-Rank
Winter Wren	*Troglodytes troglodytes*	Secure	S5B
Golden-crowned Kinglet	*Regulus satrapa*	Sensitive	S4
Ruby-crowned Kinglet	*Regulus calendula*	Sensitive	S4B
Swainson's Thrush	*Catharus ustulatus*	Secure	S4S5B
Hermit Thrush	*Catharus guttatus*	Secure	S5B
American Robin	*Turdus migratorius*	Secure	S5B
Cedar Waxwing	*Bombycilla cedrorum*	Secure	S5B
Nashville Warbler	*Vermivora ruficapilla*	Secure	S5B
Northern Parula	*Parula americana*	Secure	S5B
Yellow Warbler	*Dendroica petechia*	Secure	S5B
Chestnut-sided Warbler	*Dendroica pensylvanica*	Secure	S5B
Magnolia Warbler	*Dendroica magnolia*	Secure	S5B
Yellow-rumped Warbler	*Dendroica coronata*	Secure	S5B
Black-throated Green Warbler	*Dendroica virens*	Secure	S4S5B
Blackburnian Warbler	*Dendroica fusca*	Secure	S4B
Palm Warbler	*Dendroica palmarum*	Secure	S5B
Black-and-white Warbler	*Mniotilta varia*	Secure	S4S5B
American Redstart	*Setophaga ruticilla*	Secure	S5B
Ovenbird	*Seiurus aurocapilla*	Secure	S5B
Common Yellowthroat	*Geothlypis trichas*	Secure	S5B
White-throated Sparrow	*Zonotrichia albicollis*	Secure	S5B
Dark-eyed Junco	*Junco hyemalis*	Secure	S4S5
Common Grackle	*Quiscalus quiscula*	Secure	S5B
Purple Finch	*Carpodacus purpureus*	Secure	S4S5
American Goldfinch	*Carduelis tristis*	Secure	S5

The breeding bird community observed in the Study Area is typical of environments in western Nova Scotia. The relatively low species diversity reflects the low diversity and quality of breeding bird habitat found within the Study Area, and most of the species are common forest or edge species.

Forty-three species were observed in the forested habitats during breeding bird surveys, while 37 species were observed in the open habitats. Table 3.3 below summarizes the species richness found during the surveys.

Table 3.3 Species Richness by Habitat Type

Habitat	**Number of Species within 100 m of Points	Sample Size
Forested	38 (37, 26)	25
Open	37 (33, 24)	15

** Bracketed numbers are (Early visit richness, Late visit richness)

In the forested habitats, 34 species were observed during the early June surveys, and 42 species were observed during the later June surveys. In open habitats, 31 species were observed during early June surveys, and 33 species were observed during later surveys.

For the analysis of forest breeding birds, to associate species richness and relative densities to habitats, waterfowl and waterbirds are not analyzed since their primary habitat is not forest, and raptors were excluded as their territory size is typically much greater than the area being sampled at point counts. All fly-by observations are excluded. All observations of species greater than 100 m from the observer are also excluded. Therefore, the analysis is restricted to gamebirds, passerines and woodpeckers observed within 100 m of the observer, and excludes colonial species such as colonial swallows. Table 3.4 below provides the density of each breeding species as recorded in the two broad habitat types during the point counts.

Table 3.4 Densities of Forest and Open Habitat Species.

Common Name	Latin Name	Density (per 100 Ha)		
		Forested Habitats	Open Habitats	Overall
Ruffed Grouse	*Bonasa umbellus*	0	4.25	1.59
Mourning Dove	*Zenaida macroura*	3.82	6.37	4.78
Ruby-throated Hummingbird	*Archilochus colubris*	1.27	0	0.80
Northern Flicker	*Colaptes auratus*	1.27	0	0.80
Eastern Wood-Pewee	*Contopus virens*	1.27	0	0.80
Yellow-bellied Flycatcher	*Empidonax flaviventris*	29.30	19.11	25.48
Alder Flycatcher	*Empidonax alnorum*	7.64	12.74	9.55
Blue-headed Vireo	*Vireo solitarius*	8.92	4.25	7.17
Red-eyed Vireo	*Vireo olivaceus*	1.27	0	0.80
Gray Jay	*Perisoreus canadensis*	6.37	2.12	4.78
Blue Jay	*Cyanocitta cristata*	8.92	6.37	7.96
American Crow	*Corvus brachyrhynchos*	0	2.12	0.80
Black-capped Chickadee	*Poecile atricapillus*	20.38	10.62	16.72
Boreal Chickadee	*Poecile hudsonica*	15.29	8.49	12.74
Red-breasted Nuthatch	*Sitta canadensis*	1.27	0	0.80
Brown Creeper	*Certhia americana*	0	2.12	0.80
Winter Wren	*Troglodytes troglodytes*	7.64	6.37	7.17

Table 3.4 Densities of Forest and Open Habitat Species.

Common Name	Latin Name	Density (per 100 Ha)		
		Forested Habitats	Open Habitats	Overall
Golden-crowned Kinglet	*Regulus satrapa*	36.94	14.86	28.66
Ruby-crowned Kinglet	*Regulus calendula*	0.00	2.12	0.80
Swainson's Thrush	*Catharus ustulatus*	10.19	4.25	7.96
Hermit Thrush	*Catharus guttatus*	17.83	19.11	18.31
American Robin	*Turdus migratorius*	2.55	6.37	3.98
Cedar Waxwing	*Bombycilla cedrorum*	0.00	2.12	0.80
Northern Parula	*Parula americana*	6.37	0	3.98
Yellow Warbler	*Dendroica petechia*	2.55	2.12	2.39
Chestnut-sided Warbler	*Dendroica pensylvanica*	5.10	12.74	7.96
Magnolia Warbler	*Dendroica magnolia*	62.42	44.59	55.73
Yellow-rumped Warbler	*Dendroica coronata*	12.74	12.74	12.74
Black-throated Green Warbler	*Dendroica virens*	36.94	16.99	29.46
Blackburnian Warbler	*Dendroica fusca*	3.82	0	2.39
Palm Warbler	*Dendroica palmarum*	7.64	21.23	12.74
Black-and-white Warbler	*Mniotilta varia*	21.66	29.72	24.68
American Redstart	*Setophaga ruticilla*	10.19	6.37	8.76
Ovenbird	*Seiurus aurocapilla*	17.83	2.12	11.94
Common Yellowthroat	*Geothlypis trichas*	28.03	76.43	46.18
White-throated Sparrow	*Zonotrichia albicollis*	45.86	63.69	52.55
Dark-eyed Junco	*Junco hyemalis*	17.83	25.48	20.70
Common Grackle	*Quiscalus quiscula*	1.27	0	0.80
Purple Finch	*Carpodacus purpureus*	6.37	12.74	8.76
American Goldfinch	*Carduelis tristis*	7.64	6.37	7.17

The most frequently encountered species overall during 100 m radius 10-minute breeding bird surveys in 2011 were (in descending order), White-throated Sparrow, Magnolia Warbler, Common Yellowthroat, and Black-and-white Warbler.

The most abundant species observed overall was White-throated Sparrow, with an estimated 55.7 pairs per 100 Ha. The most abundant species in forested habitats was Magnolia Warbler, with an estimated 62.4 pairs per 100 Ha, and the most abundant species in open habitats was Common Yellowthroat, with an estimated 76.4 pairs per 100 ha.

3.1.2 Species at Risk and Species of Conservation Concern

Species at Risk are any wildlife species listed in Schedule 1 of *SARA* as "Extirpated", Endangered or Threatened or listed by NSDNR as At Risk under the Nova Scotia *Endangered Species Act* (NSESA).

Species of Conservation Concern (SOCC) are listed wildlife species not under the protection of *SARA* or the NSESA (i.e., listed as "Special Concern" in Schedule 1 of SARA; listed in Schedule 2 or 3 of SARA; ranked as S1, S2, or S3 by AC CDC; and/or ranked "Yellow" (Sensitive) by NSNDR

Two *SARA*-listed Threatened species (Whip-poor-will and Olive-sided Flycatcher) were encountered during surveys, however incidentally, as neither was recorded during 10-minute point counts. Nine SOCC were encountered during the 2011 surveys (Table 3.5).

Table 3.5 Species of Conservation Concern Noted during Breeding Bird Surveys in 2011

Common Name	Latin Name	NS DNR Status	AC CDC Rank	Breeding Habitat
Common Loon	*Gavia immer*	May Be At Risk	S3BS4N	Lakes, ponds
Turkey Vulture	*Cathartes aura*	Sensitive	S2S3B	Isolated rock ledges, crevices
Wilson's Snipe	*Gallinago delicata*	Sensitive	S2S3B	Marshy areas, close to water
Willet	*Tringa semipalmata*	May Be At Risk	S2S3B	Saltmarshes and sand dunes
Eastern Wood-Pewee	*Contopus virens*	Sensitive	S3S4B	Forests
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Sensitive	S3S4B	Forests
Gray Jay	*Perisoreus canadensis*	Sensitive	S3S4	Forests
Boreal Chickadee	*Poecile hudsonica*	Sensitive	S3	Forests
Golden-crowned Kinglet	*Regulus satrapa*	Sensitive	S4	Forests
Ruby-crowned Kinglet	*Regulus calendula*	Sensitive	S4B	Forests

3.1.2.1 Whip-poor-will

One Whip-poor-will was recorded incidentally west of the southern end of the Study Area, off of Comeaus Hill Road. Whip-poor-will is ranked as At Risk by NSDNR, due to its Threatened status under Schedule 1 of *SARA*. This crepuscular species feeds on flying insects during the evenings and roots on the ground during the day. Whip-poor-wills avoid wide-open spaces and dense forests, preferring semi-open or patchy forests, and barrens with nearby shrubby pastures or wetlands with perches (COSEWIC 2009). Whip-poor-will have experienced long-term population declines. Habitat loss and degradation as well as changes to insect populations are thought to have contributed to their decline.

3.1.2.2 Olive-sided Flycatcher

One Olive-sided Flycatcher was recorded on June 22, 2011, during the second point count survey of point 11, located along Black Pond Road. The area in which it was expected to be singing is the wetland at the southern end of Goose Lake, north of Turbine 3 and point count 20. In an attempt to get further information on its activity in the area, Surveyors went to the southern end of Goose Lake and performed some play-backs, with no response. As Olive-sided Flycatchers will travel considerable distances to feed, it was not surprising that the bird was not re-encountered in the same area in which it had been heard. The bird was not heard during surveys of points 3, 4, or 20, which are even closer to where the bird was heard singing.

3.2 FALL MIGRATION

3.2.1 Survey Effort

Fall migration activity was monitored during 99 total hours of transect, watch counts and raptor watch observation over 33 individual survey days from August 19 – November 13, 2011, representing 16 visits to each of the seven transect/watch counts. Transects and watch count locations were generally surveyed once weekly, with the exception of mid- to late-September, when they were conducted twice weekly, to capture the core migration period. Surveys were in fact conducted over 14 days in September. To survey all seven transects and watch count locations, surveys were conducted over 2-3 (usually) consecutive days until all transects and watch counts were surveyed for the target period.

3.2.2 Weather Conditions

The weather conditions during the fall survey period were generally good to fair. Table 3.6 summarizes the weather conditions encountered during the 14 fall point counts.

Table 3.6 Summary of Conditions During Fall Surveys

Date	Transect	Surveyor(s)	Average Temp. (°C)	Humidity (%)	Wind (Direction and Beaufort)	Visibility (km)	Cloud Cover (%)
19-Aug-11	T4 , T5	M Pothier	18	94%	S #3	4.8	70
20-Aug-11	T1, T2, T6, T7	M Pothier	19	94%	S #2	24	70
21-Aug-11	T3	M Pothier	19	88%	S #3	24	70
25-Aug-11	T3	M Pothier	19	98%	S #5	0.3	100
27-Aug-11	T1, T7, T6, T2, T5, T4	M Pothier	16	100%	#0	0.2	100
1-Sep-11	T1, T2, T3, T4, T5, T6, T7	RWL	22	na	#2	"Good"	50
3-Sep-11	T1, T7, T6, T2, T5, T4, T3	M Pothier	15	83%	SW #4	24	10

Table 3.6 Summary of Conditions During Fall Surveys

Date	Transect	Surveyor(s)	Average Temp. (°C)	Humidity (%)	Wind (Direction and Beaufort)	Visibility (km)	Cloud Cover (%)
6-Sep-11	T5	M Pothier	17	94%	NW #2	24	90
7-Sep-11	T2	M Pothier	16	88%	E #5	19	100
9-Sep-11	T3	M Pothier	18	83%	NW #3	24	100
10-Sep-11	T1, T7, T6, T2, T5, T4	M Pothier	14	63%	NW #4	24	0
15-Sep-11	T1, T2, T6, T7	RWL	20	na	S #2	"Good"	100
16-Sep-11	T3, T4, T5	RWL	16	na	#3	"Good"	na
17-Sep-11	T1, T6, T7, T2	M Pothier	12	72%	NW #3	24	0
18-Sep-11	T3, T5, T4	M Pothier	14	59%	NE #2	24 KM	100
20-Sep-11	T1, T2, T6, T7	RWL	16	na	#2	"Excellent"	na
21-Sep-11	T3, T4, T5	RWL	18	na	#2	"Good"	na
24-Sep-11	T1, T6, T7	M Pothier	18	100%	SW #3	0.4	100
25-Sep-11	T2, T3, T5, T4	M Pothier	17	100%	W #2	0.4	100
1-Oct-11	T3	M Pothier	17	100%	S #3	0.4	100
2-Oct-11	T1, T6, T7, T2, T5, T4	M Pothier	18	94%	E #4	19	100
6-Oct-11	T1, T6, T7, T2	M Pothier	7	53%	NW #6	24	40
7-Oct-11	T3, T5, T4	M Pothier	7	45%	NW #4	24	0
15-Oct-11	T1, T6, T7, T2	M Pothier	15	82%	SW #6	13	0
16-Oct-11	T3, T5, T4	M Pothier	14	67%	SW #6	29	0
22-Oct-11	T1, T6, T7, T2	M Pothier	12	77%	SW #2	19	20
23-Oct-11	T3, T5, T4	M Pothier	10	77%	NW #2	24	20
29-Oct-11	T1, T6, T7, T2	M Pothier	5	57%	W #2	24	10
30-Oct-11	T3, T5, T4	M Pothier	4	100%	N #6	4.8	100
5-Nov-11	T1, T6, T7, T2	M Pothier	5	45%	N #4	24	40
6-Nov-11	T3, T5, T4	M Pothier	5	66%	SW #4	24	0
12-Nov-11	T1, T6, T7, T2	M Pothier	6	57%	W #4	24	50
13-Nov-11	T3, T5, T4	M Pothier	8	62%	S #3	16	0

Surveyors:
Melvin Pothier
Richard LaPaix

The weather conditions during morning surveys had skies that were mainly overcast, with an average temperatures between 16°C and 22°C. During late October and early November

surveys temperatures were noticeably lower, generally 5°C to 10°C. Wind conditions were variable, ranging from calm (0) to Beaufort 6, and just over 3 on average.

3.2.3 Transect Counts

Fall migration transect counts were conducted between August 19, and November 13, 2011, which is within the recommended period of time for completing this type of survey.

Table 3.7 lists the 62 species, identified during the fall migration transect surveys. These species fall within six bird group categories: gamebirds, waterbirds, raptors, shorebirds, waterfowl, and landbirds. No owl species were observed during the surveys.

Table 3.7 Bird Species Reported During Fall Transect Surveys.

Common Name	Latin Name	Bird Group	NS DNR Rank	S Rank
Ruffed Grouse	*Bonasa umbellus*	Gamebird	Secure	S4S5
Great Blue Heron	*Ardea herodias*	Waterbird	Secure	S4B
Turkey Vulture	*Cathartes aura*	Raptor	Sensitive	S2S3B
Sharp-shinned Hawk	*Accipiter striatus*	Raptor	Secure	S4S5B
Broad-winged Hawk	*Buteo platypterus*	Raptor	Secure	S4S5B
Red-tailed Hawk	*Buteo jamaicensis*	Raptor	Secure	S5
American Kestrel	*Falco sparverius*	Raptor	Secure	S5B
Black-bellied Plover	*Pluvialis squatarola*	Shorebird	Secure	S4M
Herring Gull	*Larus argentatus*	Waterbird	Secure	S4S5
Great Black-backed Gull	*Larus marinus*	Waterbird	Secure	S4
Mourning Dove	*Zenaida macroura*	Landbird	Secure	S5
Downy Woodpecker	*Picoides pubescens*	Landbird	Secure	S5
Hairy Woodpecker	*Picoides villosus*	Landbird	Secure	S5
Northern Flicker	*Colaptes auratus*	Landbird	Secure	S5B
Olive-sided Flycatcher	*Contopus cooperi*	Landbird	At Risk	S3B
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Landbird	Sensitive	S3S4B
Alder Flycatcher	*Empidonax alnorum*	Landbird	Secure	S5B
Blue-headed Vireo	*Vireo solitarius*	Landbird	Secure	S5B
Red-eyed Vireo	*Vireo olivaceus*	Landbird	Secure	S5B
Gray Jay	*Perisoreus canadensis*	Landbird	Sensitive	S3S4
Blue Jay	*Cyanocitta cristata*	Landbird	Secure	S5
American Crow	*Corvus brachyrhynchos*	Landbird	Secure	S5
Common Raven	*Corvus corax*	Landbird	Secure	S5
Black-capped Chickadee	*Poecile atricapillus*	Landbird	Secure	S5
Boreal Chickadee	*Poecile hudsonica*	Landbird	Sensitive	S3
Red-breasted Nuthatch	*Sitta canadensis*	Landbird	Secure	S4S5

Table 3.7 Bird Species Reported During Fall Transect Surveys.

Common Name	Latin Name	Bird Group	NS DNR Rank	S Rank
White-breasted Nuthatch	*Sitta carolinensis*	Landbird	Secure	S4
Brown Creeper	*Certhia americana*	Landbird	Secure	S5
Winter Wren	*Troglodytes troglodytes*	Landbird	Secure	S5B
Golden-crowned Kinglet	*Regulus satrapa*	Landbird	Sensitive	S4
Ruby-crowned Kinglet	*Regulus calendula*	Landbird	Sensitive	S4B
Veery	*Catharus fuscescens*	Landbird	Secure	S4B
Swainson's Thrush	*Catharus ustulatus*	Landbird	Secure	S4S5B
Hermit Thrush	*Catharus guttatus*	Landbird	Secure	S5B
American Robin	*Turdus migratorius*	Landbird	Secure	S5B
Cedar Waxwing	*Bombycilla cedrorum*	Landbird	Secure	S5B
Tennessee Warbler	*Vermivora peregrina*	Landbird	Sensitive	S3S4B
Nashville Warbler	*Vermivora ruficapilla*	Landbird	Secure	S5B
Northern Parula	*Parula americana*	Landbird	Secure	S5B
Yellow Warbler	*Dendroica petechia*	Landbird	Secure	S5B
Magnolia Warbler	*Dendroica magnolia*	Landbird	Secure	S5B
Black-throated Blue Warbler	*Dendroica caerulescens*	Landbird	Secure	S5B
Yellow-rumped Warbler	*Dendroica coronata*	Landbird	Secure	S5B
Black-throated Green Warbler	*Dendroica virens*	Landbird	Secure	S4S5B
Blackburnian Warbler	*Dendroica fusca*	Landbird	Secure	S4B
Palm Warbler	*Dendroica palmarum*	Landbird	Secure	S5B
Bay-breasted Warbler	*Dendroica castanea*	Landbird	Sensitive	S3S4B
Black-and-white Warbler	*Mniotilta varia*	Landbird	Secure	S4S5B
American Redstart	*Setophaga ruticilla*	Landbird	Secure	S5B
Ovenbird	*Seiurus aurocapilla*	Landbird	Secure	S5B
Common Yellowthroat	*Geothlypis trichas*	Landbird	Secure	S5B
Wilson's Warbler	*Wilsonia pusilla*	Landbird	Sensitive	S3S4B
Song Sparrow	*Melospiza melodia*	Landbird	Secure	S5B
Swamp Sparrow	*Melospiza georgiana*	Landbird	Secure	S5B
White-throated Sparrow	*Zonotrichia albicollis*	Landbird	Secure	S5B
Dark-eyed Junco	*Junco hyemalis*	Landbird	Secure	S4S5
Red-winged Blackbird	*Agelaius phoeniceus*	Landbird	Secure	S4S5B
Common Grackle	*Quiscalus quiscula*	Landbird	Secure	S5B
Pine Grosbeak	*Pinicola enucleator*	Landbird	May Be At Risk	S3?B,S5N
Purple Finch	*Carpodacus purpureus*	Landbird	Secure	S4S5
American Goldfinch	*Carduelis tristis*	Landbird	Secure	S5

Table 3.8 summarizes the number of sightings and individual birds by bird group seen during the fall survey period.

Table 3.8 Fall Migration by bird group – sightings and individuals

Bird Group	# Sightings	# Individuals
Gamebirds	27	42
Landbirds	907	2288
Raptors	21	31
Shorebirds	1	1
Waterbirds	26	53
Waterfowl	1	2
Total	983	2417

The most frequently detected bird group was landbirds, followed by gamebirds.

3.2.3.1 Fall Migration Flight Height Behaviour

Due to differences in potential sensitivity of different bird groups (Kingsley and Whittam 2004), the data on migration is summarized according to seven bird groups: waterfowl (including ducks, geese and swans), waterbirds (including herons, gulls and cormorants), shorebirds (including plovers and sandpipers), raptors (including hawks, falcons, and eagles, and for the purposes of this summary, vultures), landbirds (including songbirds, and non-passerine landbirds), owls, and gamebirds (including grouse), as indicated in the above table. Although it is difficult to distinguish migrating birds and local birds, undoubtedly data on migrating birds were collected during surveys, as indicated by observations of bird species that do not breed or winter in the area and the timing of surveys. Birds observed flying within 10 m of the ground were considered to be at Tree Height (T), those flying from 10 – 40 m of the ground were considered to be at Above Tree (AT) height, those flying form 40 – 100 m were considered to be Well Above Tree height (WAT), and those birds observed flying above 100 m were described as High (H).

Table 3.9 below summarizes the transect survey bird observations by flight height presented as a percent of the total number of observations and total number of individuals. This analysis excludes birds not engaged in purposeful flight, such as land birds foraging in the trees or on the ground.

Table 3.9 Flight Behaviour of Bird Groups Observed during 2011 Transect Surveys

Bird Group	Height[1]				N[2]
	T (1-10m)	AT (<40m)	WAT (40-120m)	H (>120m)	
Landbirds	51%(31%)	47%(68%)	2%(0.4%)	-	133(470)
Raptors	27%(23%)	64%(69%)	9%(8%)	-	11(13)
Shorebirds	-	-	100%(100%)	-	1(3)
Waterbirds	8%(6%)	36%(32%)	56%(62%)	-	25(50)
Waterfowl	-	100%(100%)	-	-	1(2)

Notes:
1 Data presented are percentage of observations (percentage of individual birds) observed in each area.
2 Total number of observations (total number of individual birds).

Landbirds were the most prominent bird group recorded during the fall monitoring period. Only 2 landbirds (2% of flocks, <1% of individuals) were observed at the WAT height, and no landbirds were recorded flying at a height greater than 120 m above the ground (i.e., H flight height). Of the 470 landbirds observed flying, 68% of individuals were active at 10-40 m from the ground (AT height).

Other bird groups were seen in small numbers, and little can be interpreted from apparent differences in flight height. For example, although 100% of the observed shorebirds were noted flying at WAT height, this represents one bird, and although 63% of flying waterbirds (gulls) were observed flying at WAT height, this represents 31 birds out of a total of only 50 observed flying during the fall transect surveys.

Flocks of waterfowl flying high above the ground were notably absent, with only two individuals of an undetermined duck species being observed during the migration monitoring program, and at AT height.

Black-bellied Plover was the only shorebird observed, while Ruffed Grouse was the only gamebird species, though not observed flying.

3.2.4 Watch Counts

Species not detected during the transect surveys but detected during the watch counts included American Black Duck, Canada Goose, Double-crested Cormorant, Ruby-throated Hummingbird, and Northern Harrier.

Table 3.10 summarizes the flight behavior of the bird groups observed during the watch counts.

Table 3.10 Flight Behaviour of Bird Groups Observed during 2011 Watch Count Surveys

Bird Group	Height1				N2
	T (1-10m)	AT (<40m)	WAT (40-120m)	H (>120m)	
Landbirds	13%(5%)	83%(95%)	4%(0.5%)	1%(0.1%)	80(928)
Shorebirds	-	-	-	100%(100%)	2(45)
Raptors	11%(5%)	30%(18%)	44%(70%)	15%(7%)	27(56)
Waterbirds	7%(4%)	65%(67%)	28%(29%)	-	71(187)
Waterfowl	-	63%(15%)	13%(1%)	25%(83%)	8(139)

Notes:
1 Data presented are percentage of observations (percentage of individual birds) observed in each area.
2 Total number of observations (total number of individual birds).

As with the 2011 transect counts, landbirds were the most prominently observed bird group during watch counts. Less than one percent of landbirds were observed flying in the WAT and H flight heights. This represents six individual birds.

While the majority of flocks were relatively small, a number of observations included flocks of between 25 and an estimated 100 individuals. With the exception of a flock of 30 unidentified shorebirds flying high (H) south over the site in early September, the remaining large flocks were recorded in late October and in early November. An estimated 100 Canada geese were seen flying west, High over Watch Count 2 on October 22. The remaining large flocks were all landbirds, including 5 large flocks of American Robin (between 30 and 100 individuals per flock), observed at AT height. Other landbird observed in large flocks included Yellow-rumped Warbler, Red-winged Blackbird, Common Grackle, and American Goldfinch, all observed at AT height or less.

3.2.5 Raptor Watch

All of the species observed during the two hour raptor watch on September 20, 2011, (from noon to 2 PM) were previously recorded in either the 2011 Transect surveys, or during the watch counts. Identified species included three raptors (Northern Harrier, Sharp-shinned Hawk and Turkey Vulture), two landbirds (American Crow, American Goldfinch and Blue Jay), and two waterbirds (Great Black-backed Gull and Herring Gull), as well as unidentified shorebirds species.

Table 3.11 summarizes the flight behavior of the bird groups observed during the raptor watch.

Table 3.11 Flight Behaviour of Bird Groups Observed during the 2011 Raptor Watch

Bird Group	Height1				N2
	T (1-10m)	AT (<40m)	WAT (40-120m)	H (>120m)	
Landbirds	-	80%(75%)	20%(25%)	-	5(8)
Shorebirds	-	100%(100%)	-	-	1(6)
Raptors	-	67%(56%)	33%(45%)	-	9(11)
Waterbirds	-	39%(8%)	61%(91%)	-	49(383)

Notes:
1 Data presented are percentage of observations (percentage of individual birds) observed in each area.
2 Total number of observations (total number of individual birds).

Waterbirds were the most prominent bird group recorded during the raptor watch. Approximately 91% of the 383 individuals recorded were observed at WAT height. These were typically gull species. There were 11 raptors observed, 45% (five individuals) of which were seen flying at WAT height.

3.2.6 Species at Risk / Species of Conservation Concern

One *SARA*-listed Threatened species (Olive-sided Flycatcher) was encountered during fall surveys. Olive-sided Flycatcher is ranked as At Risk by NSDNR, and as S3B by the AC CDC. Two individuals were observed, one on transect 2, and one on transect 5. The birds were observed foraging.

Eight SOCC were encountered during the 2011 fall migration surveys (Table 3.12).

Table 3.12 Species of Conservation Concern Detected during 2011 Fall Surveys

Common Name	Latin Name	Bird Group	NS DNR Rank	AC CDC Rank
Turkey Vulture	*Cathartes aura*	Raptor	Sensitive	S2S3B
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Landbird	Sensitive	S3S4B
Gray Jay	*Perisoreus canadensis*	Landbird	Sensitive	S3S4
Boreal Chickadee	*Poecile hudsonica*	Landbird	Sensitive	S3
Golden-crowned Kinglet	*Regulus satrapa*	Landbird	Sensitive	S4
Ruby-crowned Kinglet	*Regulus calendula*	Landbird	Sensitive	S4B
Tennessee Warbler	*Vermivora peregrina*	Landbird	Sensitive	S3S4B
Bay-breasted Warbler	*Dendroica castanea*	Landbird	Sensitive	S3S4B
Wilson's Warbler	*Wilsonia pusilla*	Landbird	Sensitive	S3S4B
Pine Grosbeak	*Pinicola enucleator*	Landbird	May Be At Risk	S3?B,S5N

All except Turkey Vulture were only detected during transect surveys. SOCC that were frequently encountered in Fall include Boreal Chickadee and Golden-crowned Kinglet, whereas the other SOCC were detected on 5 or fewer surveys/locations. Most observations were of

foraging or vocalizing birds, with only single observations of three landbird SOCC, and the Turkey Vultures, observed flying, all at AT height or below.

3.3 WINTER SURVEYS

Winter surveys were conducted at each transect and watch count location once in each month of December, January and February.

3.3.1 Weather

Table 3.13 details the weather conditions during survey days in winter 2011/2012. During all of the surveys there was no snow cover and no sea ice on nearby Goose Bay and Little River Harbour. There was light rain during the December surveys, wet flurries in January, and it was overcast during February surveys.

Table 3.13 Weather Conditions Encountered during Winter Surveys in 2011/2012

Date	Transect Completed	Average Temp. (°C)	Humidity (%)	Barometric Pressure	Wind (Direction and Beaufort)	Visibility (km)	Cloud Cover
10-Dec-11	T1, T6, T7, T2	8°C	93%	101.91	NW #3	6.4 KM	100
11-Dec-11	T3, T5, T4	0°C	51%	103.41	NW #4	24 KM	30
14-Jan-12	T1, T6, T7, T2	2.5°C	75%	100.32	SW #5	19KM	100
15-Jan-12	T3, T5, T4	-10°C	72%	101.8	N #4	4.8 KM	90
25-Feb-12	T1, T6, T7, T2	5°C	65%	98.61	W #10	19KM	90
26-Feb-12	T3, T5, T4	-0.5°C	63%	101.07	NW #8	24 KM	100

3.3.2 Transect Surveys

Table 3.14 lists the 15 species identified during the winter transect surveys. These species fall within five bird group categories: waterfowl (1), gamebird (1), waterbird (1), raptor (3) and landbird (9). No owls or shorebird species were observed during the surveys.

Table 3.14 Bird Species reported during Winter Transect Surveys

Bird Group	Common Name	Latin Name	NS DNR Rank	S Rank
Waterfowl	American Black Duck	*Anas rubripes*	Secure	S5
Gamebird	Ruffed Grouse	*Bonasa umbellus*	Secure	S4S5
Raptor	Turkey Vulture	*Cathartes aura*	Sensitive	S2S3B
	Bald Eagle	*Haliaeetus leucocephalus*	Secure	S4
	Northern Harrier	*Circus cyaneus*	Secure	S5B
Waterbird	Herring Gull	*Larus argentatus*	Secure	S4S5
Landbird	Hairy Woodpecker	*Picoides villosus*	Secure	S5
	American Crow	*Corvus brachyrhynchos*	Secure	S5

Table 3.14 Bird Species reported during Winter Transect Surveys

Bird Group	Common Name	Latin Name	NS DNR Rank	S Rank
	Common Raven	*Corvus corax*	Secure	S5
	Black-capped Chickadee	*Poecile atricapillus*	Secure	S5
	Boreal Chickadee	*Poecile hudsonica*	Sensitive	S3
	Red-breasted Nuthatch	*Sitta canadensis*	Secure	S4S5
	Golden-crowned Kinglet	*Regulus satrapa*	Sensitive	S4
	American Robin	*Turdus migratorius*	Secure	S5B
	Cedar Waxwing	*Bombycilla cedrorum*	Secure	S5B

A total of 198 individual birds in 74 flocks were recorded during three surveys of the 7 transects, with a third of the flocks and half of the individuals observed flying through the site. All 7 raptors, 21 waterbirds (Herring Gull) and 41 waterfowl (American Black Duck) were observed flying, within the AT (10-40 m) height category. Landbirds were mostly observed within the forest canopy, although some were observed flying. The largest flocks observed included two flocks of American Black Duck (27 flying NW and 12 flying W) observed from Transect 6 in January, and 25 Cedar Waxwings observe from Transect 2 flying south in January. All other flock sizes were small (1 – 6 individuals).

3.3.3 Watch Counts

Watch counts amounted to 21 10-minute point counts conducted during transect counts, for a total of 3.5 hours of observations, resulting in only 17 records of seven species (Table 3.15). There were no more than 2 flocks observed during any one 10-minute watch count, and no birds were observed at 9 of the 21 watch counts conducted. The largest flocks observed included 8 gulls at WC1 and 8 American Black Ducks at WC7 in January, and 25 Canada Goose at WC7 in February.

Table 3.15 Birds Observed during the 2012 Winter Watch Counts

Bird Group	Common Name	Latin Name	NS DNR Rank	S Rank
Waterfowl	Canada Goose	*Branta canadensis*	Secure	SNAB,S4N
	American Black Duck	*Anas rubripes*	Secure	S5
Raptor	Turkey Vulture	*Cathartes aura*	Sensitive	S2S3B
Waterbird	Herring Gull	*Larus argentatus*	Secure	S4S5
Landbird	Great Black-backed Gull	*Larus marinus*	Secure	S4
	American Crow	*Corvus brachyrhynchos*	Secure	S5
	Common Raven	*Corvus corax*	Secure	S5

3.4 OWL SURVEYS

Owl surveys were conducted at 11 stations within and near the Study Area on April 1 and again on May 2, 2012. Conditions were good on both nights, with no precipitation, and no wind. April 1 was cool, at 2°C, while May was a little warmer, between 5 and 7°C. Noise levels were low during both surveys, with no or minimal traffic.

The first survey yielded only a single owl, a Northern Saw-whet Owl recorded 200 m east of Station 8 in Little River Harbour, along Comeau's Hill Road. The same species was recorded at Station 8 during the May survey as well. Other owls recorded in May included single Northern Saw-whet Owls 100 m NE of Station 5, 50 m N of Station 6, and 50 m N of Station 11 (near Goose Lake). Also recorded at Station 11 was a Great Horned Owl 30 m to the east.

Non-owl species recorded during the May survey included American Woodcock recorded at Stations 2, 3, and 10, and a Common Loon at Station 11.

3.5 SPRING MIGRATION

3.5.1 Survey Effort

Spring migration activity was monitored during 68.6 total hours of transect and watch counts over 27 individual survey days from April 15 – May 31, 2012, representing 11 visits to each of the seven transect/watch counts. Transects and watch count locations were at first surveyed once weekly, but generally surveyed twice weekly from May 5 to the end of the survey period, to capture the core migration period. Surveys were in fact conducted over 21 days in May. To survey all seven transects and watch count locations, surveys were conducted over 2-3 (usually) consecutive days until all transects and watch counts were surveyed for the target period, with the exception of visit seven which was conducted over 4 days. All surveys in spring were conducted by Melvin Pothier, a local birder.

3.5.2 Weather Conditions

The weather conditions during the spring survey period were generally good to fair. Table 3.16 summarizes the weather conditions encountered during the spring surveys.

Table 3.16 Summary of Conditions During Spring Surveys

Date	Transect Completed	Temp. Range (°C)	Humidity (%)	Wind (Direction and Beaufort)	Visibility (km)	Cloud Cover (%)
14-Apr-12	T1, T6, T7, T2	4-12°C	30%	N #5	24 KM	0
15-Apr-12	T3, T5, T4	6-10°C	82%	W #3	19 KM	0
21-Apr-12	T1, T6, T7, T2	7-12°C	88%	S #5	14 KM	100
22-Apr-12	T3, T5, T4	10-12°C	90%	S #2	0.4 KM	100
28-Apr-12	T1, T6, T7, T2	3-2°C	60%	NW #7	24 KM	100

Table 3.16 Summary of Conditions During Spring Surveys

Date	Transect Completed	Temp. Range (°C)	Humidity (%)	Wind (Direction and Beaufort)	Visibility (km)	Cloud Cover (%)
29-Apr-12	T3, T5, T4	(-2) - 8°C	33%	W #5	24 KM	50
5-May-12	T1, T6, T7, T2	5-9°C	87%	#0	24 KM	100
6-May-12	T3, T5, T4	8-10°C	76%	N #5	24 KM	90
8-May-12	T1, T6, T7, T2	4-10°C	76%	SE #3	24 KM	10
9-May-12	T3	10-9°C	100%	S #6	13 KM	100
10-May-12	T5, T4	11°C	100%	S #7	6.4 KM	100
12-May-12	T1, T6, T7, T2	5-12°C	62%	SW #5	24 KM	0
13-May-12	T3, T5, T4	4-15°C	51%	S #4	24 KM	10
15-May-12	T6, T7	11-13°C	88%	SW #5	19 KM	100
16-May-12	T1, T2, T6, T7	12-13°C	94%	S #5	19 KM	100
17-May-12	T3	13°C	100%	SW #5	0.8 KM	100
18-May-12	T5, T4	3-8°C	76%	W #3	24 KM	10
19-May-12	T1, T6, T7, T2	5-15°C	39%	W #3	24 KM	0
20-May-12	T3, T5, T4	6-16°C	68%	W #2	24 KM	0
22-May-12	T3, T4	15°C	100%	SE #3	0.4 KM	100
23-May-12	T2, T5	15°C	94%	NE #3	1 KM	10
24-May-12	T1, T6, T7	13-15°C	94%	E #4	24 KM	10
26-May-12	T3, T5, T4	13-14°C	90%	SW #5	0.5KM	100
27-May-12	T1, T6, T7, T2	9-19°C	43%	0	24 KM	0
29-May-12	T3, T5, T4	9-10°C	87%	W #4	6.4 KM	100
30-May-12	T2	12-13°C	80%	SE #3	0.8 KM	100
31-May-12	T1, T6, T7	11-16°C	88%	SE #4	0.5 KM	100

The weather conditions during morning surveys had skies that were mainly overcast, with temperatures ranging from below 0°C, to as warm as 19°C later in May. Wind conditions were variable, ranging from calm (0) to Beaufort 7, and just nearly 4 on average. Visibility was usually quite good with only 6 days out of 277 with visibility less than 1 km, but no less than 0.4 km.

3.5.3 Transect Counts

During transect count surveys, a total of 57 different species were identified, and are listed in Table 3.17. These species fall within 7 bird group categories: gamebirds, waterbirds, raptors, owls, shorebirds, waterfowl, and landbirds. Most of the species are landbirds, while there were only single species recorded for game bird (Ruffed Grouse), owl (Great Horned Owl), shorebird (Willet) and waterfowl (American Black Duck).

Table 3.17 Bird Species Reported during Spring Transect Surveys

Common Name	Latin Name	Bird Group	NS DNR Rank	S Rank
American Black Duck	*Anas rubripes*	Waterfowl	Secure	S5
Ruffed Grouse	*Bonasa umbellus*	Gamebird	Secure	S4S5
Common Loon	*Gavia immer*	Waterbird	May Be At Risk	S3B,S4N
Double-crested Cormorant	*Phalacrocorax auritus*	Waterbird	Secure	S5B
Great Blue Heron	*Ardea herodias*	Waterbird	Secure	S4B
Turkey Vulture	*Cathartes aura*	Raptor	Sensitive	S2S3B
Red Tailed Hawk	*Buteo jamaicensis*	Raptor	Secure	S5
Willet	*Tringa semipalmata*	Shorebird	May Be At Risk	S2S3B
Herring Gull	*Larus argentatus*	Waterbird	Secure	S4S5
Great Black-backed Gull	*Larus marinus*	Waterbird	Secure	S4
Mourning Dove	*Zenaida macroura*	Landbird	Secure	S5
Great Horned Owl	*Bubo virginianus*	Owl	Secure	S5
Downy Woodpecker	*Picoides pubescens*	Landbird	Secure	S5
Hairy Woodpecker	*Picoides villosus*	Landbird	Secure	S5
Northern Flicker	*Colaptes auratus*	Landbird	Secure	S5B
Pileated Woodpecker	*Dryocopus pileatus*	Landbird	Secure	S5
Yellow-bellied Flycatcher	*Empidonax flaviventris*	Landbird	Sensitive	S3S4B
Alder Flycatcher	*Empidonax alnorum*	Landbird	Secure	S5B
Eastern Phoebe	*Sayornis phoebe*	Landbird	Sensitive	S3S4B
Blue-headed Vireo	*Vireo solitarius*	Landbird	Secure	S5B
Red-eyed Vireo	*Vireo olivaceus*	Landbird	Secure	S5B
Gray Jay	*Perisoreus canadensis*	Landbird	Sensitive	S3S4
Blue Jay	*Cyanocitta cristata*	Landbird	Secure	S5
American Crow	*Corvus brachyrhynchos*	Landbird	Secure	S5
Common Raven	*Corvus corax*	Landbird	Secure	S5
Black-capped Chickadee	*Poecile atricapillus*	Landbird	Secure	S5
Boreal Chickadee	*Poecile hudsonica*	Landbird	Sensitive	S3
Red-breasted Nuthatch	*Sitta canadensis*	Landbird	Secure	S4S5
Brown Creeper	*Certhia americana*	Landbird	Secure	S5
Winter Wren	*Troglodytes troglodytes*	Landbird	Secure	S5B
Golden-crowned Kinglet	*Regulus satrapa*	Landbird	Sensitive	S4
Swainson's Thrush	*Catharus ustulatus*	Landbird	Secure	S4S5B
Hermit Thrush	*Catharus guttatus*	Landbird	Secure	S5B
American Robin	*Turdus migratorius*	Landbird	Secure	S5B
Gray Catbird	*Dumetella carolinensis*	Landbird	May Be At Risk	S3B
Cedar Waxwing	*Bombycilla cedrorum*	Landbird	Secure	S5B

Table 3.17 Bird Species Reported during Spring Transect Surveys

Common Name	Latin Name	Bird Group	NS DNR Rank	S Rank
Northern Parula	*Parula americana*	Landbird	Secure	S5B
Yellow Warbler	*Dendroica petechia*	Landbird	Secure	S5B
Chestnut-sided Warbler	*Dendroica pensylvanica*	Landbird	Secure	S5B
Magnolia Warbler	*Dendroica magnolia*	Landbird	Secure	S5B
Yellow-rumped Warbler	*Dendroica coronata*	Landbird	Secure	S5B
Black-throated Green Warbler	*Dendroica virens*	Landbird	Secure	S4S5B
Palm Warbler	*Dendroica palmarum*	Landbird	Secure	S5B
Black-and-white Warbler	*Mniotilta varia*	Landbird	Secure	S4S5B
American Redstart	*Setophaga ruticilla*	Landbird	Secure	S5B
Ovenbird	*Seiurus aurocapilla*	Landbird	Secure	S5B
Common Yellowthroat	*Geothlypis trichas*	Landbird	Secure	S5B
American Tree Sparrow	*Spizella arborea*	Landbird	Secure	S5N
Song Sparrow	*Melospiza melodia*	Landbird	Secure	S5B
Swamp Sparrow	*Melospiza georgiana*	Landbird	Secure	S5B
White-throated Sparrow	*Zonotrichia albicollis*	Landbird	Secure	S5B
Dark-eyed Junco	*Junco hyemalis*	Landbird	Secure	S4S5
Northern Cardinal	*Cardinalis cardinalis*	Landbird	Secure	S3S4
Common Grackle	*Quiscalus quiscula*	Landbird	Secure	S5B
Baltimore Oriole	*Icterus galbula*	Landbird	May Be At Risk	S2S3B
Purple Finch	*Carpodacus purpureus*	Landbird	Secure	S4S5
American Goldfinch	*Carduelis tristis*	Landbird	Secure	S5

Table 3.18 summarizes the number of sightings and individual birds by bird group seen during the spring survey period.

Table 3.18 Spring Migration Transect Surveys by Bird Group – Sightings and Individuals

Bird Group	# Sightings (flocks)	# Individuals
Gamebird	24	26
Landbird	1303	2046
Owl	2	2
Raptor	8	10
Shorebird	17	29
Waterbird	29	44
Waterfowl	1	1
Total	**1384**	**2158**

The most frequently detected bird group was landbirds, followed by waterbirds.

3.5.3.1 Spring Migration Flight Height Behaviour

Table 3.19 below summarizes the transect survey bird observations by flight height presented as a percent of the total number of observations and total number of individuals. This analysis is for flying birds only, as it excludes foraging and vocalizing birds.

Table 3.19 Flight Behaviour of Bird Groups Observed during 2012 Spring Transect Surveys

Bird Group	Height[1]				N[2]
	T (1-10m)	AT (<40m)	WAT (40-120m)	H (>120m)	
Landbirds	78%(71%)	22%(29%)	-	-	27(38)
Raptors	43%(44%)	57%(56%)	-	-	7(9)
Shorebirds	10%(18%)	70%(53%)	20%(29%)	-	10(17)
Waterbirds	18%(14%)	64%(74%)	18%(12%)	-	28(43)
Waterfowl	100%(100%)	-	-	-	1(1)

Notes:
1 Data presented are percentage of observations (percentage of individual birds) observed in each area.
2 Total number of observations (total number of individual birds).

For transects, the number of birds observed in flight was relatively low. The majority of birds that were observed flying were at or below T (Tree Height).

No landbirds were observed flying at or above the WAT height. Activity was spread out among 12 different landbird species, all common and ranked Secure. Other bird groups were seen in small numbers, and little can be interpreted from apparent differences in flight height. For example, although 20% of the flocks and 29% of the individual shorebirds were noted flying at WAT height, this represents two flocks of a total of 5 Willets. Raptors recorded flying or soaring included Red-tailed Hawk (one individual flying at T level), and Turkey Vultures. Turkey Vultures overwintered in the area; a possible roosting site was noted northeast of the Study Area, north of Upper Wedgeport (M. Pothier, pers. comm. 2012).

Flocks of waterfowl flying high above the ground were notably absent, with only one individual American Black Duck observed during the spring transects. Five species (Common Loon, Double-crested Cormorant, Great Blue Heron, Great Black-backed Gull and Herring Gull) of waterbirds were recorded, totaling 43 individuals in 28 flocks. Few were observed at the WAT height.

3.5.4 Watch Counts

All species detected during the watch counts were also detected during the transect surveys. The 14 species detected included Common Loon and Willet, both May Be At Risk species, and Turkey Vulture, ranked Sensitive. The remaining species, all ranked Secure, included four

waterbirds, a raptor, and six landbirds. Table 3.20 below summarizes the flight behavior of the bird groups observed flying during the watch counts.

Table 3.20 Flight Behaviour of Bird Groups Observed during Spring 2012 Watch Counts

Bird Group	Height1				N2
	T (1-10m)	AT (<40m)	WAT (40-120m)	H (>120m)	
Landbirds	9%(4%)	91%(96%)	-	-	11(53)
Raptors	17%(13%)	33%(38%)	50%(50%)	-	6(8)
Shorebirds	-	67%(80%)	33%(20%)	-	3(5)
Waterbirds	3%(2%)	79%(89%)	18%(10%)	-	67(126)

Notes:
1 Data presented are percentage of observations (percentage of individual birds) observed in each area.
2 Total number of observations (total number of individual birds).

As with the 2012 spring transect surveys, waterbirds were the most prominently observed bird group observed in flight. Most waterbirds were observed at the AT height, but 18% of flocks and 10% of individuals were observed at WAT, amounting to 12 individual birds, predominantly Herring Gulls, spread out among all the watch counts. While 50% of raptors and 20% of shorebirds (Willet) were at WAT height, numbers were very low, with only 8 raptors and 5 willets in total. The willets were all recorded at WC3 and WC4, at the northern end of the Study Area. All landbirds were observed flying at AT height or less. While most landbirds were recorded as single birds, 40 of the 53 individuals were of a single flock of Cedar Waxwings.

3.5.5 Species at Risk / Species of Conservation Concern

No *SARA*-listed species were encountered during spring surveys; however three SOCC were encountered during transect and watch count surveys. These included the May Be At Risk species Willet and Common Loon, and the Sensitive species Turkey Vulture.

Willet were detected in low numbers regularly near Transect 4 in May, at the northern end of the Study area, but were also noted at three other transects, including Transects 6 and 7 at the southern end.

Turkey Vultures were also detected in low numbers (1 or 2 birds per flock) through the spring monitoring period, but rarely at WAT height.

There were three records of Common Loon in May, generally flying from the south, in a northerly direction.

4.0 Summary

A total of 40 point counts (25 forested and 15 open habitat) were each surveyed twice for breeding birds, as 10-minute point counts (early and late June 2011), recording 54 bird species, including 48 with for potential for breeding within the Study Area. Two at risk species were recorded, though only incidentally and singly: Olive-sided Flycatcher and Whip-poor-will. Species of Conservation Concern (SOCC) included Common Loon (May Be At Risk; single flyover), Willet (May Be at Risk; regularly at both forested and open habitats), Turkey Vulture (Sensitive; single incidental flyover), Wilson's Snipe (Sensitive; single flyover outside point), and six passerines considered Sensitive (Eastern Wood-Pewee, Yellow-bellied Flycatcher, Gray Jay, Boreal Chickadee, Golden-crowned Kinglet, and Ruby-crowned Kinglet). The most common and abundant species recorded during breeding bird surveys included White-throated Sparrow, Magnolia Warbler, Common Yellowthroat, and Black-and-white Warbler.

Fall migration surveys included 16 visits to each of seven 500 m transects (which each include a single 10-minute watch count) between mid-August and mid-November, as well as a 2-hour raptor watch survey on September 22, 2011, for a total of 99 hours of surveys. A total of 62 species within six bird group categories were recorded during transect surveys: gamebirds, waterbirds, raptors, shorebirds, waterfowl, and landbirds. The majority of transect records were of landbirds at or below tree level. Of the birds observed flying, most (90%) were landbirds, of which less than 1% were observed flying within the blade sweep of a turbine (way above trees; WAT). Two additional species not detected during the transect counts but detected during the watch counts are Ruby-throated Hummingbird and Northern Harrier. As with the 2011 transect counts, landbirds were the most prominent bird group during watch counts. Less than one percent (six individual birds) of landbirds were observed flying in the WAT and H flight heights. Raptors were recorded regularly during watch counts, with a high proportion of raptors recorded at WAT height; 70 % of individuals. The highest numbers at this height were Turkey Vultures, including a flock of 5 in September and 12 in November. The 2-hour raptor watch on September 20 produced 11 raptors of three species (Northern Harrier, Sharp-shinned Hawk and Turkey Vulture), including 5 flying at WAT height. Of note however were frequent movements of waterbirds (gulls) observed during the survey, largely to the south of the observation point (near Transect 1, the southern-most transect). While flock size was general small, with 1 to 6 birds, there was a single flock of an estimated 300 gulls flying from east to west, approximately 200 m south of the observation points, between 40 and 70 m height (WAT). The rate of flocks observed per hour was 24.5 , compared to an average of 7 flocks of gulls per hour at Transect 1, or 3.6 flocks per hour for all transects, over the fall migration period.

Winter surveys were conducted in the winter of 2011/2012 three times at each of the migration transects and watch count locations; once in each of December, January and February. The 15 species identified during the winter transect surveys fall within five bird group categories: waterfowl (1), gamebird (1), waterbird (1), raptor (3) and landbird (9). A total of 198 individual

birds in 74 flocks were recorded. The largest flocks observed included two flocks of American Black Duck (27 and 12), and 25 Cedar Waxwings, making up nearly a third of the individuals recorded. Winter watch counts totaling 3.5 hours of observations for overhead flying birds saw no more than 2 flocks in any one watch count survey, with no birds observed during 43% of the counts. The largest flocks observed included 8 gulls and 8 American Black Ducks in January, and 25 Canada Goose in February, which was 65% of the individuals recorded.

Owl surveys were conducted in early April and early May at each of 11 stops along main roads at the northern end of the Study Area and to the west along Comeau's Hill Road, following the protocols of the Atlantic Nocturnal Owl Survey. The early April survey yielded only a single Saw-whet Owl, which was also recorded in the early May survey, along with three more Saw-whet Owls, and a Great Horned Owl near Goose Lake. Non-owl species recorded during the May survey included three American Woodcock and a Common Loon.

Spring migration surveys were conducted between mid-April and late-May 2012 at the same transect and watch count locations as the fall survey, for a total of 68.6 total hours over 27 days, totaling 11 visits to each survey location. Transect surveys yielded 57 species of seven bird group categories, though only single species were recorded for gamebird (Ruffed Grouse), owl (Great Horned Owl), shorebird (Willet) and waterfowl (American Black Duck). The majority of birds identified during spring transect counts were landbirds observed within the local habitat, with only 5% of flocks and individuals observed flying through the site or soaring. Overall, few birds were observed flying through the Study Area within the WAT height. Watch count results indicate relatively low numbers of birds flying through the Study Area. Waterbirds, mostly gulls, were the most prevalent bird observed flying through the site, with 18% of flocks and 10% of individuals flying at WAT height.

Field data contained in this report was collected by Richard LaPaix, Melvin Pothier, and Fulton Lavender for the Wedgeport Wind Farm Project. This report was prepared by Greg Johnson and reviewed by Heather Giddens and is intended to inform the environmental assessment of the Wedgeport Wind Farm Project. Any use that a third party makes of this report, or any reliance on decisions made based on it, is the responsibility of such third parties.

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5.0 References

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APPENDIX I
Visual Assessment

N

Project Components

- Proposed Turbine Location
- Proposed Substation Location
- Proposed Collection System / Access Road Network
- Study Area

Study Features

Visible Turbines From Location

- 0 - 3
- 3 - 11
- 11 -17
- 17 - 22
- 22 - 25

Map Features

- Other Structure
- Community Centre
- Church
- Building
- Factory
- Fire Station
- Post Office
- School
- Highway
- Collector
- Arterial Road
- Local Road
- Seasonal Roady
- Track; Trail
- Trail (Field Identified)
- Watercourse (NSGC)
- Waterbody

SOURCE:
Base Data: Nova Scotia Geomatics Centre, Nova ScotiaTopographic Database (NSTDB) unless otherwise noted.

ST NS-121510794-053

0 400 800 1,200 1,600

Distance in Metres

Goose Lake
Tusket River
Black Pond Road
Upper Wedgeport
WT-25
WT-24
WT-23
WT-22
WT-20
WT-21
WT-17
WT-18
WT-19
WT-15
WT-16
WT-14
WT-13
WT-12
WT-11
WT-10
WT-9
WT-8
WT-7
WT-6
WT-5
WT-4
WT-3
WT-2
WT-1
Little River
Comeaus Hill Road
WEDGEPORT
334
Little River Harbour
Goose Bay
Lower Wedgeport
Little River Harbour
Comeaus Hill

All spatial data contains varying levels of inherent inaccuracies. This product was produced for the sole purpose of supporting information specific to a stantec project and should not be used for other purposes.

PREPARED BY: M. Huskins-Shupe	WEDGEPORT WIND PROJECT	FIGURE NO.: 1
REVIEWED BY: G. Asche		DATE: Jun 14, 2012
AnaiaGlobal RENEWABLE ENERGIES www.anaiaenergy.com	**Viewshed Analysis**	Stantec

Path: V:\1215\active\121510xxx\121510794_Wedgeport\geomatics\mapping\mxd\EA_final\ST_NS-121510794-053_Viewshed_map.mxd

Stantec Consulting Ltd. © 2012

Technical Data:

Photograph View Point:

Photograph Number:	1
Date of Photograph:	May 1, 2012
Coordinate System:	UTM Zone 20N (NAD 1983)
Easting:	254909 m E
Northing:	4850310 m N
View Direction:	140° SE

Wind Turbines Used:

Model:	Gamesa - G97 2MW
Hub Height:	100 m
Rotor Diameter:	97 m

Simulation:

Total Number of Wind Turbines:	25
Total Number of Visible Turbines:	12
Closest Visible Turbine:	~1.6 km
Furthest Visible Turbine:	~ 3.8 km

Study Features
- Photo Site
- Montage Line of Site

Project Components
- Proposed Turbine Location
- Study Area

Map Features
- Highway
- Road
- Seasonal Road
- Trail
- Trail (Field Identified)
- Watercourse (NSGC)
- Waterbody

Stantec Project No.:121510794-033

0 1,000 2,000 3,000
Distance in Metres

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PREPARED BY: C. Shupe
REVIEWED BY: M. Huskins-Shupe

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WEDGEPORT WIND PROJECT

Photo Montage One - Simulated View of Project From Comeaus Hill Road

FIGURE NO.: 2
DATE: Jun 14, 2012

Stantec

Path: V:\1215\active\121510xxx\121510794_Wedgeport\geomatics\mapping\mxd\EA_final\ST_NS-121510794-033_PhotoMontage_Site1.mxd

Coordinate System: NAD 1983 UTM Zone 20N

Stantec Consulting Ltd. © 2011

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Technical Data:

Photograph View Point:

Photograph Number:	3
Date of Photograph:	May 1, 2012
Coordinate System:	UTM Zone 20N (NAD 1983)
Easting:	256204 m E
Northing:	4846084 m N
View Direction:	35° NNE

Wind Turbines Used:

Model:	Gamesa - G97 2MW
Hub Height:	100 m
Rotor Diameter:	97 m

Simulation:

Total Number of Wind Turbines:	25
Total Number of Visible Turbines:	8
Closest Visible Turbine:	~1.4 km
Furthest Visible Turbine:	~ 2.7 km

Study Features
- Photo Site
- Montage Line of Site

Project Components
- Proposed Turbine Location
- Study Area

Map Features
- Highway
- Road
- Seasonal Road
- Trail
- Trail (Field Identified)
- Watercourse (NSGC)
- Waterbody

Stantec Project No.:121510794-035

0 1,000 2,000 3,000

Distance in Metres

PREPARED BY: C. Shupe

REVIEWED BY: M. Huskins-Shupe

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WEDGEPORT WIND PROJECT

Photo Montage Two - Simulated View of Project From Comeaus Hill Road (North of Little River Harbour)

FIGURE NO.: 3

DATE: Jun 14, 2012

Stantec

Path: V:\1215\active\121510xxx\121510794_Wedgeport\geomatics\mapping\mxd\EA_final\ST_NS-121510794-035_PhotoMontage_Site3.mxd

Coordinate System: NAD 1983 UTM Zone 20N

Stantec Consulting Ltd. © 2011

All spatial data contains varying levels of inherent inaccuracies. This product was produced for the sole purpose of supporting information specific to a stantec project and should not be used for other purposes.

Technical Data:

Photograph View Point:

Photograph Number:	2
Date of Photograph:	May 1, 2012
Coordinate System:	UTM Zone 20N (NAD 1983)
Easting:	256168 m E
Northing:	4843634 m N
View Direction:	50° NE

Wind Turbines Used:

Model:	Gamesa - G97 2MW
Hub Height:	100 m
Rotor Diameter:	97 m

Simulation:

Total Number of Wind Turbines:	25
Total Number of Visible Turbines:	4
Closest Visible Turbine:	~1.5 km
Furthest Visible Turbine:	~ 2.1 km

Study Features
- Photo Site
- Montage Line of Site

Project Components
- Proposed Turbine Location
- Study Area

Map Features
- Highway
- Road
- Seasonal Road
- Trail
- Trail (Field Identified)
- Watercourse (NSGC)
- Waterbody

Stantec Project No.:121510794-036

0 1,000 2,000 3,000
Distance in Metres

PREPARED BY: C. Shupe
REVIEWED BY: M. Huskins-Shupe

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WEDGEPORT WIND PROJECT

Photo Montage Three - Simulated View of Project From Little River Harbour Community Centre

FIGURE NO.: 4
DATE: Jun 14, 2012

Stantec

Path: V:\1215\active\121510xxx\121510794_Wedgeport\geomatics\mapping\mxd\EA_final\ST_NS-121510794-036_PhotoMontage_Site4.mxd

Coordinate System: NAD 1983 UTM Zone 20N

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Technical Data:

Photograph View Point:

Photograph Number:	7
Date of Photograph:	May 2, 2012
Coordinate System:	UTM Zone 20N (NAD 1983)
Easting:	258996 m E
Northing:	4848964 m N
View Direction:	292° NW

Wind Turbines Used:

Model:	Gamesa - G97 2MW
Hub Height:	100 m
Rotor Diameter:	97 m

Simulation:

Total Number of Wind Turbines:	25
Total Number of Visible Turbines:	2
Closest Visible Turbine:	~ 2.3 km
Furthest Visible Turbine:	~ 2.7 km

Study Features
- Photo Site
- Montage Line of Site

Project Components
- Proposed Turbine Location
- Study Area

Map Features
- Highway
- Road
- Seasonal Road
- Trail
- Trail (Field Identified)
- Watercourse (NSGC)
- Waterbody

Stantec Project No.:121510794-042

0 1,000 2,000 3,000
Distance in Metres

All spatial data contains varying levels of inherent inaccuracies. This product was produced for the sole purpose of supporting information specific to a stantec project and should not be used for other purposes.

PREPARED BY: C. Shupe
REVIEWED BY: M. Huskins-Shupe

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WEDGEPORT WIND PROJECT

Photo Montage Four - Simulated View of Project From Upper Wedgeport Fire Hall

FIGURE NO.: 5
DATE: Jun 14, 2012

Stantec

Path: V:\1215\active\121510xxx\121510794_Wedgeport\geomatics\mapping\mxd\EA_final\ST_NS-121510794-042_PhotoMontage_Site5.mxd

Coordinate System: NAD 1983 UTM Zone 20N

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Technical Data:

Photograph View Point:

Photograph Number:	13
Date of Photograph:	May 2, 2012
Coordinate System:	UTM Zone 20N (NAD 1983)
Easting:	260194 m E
Northing:	4846796 m N
View Direction:	280° W

Wind Turbines Used:

Model:	Gamesa - G97 2MW
Hub Height:	100 m
Rotor Diameter:	97 m

Simulation:

Total Number of Wind Turbines:	25
Total Number of Visible Turbines:	4
Closest Visible Turbine:	~ 2.5 km
Furthest Visible Turbine:	~ 3.0 km

Study Features
- Photo Site
- Montage Line of Site

Project Components
- Proposed Turbine Location
- Study Area

Map Features
- Highway
- Road
- Seasonal Road
- Trail
- Trail (Field Identified)
- Watercourse (NSGC)
- Waterbody

Stantec Project No.:121510794-043

0 1,000 2,000 3,000
Distance in Metres

PREPARED BY: C. Shupe
REVIEWED BY: M. Huskins-Shupe

AnaiaGlobal RENEWABLE ENERGIES www.anaiaenergy.com

WEDGEPORT WIND PROJECT

Photo Montage Five - Simulated View of Project From Surette Street, Wedgeport

FIGURE NO.: 6
DATE: Jun 14, 2012

Stantec

Path: V:\1215\active\121510xxx\121510794_Wedgeport\geomatics\mapping\mxd\EA_final\ST_NS-121510794-043_PhotoMontage_Site6.mxd

Coordinate System: NAD 1983 UTM Zone 20N

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Technical Data:

Photograph View Point:

Photograph Number:	11
Date of Photograph:	May 2, 2012
Coordinate System:	UTM Zone 20N (NAD 1983)
Easting:	259540 m E
Northing:	4842359 m N
View Direction:	340° NNW

Wind Turbines Used:

Model:	Gamesa - G97 2MW
Hub Height:	100 m
Rotor Diameter:	97 m

Simulation:

Total Number of Wind Turbines:	25
Total Number of Visible Turbines:	13
Closest Visible Turbine:	~ 2.8 km
Furthest Visible Turbine:	~ 5.0 km

Study Features
- Photo Site
- Montage Line of Site

Project Components
- Proposed Turbine Location
- Study Area

Map Features
- Highway
- Road
- Seasonal Road
- Trail
- Trail (Field Identified)
- Watercourse (NSGC)
- Waterbody

Stantec Project No.:121510794-044

0 1,000 2,000 3,000
Distance in Metres

PREPARED BY: C. Shupe
REVIEWED BY: M. Huskins-Shupe

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WEDGEPORT WIND PROJECT

Photo Montage Six - Simulated View of Project From Nature Trail, Wedge Point

FIGURE NO.: 7
DATE: Jun 14, 2012

Stantec

Path: V:\1215\active\121510xxx\121510794_Wedgeport\geomatics\mapping\mxd\EA_final\ST_NS-121510794-044_PhotoMontage_Site7.mxd

Coordinate System: NAD 1983 UTM Zone 20N

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