FINAL

2014 Baseline Avifauna Study, Wabush 3 Project Development Area

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EXECUTIVE SUMMARY

This report provides an assessment of the diversity and breeding status of birds that occurred within the proposed Wabush 3 Project Development Area (PDA) during mid-July, 2014. The avian community was initially described by Amec Foster Wheeler following field surveys in 2012. However, the configuration and spatial extent of the PDA was subsequently modified thus warranting the requirement for additional surveys. From July 9 to 12, Amec Foster Wheeler assessed avian diversity within 25 point count locations that were distributed throughout the modified PDA. Birds were identified based on visual and auditory characteristics by a team of experienced biologists. Resident birds were found in all point count locations and all habitats. The most abundant species across all point counts (occurring in >38% of locations) were white throated sparrow, dark-eyed junco, Swainson's thrush and Tennessee warbler. All species were classified as being either possible, probable, or confirmed breeders and are generally common across western Labrador. No federally or provincially listed species at risk were detected during this survey though several species are known to occur in the general area beyond the PDA. Strong territorial behaviour by a female northern goshawk suggests that an active nest occurs in the eastern portion of the study area.

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1.0 INTRODUCTION

In 2012, point count surveys were conducted by Amec Foster Wheeler on behalf of the Iron Ore Company of Canada to describe the avian community within the proposed Wabush 3 Project Development Area (PDA). Results from this baseline study are presented in an earlier report (Amec Foster Wheeler 2012) as well as in chapter 15 of the recently submitted Environmental Impact Statement for this proposed development. Subsequent to the field studies conducted in 2012, the spatial configuration of the PDA was slightly modified and now encompasses an additional area (570 ha) that was not assessed during the initial survey. The objective of this current survey is to describe avian diversity within this modified PDA to allow a complete evaluation of breeding birds across the entire PDA. Areas surveyed in 2014 include portions of the open pit, waste rock storage area and linear features (proposed fencing corridors, roads, and power lines) that were not part of the initial PDA.

2.0 METHODS

2.1 Study area

The proposed Wabush 3 PDA occurs within the Mid Subarctic Ecoregion (Canada Committee on Ecological Land Classification 1989) and contains multiple ecotypes including black spruce forest associations, alpine shrub, exposed earth, and a range of wetland habitats. Within Canada's classification of Bird Conservation Regions (Environment Canada 2013), the Labrador City region occurs within the Taiga Shield and Hudson Plains Region (BCR 7). Habitat diversity within the PDA enables occupancy by a range of functional groups including waterfowl, birds of prey, shorebirds, woodpeckers, and a number of passerine species (e.g. sparrows, wood warblers, and flycatchers).

2.2 Survey methodology

An avifauna survey was conducted from July 9 to 12, 2014, within the modified Wabush 3 PDA area adjacent to IOC's existing operations in western Labrador. Prior to the field survey, twenty-five point count locations were selected in a configuration intended to maximize spatial coverage of this modified PDA area (90 ha; Figure 1). Avian diversity was assessed within these point count locations (200 m radius (12 ha) circular plots) in which experienced observers (John Gosse and Holly Hogan) identified all species during a 12 minute time frame. Birds were identified based on a combination of auditory, visual and behavioural cues. Surveys were conducted during early morning (5-9 am), when detection probability is the highest, and during periods of favourable weather (low winds, no precipitation). Intermittent periods of sub-optimal weather (i.e. rain showers and moderate winds) reduced the time available to obtain additional data from areas visited in 2012; therefore, the current survey was limited to areas of the PDA that had not previously been assessed. Coordinates for each point count location and the dates

surveyed are given in Appendix A. Point count locations that were surveyed in 2012 are shown in Figure 2.

All birds detected during point count surveys were also observed for possible nesting activity. Protection of nest sites from anthropogenic disturbance during the breeding season (mid-May to August 15) is a requirement under the Migratory Birds Convention Act. Behavioural indicators that were considered indicative of breeding included 1) the occurrence of singing males or interacting male-female pairs, 2) distraction displays (i.e., broken wing display), 3) delivery of nesting material and/or food to a specific location, 4) aggressive territorial behaviour (e.g. diving), and/or, 5) the presence of nestlings or recently fledged birds. Based on the presence/absence of these indicators the breeding status of each species was recorded as “possible”, “probable”, or “confirmed” based on criteria from Bird Studies Canada and the Quebec Breeding Bird Atlas (Quebec Breeding Bird Atlas 2010). The codes used to classify breeding status are shown in Table 1. If one or more of these behaviours was observed an attempt was made to locate the specific nest location as an active nest site would provide definitive evidence of breeding in the study area. The dominant habitat type at each point count location was classified using the Maritime Breeding Bird Atlas habitat checklist. This classification system enables visual characterization of dominant land-cover type (i.e. woodland, grassland, wetland etc.) and successively finer-scale attributes including habitat structure and extent of disturbance (Maritimes Breeding Bird Atlas 2008).

Figure 1 – Avifauna point count locations within the modified Wabush 3 PDA, July 9-12, 2014.

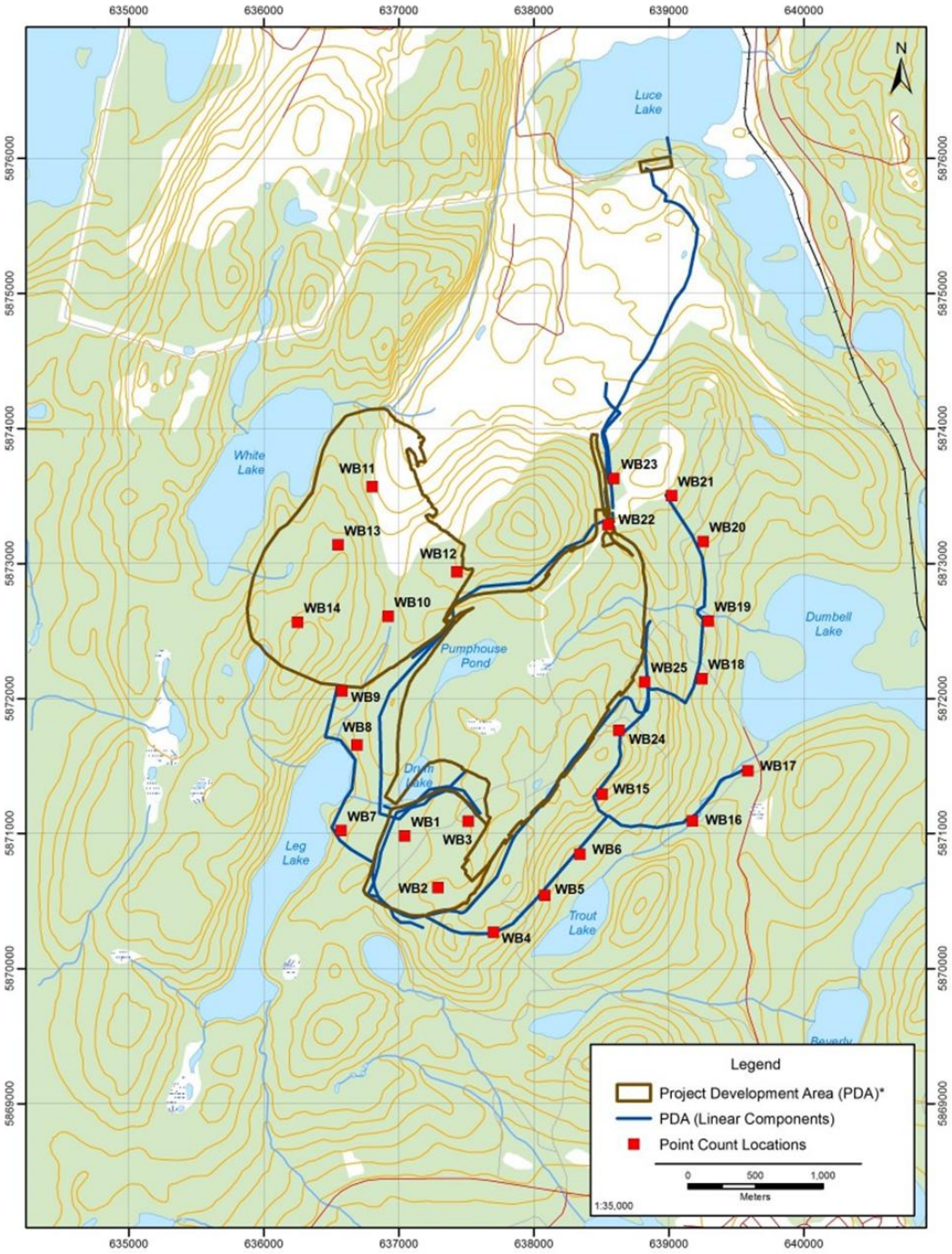
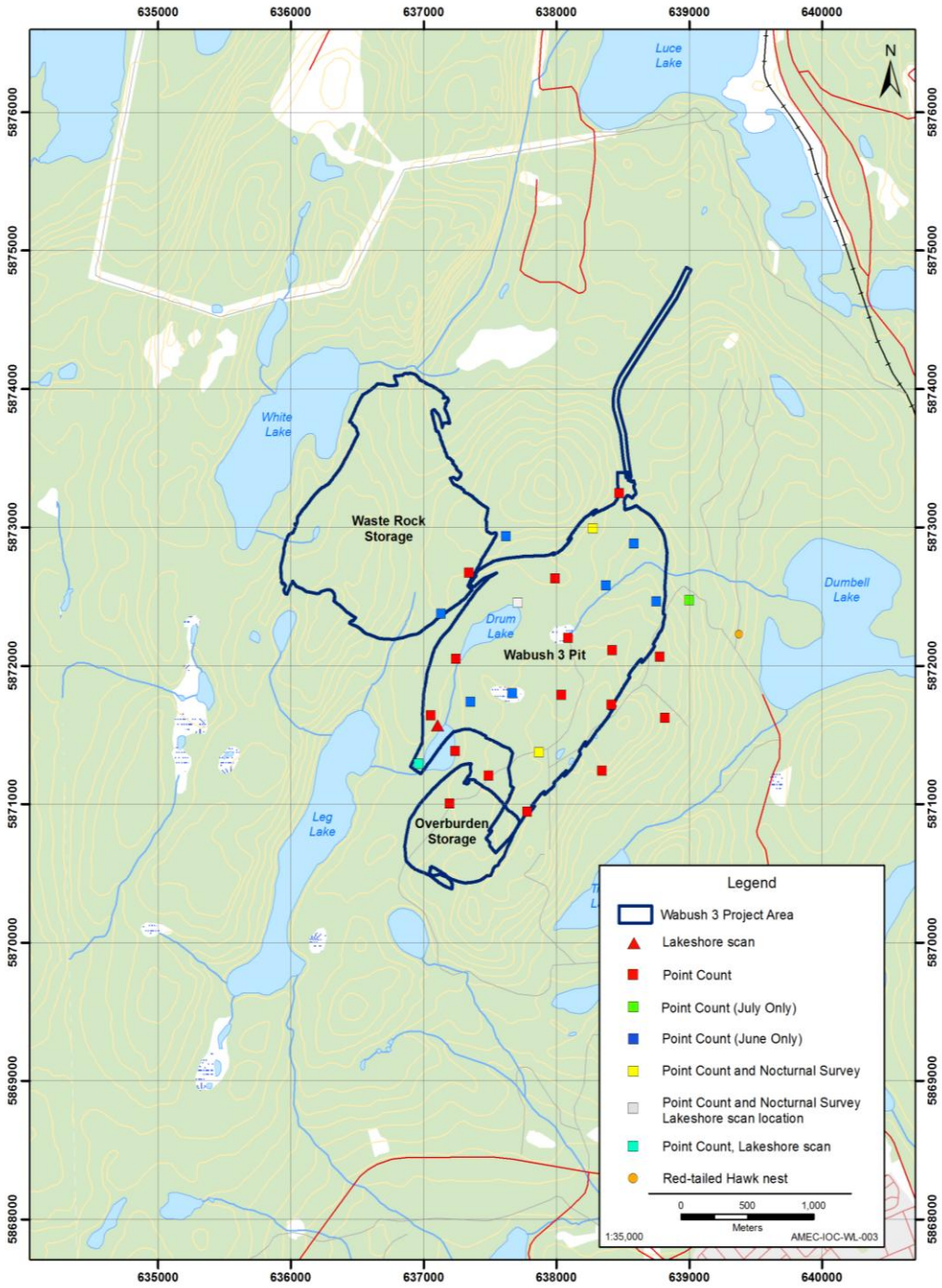


Figure 2 – Avifauna point count locations within the Wabush 3 PDA, June-July 2012.



3.0 RESULTS AND DISCUSSION

The habitat variability that occurred throughout the PDA supported a diverse assemblage of birds (25 species) that ranged from those typically associated with black spruce forest (e.g. yellow-rumped warbler and Swainson's thrush), deciduous habitat (e.g. Tennessee warbler) and open habitats (eg. American robin and Lincoln's sparrow). The most abundant species across all point counts (occurring in >38% of locations) were white throated sparrow, dark-eyed junco, Swainson's thrush and Tennessee warbler (Table 2). No federally or provincially listed species at risk were detected during this survey though several of these species (including olive-sided flycatcher, rusty blackbird, and common nighthawk) are known to occur in the vicinity of Labrador City/Wabush (Amec Foster Wheeler 2012). Furthermore, none of the species observed are particularly uncommon for this region of Labrador. The assemblage of species detected in 2014 was similar to that recorded in 2012 though the total number of species in this survey was lower. This is likely due to earlier timing of the 2012 survey (June-early July) which coincided with the period of peak vocalization and would have increased detectability. In addition, the 2012 survey included scans of water bodies which allowed the detection of species confined to these habitats (e.g. common loon and surf scoter) and included a greater number of point count locations (n=28). The only species detected in 2014 that were not observed during 2012 were winter wren, bohemian waxwing and northern goshawk.

All bird species detected during this survey were considered as either possible, probable, or confirmed breeders based on the criteria presented in Table 1. White-throated sparrow fledglings were observed within several point count stations thus confirming their status as a local breeder. A female goshawk detected within mature deciduous forest exhibited strong territorial behaviour (constant and directed calling and partial dive-bombing), and although an active nest was not found, it was also likely breeding in the area. Other probable breeders within the study area (based on their abundance) included dark-eyed junco, Swainson's thrush, Tennessee warbler, fox sparrow, American robin, yellow-rumped warbler, and yellow-bellied flycatcher. All other species listed in Table 2 are considered as possible breeders given that multiple individuals were recorded singing in appropriate habitat during the breeding season. No other nests were found during point count surveys or during travel to consecutive points. A complete list of species observed at each point count station is given in Table 3.

Table 1 – Breeding evidence codes used in point count surveys.

Level of certainty	Code	Definition
No Evidence	*X*	Species observed in the survey area, outside of suitable breeding habitat.
Possible	*S*	Individual singing in suitable nesting habitat during the breeding season.
	H	Individual observed in suitable nesting habitat during breeding season.
Probable	*T*	Presumed territory based on presence of an adult bird in the same place in suitable nesting habitat on two visits, a week or more apart.
	A	Agitated behaviour or alarm call of an adult in suitable nesting habitat.
	M	Seven or more individuals heard in suitable nesting habitat during the breeding season.
	P	Presence of a pair in suitable nesting habitat during the breeding season.
Confirmed	*NM*	Carrying nest material or building nest.
	FY	Presence of recently fledged young.
	CF	Adult carrying food for young.

Table 2 – Ranked abundance of bird species detected within 25 point count stations and the probability of breeding within the Wabush 3 PDA, July 9 to 12, 2014.

Species	Scientific Name	% point counts detected	Total Individuals Detected	Probability of breeding
White-throated Sparrow	*Zonotrichia albicollis*	64	37	FY
Dark-eyed Junco	*Junco hyemalis*	44	14	M
Swainson's Thrush	*Catharus ustulatus*	38	11	M
Tennessee Warbler	*Vermivora peregrina*	38	14	M
Fox Sparrow	*Passerella iliaca*	29	8	M

Species	Scientific Name	% point counts detected	Total Individuals Detected	Probability of breeding
American Robin	*Turdus migratorius*	29	14	M
Yellow-rumped Warbler	*Dendroica coronata*	29	11	M
Yellow-bellied Flycatcher	*Sphyrapicus varius*	25	8	M
Orange-Crowned Warbler	*Vermivora celata*	25	6	S
Winter wren	*Troglodytes hiemalis*	25	6	S
Gray Jay	*Perisoreus canadensis*	23	6	FY
Hermit Thrush	*Catharus guttatus*	16	4	S
Blackpoll Warbler	*Dendroica striata*	12	3	S
Ruby-crowned Kinglet	*Regulus calendula*	12	4	S
Boreal Chickadee	*Poecile hudsonicus*	8	2	S
White-winged Crossbill	*Loxia leucoptera*	8	5	S
Wilson's Warbler	*Wilsonia pusilla*	8	2	S
Chipping Sparrow	*Spizella pusila*	8	2	S
Alder flycatcher	*Empidonax alnorum*	8	2	S
Blackpoll warbler	*Dendroica striata*	8	2	S
Lincoln's Sparrow	*Melospiza lincolnii*	8	3	S
Magnolia Warbler	*Dendroica magnolia*	4	1	S
Northern Flicker	*Colaptes auratus*	4	1	S
Bohemian waxwing	*Bombycilla garrulus*	4	5	S
Red-eyed Vireo	*Vireo olivaceus*	4	1	S
Northern goshawk	*Accipiter gentilis*	4	1	A

Table 3- Abundance and habitat associations of birds detected within 25 point count stations in the Wabush 3 PDA, July 9-12, 2014.

Point Count #	Common name	Scientific name	Number of individuals	Habitat type/Location
1	White-throated sparrow	*Zonotrichia albicollis*	5	Open black spruce forest/Overburden storage area
	Fox sparrow	*Passerella iliaca*	2	
	Lincoln's sparrow	*Melospiza lincolnii*	1	
	American robin	*Turdus migratorius*	2	
	Swainson's thrush	*Catharus ustulatus*	1	
	Hermit thrush	*Catharus guttatus*	1	
	Tennessee warbler	*Vermivora peregrina*	3	
2	White-throated sparrow	*Zonotrichia albicollis*	5	Open black spruce forest/Overburden storage area
	Fox sparrow	*Passerella iliaca*	1	
	Dark-eyed Junco	*Junco hyemalis*	2	
	American robin	*Turdus migratorius*	2	
	Orange-crowned warbler	*Vermivora celata*	1	
3	White-throated sparrow	*Zonotrichia albicollis*	3	Open black spruce forest/Overburden storage area
	Fox sparrow	*Passerella iliaca*	1	
	Chipping sparrow	*Spizella pusila*	1	
	Dark-eyed Junco	*Junco hyemalis*	1	
	American robin	*Turdus migratorius*	2	
	Tennessee warbler	*Vermivora peregrina*	1	
	Yellow-rumped warbler	*Dendroica coronata*	1	

Point Count #	Common name	Scientific name	Number of individuals	Habitat type/Location
	Blackpoll warbler	*Dendroica striata*	1	
	Orange-crowned warbler	*Vermivora celata*	1	
4	White-throated sparrow	*Zonotrichia albicollis*	3	Rock barren/Proposed fencing
	American robin	*Turdus migratorius*	1	
	Hermit thrush	*Catharus guttatus*	1	
	Ruby crowned kinglet	*Regulus calendula*	1	
	Wilson's warbler	*Wilsonia pusilla*	1	
	Yellow-rumped warbler	*Dendroica coronata*	1	
	Orange-crowned warbler	*Vermivora celata*	1	
	Tennessee warbler	*Vermivora peregrina*	1	
	Alder flycatcher	*Empidonax alnorum*	1	
	Yellow-bellied flycatcher	*Sphyrapicus varius*	1	
5	White-throated sparrow	*Zonotrichia albicollis*	2	Open black spruce forest/Proposed fencing
	Chipping sparrow	*Spizella pusila*	1	
	Swainson's thrush	*Catharus ustulatus*	1	
	Hermit thrush	*Catharus guttatus*	1	
	Winter wren	*Troglodytes hiemalis*	1	
	Tennessee warbler	*Vermivora peregrina*	1	
	White-winged crossbill	*Loxia leucoptera*	2	
	Boreal chickadee	*Poecile hudsonicus*	1	
	Northern flicker	*Colaptes auratus*	1	

Point Count #	Common name	Scientific name	Number of individuals	Habitat type/Location
6	White-throated sparrow	*Zonotrichia albicollis*	1	Open black spruce forest/Proposed fencing
	Dark-eyed Junco	*Junco hyemalis*	1	
	Swainson's thrush	*Catharus ustulatus*	1	
7	Dark-eyed Junco	*Junco hyemalis*	1	Open black spruce forest/Proposed fencing
	Gray jay	*Perisoreus canadensis*	1	
8	White-throated sparrow	*Zonotrichia albicollis*	1	Open black spruce forest/Proposed fencing
9	White-throated sparrow	*Zonotrichia albicollis*	1	Open black spruce forest[1]
	American robin	*Turdus migratorius*	3	
	Wilson's warbler	*Wilsonia pusilla*	1	
10	White-throated sparrow	*Zonotrichia albicollis*	3	Open black spruce forest[1]/Rock storage area
	Dark-eyed Junco	*Junco hyemalis*	1	
	Fox sparrow	*Passerella iliaca*	1	
	American robin	*Turdus migratorius*	1	
	Yellow-rumped warbler	*Dendroica coronata*	1	
	Hermit thrush	*Catharus guttatus*	1	
	Ruby crowned kinglet	*Regulus calendula*	1	
	Alder flycatcher	*Empidonax alnorum*	1	
	Boreal chickadee	*Poecile hudsonicus*	1	
	Blackpoll warbler	*Dendroica striata*	1	
11	White-throated sparrow	*Zonotrichia albicollis*	1	Open black spruce forest/Rock storage area
	Ruby crowned kinglet	*Regulus calendula*	2	

Point Count #	Common name	Scientific name	Number of individuals	Habitat type/Location
	Yellow-bellied flycatcher	*Sphyrapicus varius*	2	
	Gray jay	*Perisoreus canadensis*	1	
	Winter wren	*Troglodytes hiemalis*	1	
12	White-throated sparrow	*Zonotrichia albicollis*	1	Open black spruce forest[1]/Rock storage area
	Fox sparrow	*Passerella iliaca*	1	
	Yellow-bellied flycatcher	*Sphyrapicus varius*	1	
13	Swainson's thrush	*Catharus ustulatus*	1	Young black spruce forest/Rock storage area
	Dark-eyed Junco	*Junco hyemalis*	1	
	Tennessee warbler	*Vermivora peregrina*	1	
	Winter wren	*Troglodytes hiemalis*	1	
14	White-throated sparrow	*Zonotrichia albicollis*	2	Rock barren/Rock storage area
	Fox sparrow	*Passerella iliaca*	1	
	Blackpoll warbler	*Dendroica striata*	1	
15	Lincoln's sparrow	*Melospiza lincolnii*	1	Willow thicket/Proposed fencing
	White-throated sparrow	*Zonotrichia albicollis*	2	
	Swainson's thrush	*Catharus ustulatus*	1	
	Yellow-rumped warbler	*Dendroica coronata*	1	
	Tennessee warbler	*Vermivora peregrina*	1	
	Orange-crowned warbler	*Vermivora celata*	1	
	Gray jay	*Perisoreus canadensis*	1	
16	Dark-eyed Junco	*Junco hyemalis*	1	Open black spruce

Point Count #	Common name	Scientific name	Number of individuals	Habitat type/Location
	White-winged crossbill	*Loxia leucoptera*	3	forest[1]/Proposed fencing
	White-throated sparrow	*Zonotrichia albicollis*	2	
	Swainson's thrush	*Catharus ustulatus*	1	
	Yellow-rumped warbler	*Dendroica coronata*	1	
	Tennessee warbler	*Vermivora peregrina*	1	
	Magnolia warbler	*Dendroica magnolia*	1	
	Yellow-bellied flycatcher	*Sphyrapicus varius*	1	
17	Dark-eyed Junco	*Junco hyemalis*	1	Mature deciduous forest[1]/Proposed fencing
	White-throated sparrow	*Zonotrichia albicollis*	1	
	Fox sparrow	*Passerella iliaca*	1	
	Swainson's thrush	*Catharus ustulatus*	1	
	American robin	*Turdus migratorius*	1	
	Tennessee warbler	*Vermivora peregrina*	1	
	Gray jay	*Perisoreus canadensis*	1	
	Winter wren	*Troglodytes hiemalis*	2	
	Yellow-bellied flycatcher	*Sphyrapicus varius*	1	
	Orange-crowned warbler	*Vermivora celata*	1	
18	Swainson's thrush	*Catharus ustulatus*	2	Mature deciduous forest/Proposed fencing
	Orange-crowned warbler	*Vermivora celata*	1	
	Winter wren	*Troglodytes hiemalis*	1	
	Red-eyed vireo	*Vireo olivaceus*	1	

Point Count #	Common name	Scientific name	Number of individuals	Habitat type/Location
	Yellow-bellied flycatcher	*Sphyrapicus varius*	1	
	Northern goshawk	*Accipiter gentilis*	1	
19	Tennessee warbler	*Vermivora peregrina*	2	Mature deciduous forest[1]/Proposed fencing
	Yellow-rumped warbler	*Dendroica coronata*	1	
	Winter wren	*Troglodytes hiemalis*	1	
20	Dark-eyed Junco	*Junco hyemalis*	1	Open black spruce forest[1]/Proposed fencing
	Swainson's thrush	*Catharus ustulatus*	1	
	Yellow-rumped warbler	*Dendroica coronata*	2	
	Gray jay	*Perisoreus canadensis*	2	
21	Dark-eyed Junco	*Junco hyemalis*	1	Open black spruce forest[1]/Proposed fencing
22	White-throated sparrow	*Zonotrichia albicollis*	1	Open black spruce forest[1]/Proposed fencing
	Yellow-rumped warbler	*Dendroica coronata*	1	
	Dark-eyed Junco	*Junco hyemalis*	1	
23	White-throated sparrow	*Zonotrichia albicollis*	1	Open black spruce forest[1]/Proposed fencing
	Yellow-bellied flycatcher	*Sphyrapicus varius*	1	
24	White-throated sparrow	*Zonotrichia albicollis*	2	Rock barren/Proposed fencing
	Lincoln's sparrow	*Melospiza lincolnii*	1	
	Dark-eyed Junco	*Junco hyemalis*	1	
	American robin	*Turdus migratorius*	2	
	Tennessee warbler	*Vermivora peregrina*	2	
	Yellow-rumped warbler	*Dendroica coronata*	1	

Point Count #	Common name	Scientific name	Number of individuals	Habitat type/Location
	Hermit thrush	*Catharus guttatus*	1	
25	Dark-eyed Junco	*Junco hyemalis*	2	Rock barren/Proposed fencing
	Swainson's thrush	*Catharus ustulatus*	1	
	Bohemian waxwing	*Bombycilla garrulus*	5	
	Tennessee warbler	*Vermivora peregrina*	1	
	Yellow-rumped warbler	*Dendroica coronata*	1	

[1]Indicates light ground disturbance (e.g. roads, trails, small clearings)

4.0 LITERATURE CITED

Amec Foster Wheeler. 2012. Baseline Avian Surveys for the Proposed Wabush 3 Mine Site and Potential Ski Hill Labrador City, NL.

Canada Committee on Ecological Land Classification. 1989. Eco-climatic Regions of Canada: First Approximation. Environment Canada, Ecological Land Classification Series No. 23, Canadian Wildlife Service.

Environment Canada. 2013. Bird Conservation Strategy for Bird Conservation Region 7 and Marine Biogeographic Unit 10 in Newfoundland and Labrador – Taiga Shield and Hudson Plains and Newfoundland-Labrador Shelves. Canadian Wildlife Service, Environment Canada. Sackville, New Brunswick. iv + 113 pp. + appendices.

Maritimes Breeding Bird Atlas. 2008. Guide to Atlassing for Species at Risk in the Maritimes Provinces, 2nd Ed, Bird Studies Canada, Sackville, NB.

Quebec Breeding Bird Atlas. 2010. Quebec Breeding Bird Atlas Guide for Atlassers. Available online at:
http://www.atlas-oiseaux.qc.ca/index_en.jsp.

Appendix A

UTM coordinates (NAD83/Zone 19) of point count locations within the Wabush 3 PDA.

Point Count #	Northing	Easting	Date surveyed
1	5871198	637040	July 9
2	5870816	637286	July 9
3	5871307	637512	July 9
4	5870485	637697	July 9
5	5870758	638077	July 9
6	5871062	638337	July 9
7	5871238	636568	July 10
8	5871871	636687	July 10
9	5872273	636575	July 10
10	5872825	636916	July 10
11	5873786	636799	July 10
12	5873154	637426	July 10
13	5873353	636546	July 10
14	5872781	636247	July 10
15	5871508	638501	July 11
16	5871309	639170	July 11
17	5871680	639582	July 11
18	5872363	639242	July 11
19	5872791	639289	July 11
20	5873379	639250	July 11
21	5873718	639018	July 11

Point Count #	Northing	Easting	Date surveyed
22	5873504	638547	July 12
23	5873846	638588	July 12
24	5871981	638626	July 12
25	5872339	638818	July 12

Appendix B

John Gosse, M. Sc. (Biology)

SUMMARY OF EXPERIENCE: John Gosse is a terrestrial ecologist with over 20 years of experience in resource conservation issues including species at risk recovery and assessing the impacts of non-native species on forest regeneration. Mr. Gosse has extensive experience in conducting surveys for woodland birds of prey, Harlequin Ducks, shorebirds, and boreal songbirds including two listed species at risk (the Olive-sided Flycatcher and Rusty Blackbird). He is a current member of the Newfoundland Land-birds and Shorebirds Recovery Teams and has contributed to the development of population monitoring guidelines for the Province. John recently authored the provincial Recovery Strategy for Olive-sided Flycatchers and has published multiple articles in scientific journals on avian ecology. Mr. Gosse is also a long-time participant of the North American Breeding Bird Survey and has led survey efforts in several regions of eastern Newfoundland.

RELEVANT PROJECTS

- Avifauna nest survey, EMERA, Stephenville, NL, Canada. During summer, 2013, John participated in a field study to determine the presence/absence of nesting birds along a proposed transmission line corridor route in western Newfoundland.
- Breeding bird survey, Canadian Wildlife Service, St. John's, NL, Canada. During summer, 2013, John conducted breeding bird surveys in a remote wilderness setting along the Mecatina River in southern Labrador.
- Labrador West Transmission Link, Nalcor Energy Limited, NL; Conducted the collection of data on the composition of mammal communities along the proposed transmission line route in western Labrador.
- Western Newfoundland Transmission Line Assessment (EMERA); Conducted field surveys for the threatened Newfoundland marten along the proposed transmission line route in western Newfoundland.
- Species at Risk Recovery, Parks Canada; Led a long-term recovery program to establish a viable population of Newfoundland marten in Terra Nova National Park/eastern Newfoundland. Components of this program included ecological research, translocations to increase the number of resident animals, the development of alternative trapping approaches to mitigate accidental mortality, and the development and delivery of educational products and programs.
- Ecological research on Harlequin Ducks; Conducted research on the distribution and abundance of Harlequin Ducks in Hebron Fiord, Labrador. Also, assessed diel activity, reproductive success and feeding ecology.

Holly Hogan, M. Sc. (Biology)

SUMMARY OF EXPERIENCE: Holly Hogan has been involved in avian studies for over 25 years. Her graduate work involved comparing avian assemblages in different forest types in western Newfoundland and evaluating species/habitat associations. She conducted similar research for the Canadian Wildlife Service (BC) in various silvicultural forest treatments; and in sage habitats in British Columbia. Holly has worked on various Environmental Assessments programs from both the regulatory and the consulting perspectives for 10 years. As an Environmental Assessment Biologist for the Canadian Wildlife Service (NL) Holly developed various bird monitoring programs. As a consultant, Holly participated in several avian baseline studies and effects monitoring studies. Holly also has extensive experience monitoring seabird populations at sea and on breeding colonies. In addition to professional associations, Holly has been involved in the North American Breeding Bird Survey (BBS) and the Audubon Society Christmas Bird Count (CBC) intermittently for over 25 years. For the last four years, Holly managed the Witless Bay and Baccalieu Island Seabird Ecological Reserves for the Department of Environment and Conservation.

RELEVANT PROJECTS

- Avifauna nest survey, EMERA, Stephenville, NL, Canada. During summer, 2013, Holly participated in a field study to determine the presence/absence of nesting birds along a proposed transmission line corridor route in western Newfoundland.
- Environmental Assessment Biologist, Canadian Wildlife Service (CWS), St. John's, NL, Canada. In this role, Holly reviewed hundreds of projects under both the federal and provincial environmental assessment processes. She also developed various avian monitoring programs, including pre-construction bird monitoring program for the Trans-Labrador Highway (Goose Bay – Cartwright phase), and mortality monitoring at satellite towers. She was also involved in developing national guidelines for pre- and post-construction bird monitoring programs for environmental assessments of wind power projects.
- EEM for a Department of Forest Resources and Agriculture Phenotrothion Spray Program, NL. Holly managed an environmental effects monitoring program on the effects of the aerial application of a pesticide (phenetrothion) on common passerine species. The program involved identifying target species and subsequent specimen collection post-spray and submitting samples to the Canadian Wildlife Service for brain chemistry analysis.
- Monitoring Effects of Various Silviculture Treatments on Avian Communities, British Columbia Conservation Foundation, Cloverdale, BC. Holly assessed bird censusing methods and conducted bird surveys in three different silvicultural treatments; conducted nest searches, selected and implemented vegetation sampling methods, analysed data and prepared summary data reports.