



Stantec

Sisson Project:

**Baseline Wildlife and Wildlife Habitat
Technical Report**

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1.0 INTRODUCTION

This document is the Baseline Wildlife and Wildlife Habitat Technical Report prepared by Stantec Consulting Ltd. (Stantec) as background information for the Environmental Impact Assessment (EIA) of the Sisson Project (the Project), proposed by Northcliff Resources Ltd. (Northcliff).

The Project consists of a conventional open pit tungsten and molybdenum mine, an ore processing plant, and associated facilities and infrastructure located on provincial Crown land approximately 10 km southwest of the community of Napadogan, New Brunswick and approximately 60 km directly northwest of the city of Fredericton (see Figure 1.1 for a map of the Project area).

1.1 PURPOSE OF THIS TECHNICAL REPORT

The purpose of this Baseline Wildlife and Wildlife Habitat Technical Report is to describe the baseline conditions of these components of the terrestrial environment within the vicinity of the Project. The Terrestrial Environment has been identified as important to supporting terrestrial wildlife in the area surrounding the Project. In this report, Terrestrial Environment will be referred to as a valued environmental component (VEC). This VEC includes all terrestrial wildlife, wildlife habitat, and birds. Though vegetation is also part of the terrestrial environment, it will be addressed separately in the Vegetated and Wetland Environments Technical Report.

1.2 DATA COLLECTION METHODS

Stantec conducted a review of available background information pertaining to wildlife and wildlife habitat near the Project by consulting relevant sources and studies, including the Atlantic Canada Conservation Data Centre (AC CDC), Maritimes Breeding Bird Atlas (MBBA 2006), Breeding Bird Survey (BBS), and existing field studies. Following this review, a gap analysis was conducted to identify key missing or incomplete information.

In order to fill the knowledge gaps identified in the gap analysis, the Stantec team designed follow-up field studies. These field studies, conducted in 2011, involved characterizing the types of wildlife habitat that exist in the area surrounding the Project and determining the availability of those types of habitat. Biophysical teams then conducted field surveys to evaluate the species of wildlife present within the available habitat types. These wildlife field studies focused primarily on forest breeding birds, including species at risk. Biophysical teams made incidental wildlife observations during the 2011 field season, which are reported in Section 3.0. At the time of writing this report, the New Brunswick Trappers & Fur Harvesters Federation, on behalf of Northcliff, was in the process of conducting winter track transects. Data from those surveys will be compiled, analyzed and reported upon separately.

The follow-up field studies also helped the Project team determine the richness, density, and distribution of bird species (including species at risk and species of conservation concern) and habitat types in the area surrounding the Project.

1.3 SPATIAL BOUNDARIES

The spatial boundaries for the characterization of the existing conditions for wildlife and wildlife habitat are based on the following terms.

The **Project Development Area (PDA)** is the most basic and immediate area of the Project. The PDA is limited to the area of physical disturbance associated with the construction and operation of the Project. For this Project, the PDA consists of an area of approximately 1,200 hectares (ha) that includes the area of physical disturbance associated with the open pit, processing facility, storage areas, and tailings storage facility (TSF). The PDA also includes access roads and a transmission line, the specific area of which will be determined and assessed in the EIA Report.

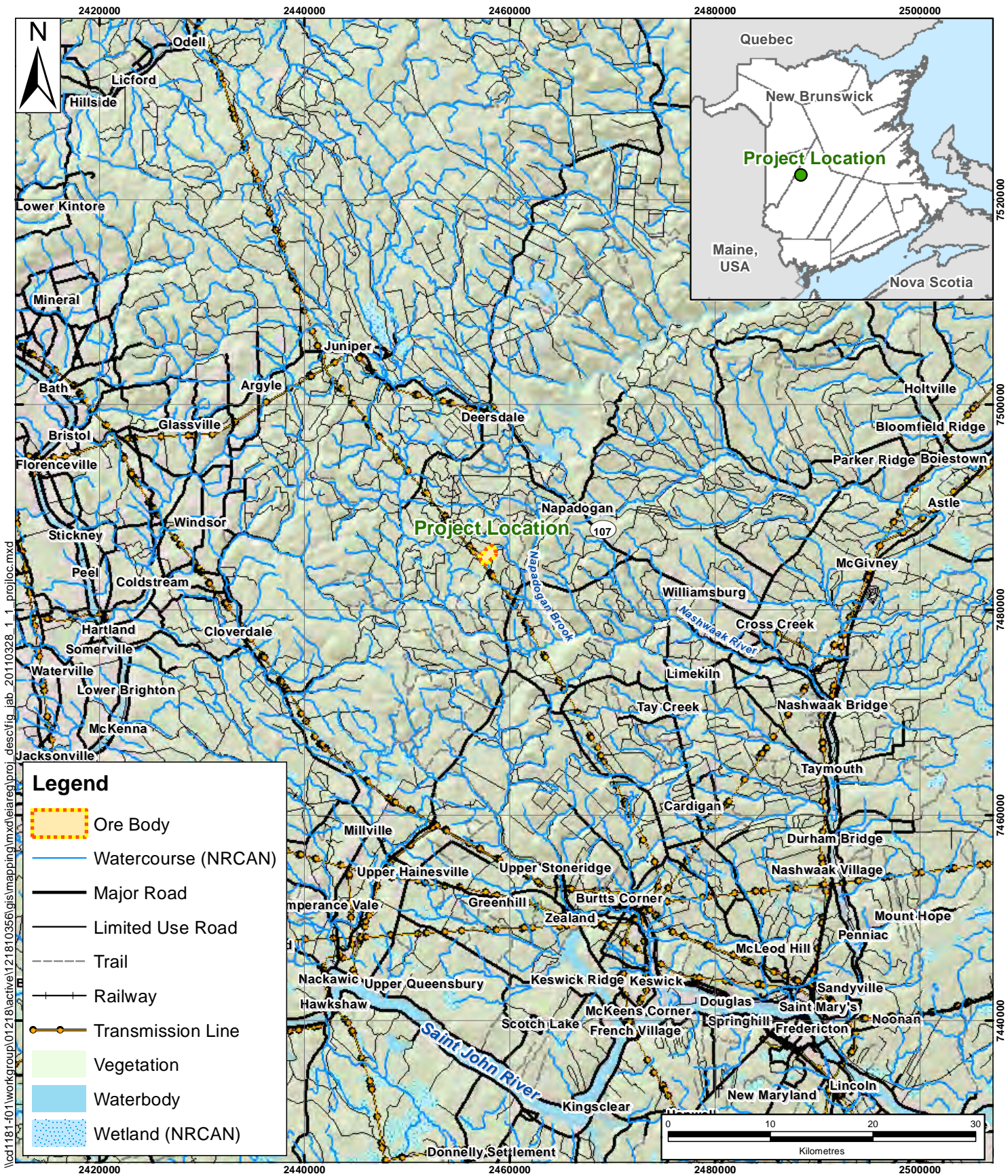
The **Study Area** for this Technical Report includes terrestrial environments within a 23.00 km by 24.75 km area around the PDA, predominantly within the Beadle Ecodistrict of the Central Uplands Ecoregion (Figure 1.2), and incorporates field studies that have been undertaken in areas with available terrestrial habitat information (*i.e.*, Crown land).

1.4 ORGANIZATION OF THIS TECHNICAL REPORT


The remainder of this Technical Report is presented in four sections, as follows:

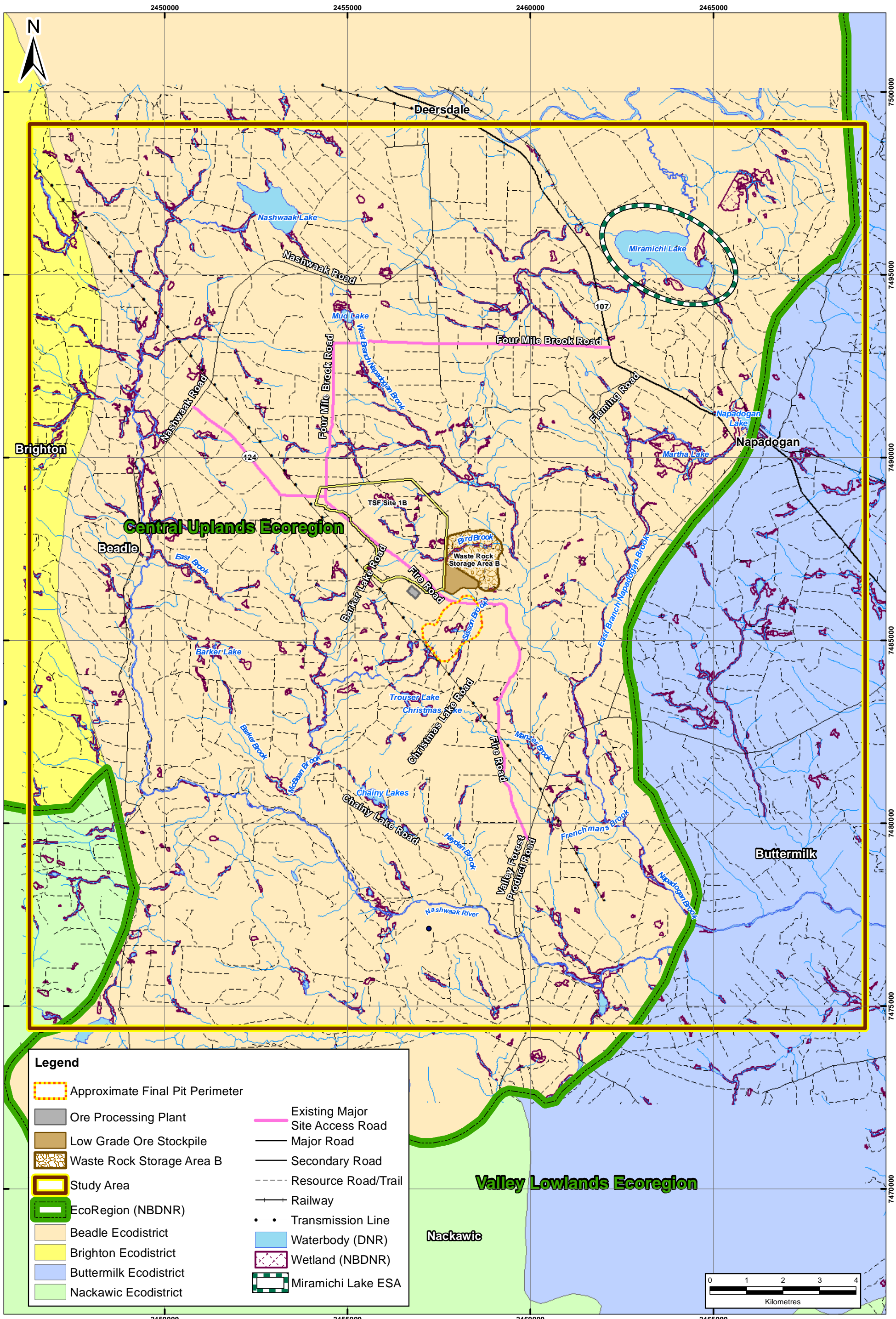
- Section 2.0 summarizes the data relating to wildlife and wildlife habitat in the terrestrial environment within the PDA and Study Area, as documented from literature and other published sources and existing available studies. It identifies the data gaps that were to be filled by field studies specifically conducted for this Technical Report in 2011.
- Section 3.0 summarizes the 2011 field studies Stantec conducted to fill gaps in available information to characterize existing conditions with respect to wildlife and wildlife habitat.
- Section 4.0 provides an overall summary of the Technical Report.
- Section 5.0 provides references consulted as part of the work as well as personal communications.

Additional supporting documentation is provided in the appendices. Appendix A provides a glossary and list of acronyms and units. Appendix B contains summary tables from existing data sources. Appendix C provides a summary of the point count surveys conducted in 2011. Appendix D provides an overall summary of bird data sources.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Project Location		Scale:	Project No.:	Data Sources:	Fig. No.:	
Sisson Project:		1:500,000	121810356	SNB	1.1	
Baseline Wildlife and Wildlife Habitat Technical Report		Date:	Dwn. By:	NRCAN, ESRI		
Napadogan, N.B.		(dd/mm/yyyy)	JAB	Appd. By:		
Client: Northcliff Resources Ltd.		09/03/2012		DLM		



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

Study Area Sisson Project: Baseline Wildlife and Wildlife Habitat Technical Report Napadogan, N.B.		Scale:	Project No.:	Data Sources:	Fig. No.:
		1:95,000	121810356	NBDNR, SNB, AC CDC	1.2
Client:	Northcliff Resources Ltd.	Date:	Dwn. By:	Appd. By:	
		09/03/2012	JAB	GAMJ	

2.0 OVERVIEW OF THE TERRESTRIAL ENVIRONMENT

Excluding fish and marine mammals, a total of 480 vertebrate animal species can be found in New Brunswick, including 183 species of breeding birds, 55 terrestrial mammal species, 16 amphibian species, and 7 species of reptiles (NBDNR 2011a).

Wildlife is widespread throughout the Study Area, and wildlife use forestry roads and power line corridors as travel ways. Common New Brunswick wildlife have been observed in the Study Area, including white-tailed deer, moose, coyote, red fox, raccoon, and black bear.

Small mammals such as varying hare, mice, shrew, voles, and red squirrel have also been observed within the Study Area. Amphibian species such as red-backed salamander, wood frog, spring peeper, green frog, mink frog, bullfrog, and American toad can be found near wetlands and watercourses. Common New Brunswick reptile species such as garter snake have also been observed within the Study Area.

This section summarizes the data on wildlife and wildlife habitat in the vicinity of the Project to provide a compilation of known information on the baseline conditions of wildlife and wildlife habitat as part of the Terrestrial Environment in the Study Area and includes:

- ecological land classification;
- government and institutional information sources;
- 2008 field studies carried out by Rescan™ Environmental Services Ltd. for Geodex Minerals Ltd., the company that was sole owner of the Sisson mineral rights at the time;
- species at risk;
- species of conservation concern; and
- identified gaps in data.

The information provided is based on existing data available from a variety of sources of information, including the New Brunswick Department of Natural Resources (NBDNR), AC CDC, and Bird Studies Canada. When necessary, these sources are supplemented by information about wildlife gathered through survey work conducted in 2008 and field programs conducted in 2011.

The terms species at risk and species of conservation concern are referred to frequently in this report. These are defined as follows.

Species at risk include species that are listed under Schedule 1 of the *Species at Risk Act (SARA)* as “extirpated”, “endangered”, or “threatened” and/or listed under the New Brunswick *Endangered Species Act (NB ESA)* as “Endangered” or “Regionally Endangered”.

Species of conservation concern includes those listed species that are not currently under the protection of *SARA* or the *NB ESA* (*i.e.*, are listed as “special concern” in Schedule 1 of *SARA*; listed in Schedule 2 or 3 of *SARA*; listed as “special concern”, “threatened” or “endangered” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) but not yet listed in Schedule 1 of *SARA*; or ranked as S1, S2, or S3 by AC CDC; and/or ranked as “May Be At Risk” or “Sensitive” in the *NB ESA*).

The various rankings under *SARA*, *NB ESA*, COSEWIC, and other conservation authorities are listed in Appendix A (Glossary and List of Acronyms and Units).

2.1 ECOLOGICAL LAND CLASSIFICATION

The New Brunswick Ecological Land Classification (NBELC) is part of a national ELC system, which classifies ecological units at various spatial scales (NBDNR 2007). At the national scale the Project is within the Atlantic Maritime Ecozone, which encompasses the Maritime Provinces of Canada and the Gaspé Peninsula and southeastern Quebec (Marshal *et al.* 1999).

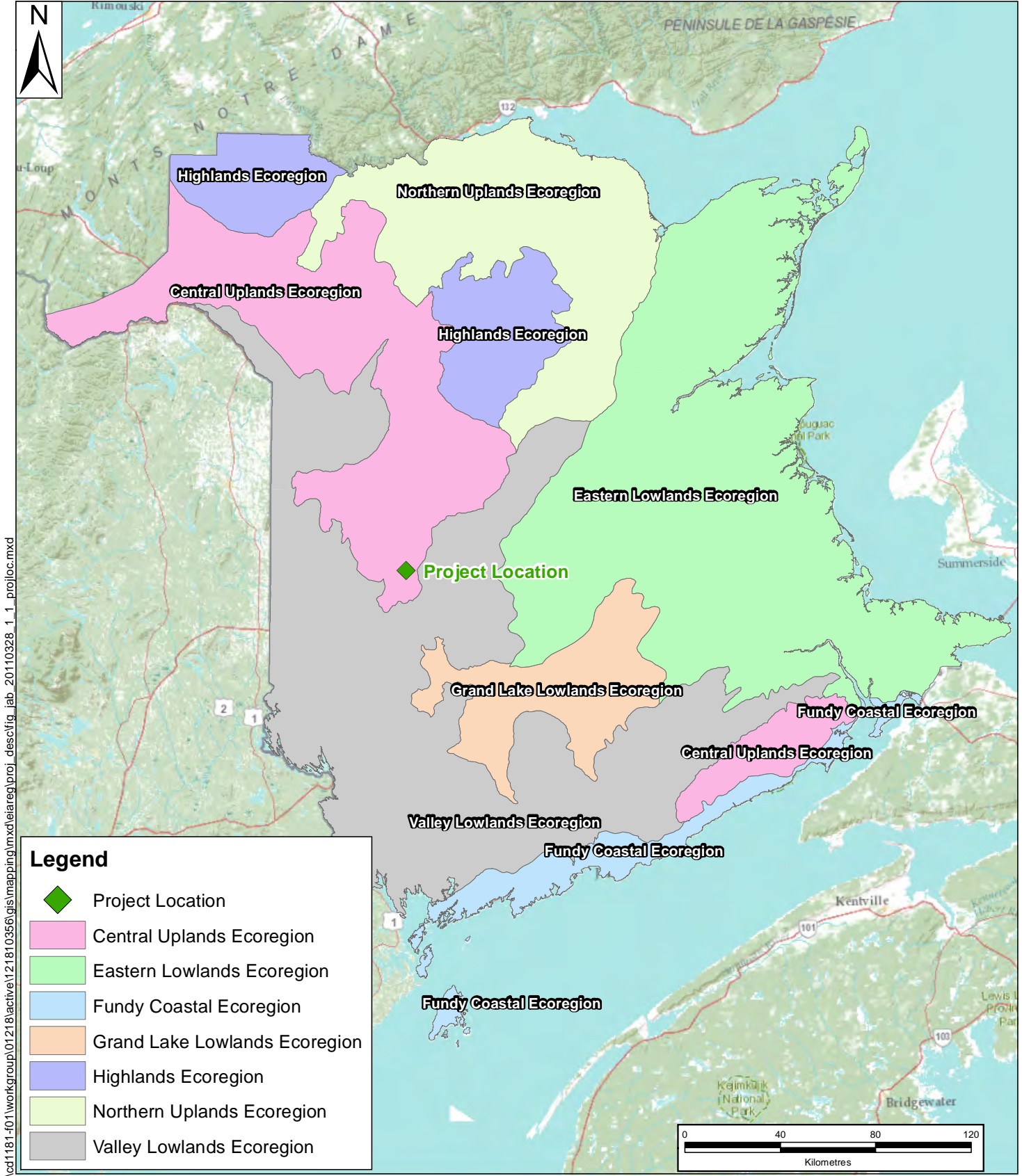
The NBELC divides the province into seven ecoregions, which are defined primarily by climate, but are also differentiated by other features, such as geology and soils, forest cover and vegetation, and wetlands (Figure 2.1). Each of these ecoregions is further divided into ecodistricts, which are delineated by features such as elevation or rock types. Ecosites are a fine-scale of classification within the NBELC, encompassing landforms such as hilltops and valleys. Features such as topoclimate, moisture, and nutrient regime are typically uniform within a single ecosite. As well, ecosites are generally represented by one or several related plant communities.

Within New Brunswick, there are three forest regions: Boreal, Great Lakes-St. Lawrence, and Acadian. The Boreal and Great Lakes-St. Lawrence forest regions are found in relatively small northern sections of the province. The majority of New Brunswick, including the PDA and Study Area, is within the Acadian forest region (Wiken *et al.* 1996). The Acadian forest is a transition zone between boreal forests to the north and temperate deciduous forests to the south, so it contains species from both regions. The Acadian forest contains a wide variety of forest stands that are characterized by the presence of species such as red spruce, balsam fir, yellow birch, and sugar maple (Wiken *et al.* 1996; Hinds 2000).

The PDA is located completely within the Central Uplands Ecoregion, in the Beadle Ecodistrict, in the south of the Central Uplands Ecoregion. The Study Area is located both in the Central Uplands Ecoregion (Beadle and Brighton ecodistricts) and the Valley Lowlands Ecoregion (Buttermilk Ecodistrict) (Figure 1.2). The following sections describe these ecoregions and ecodistricts in more detail.

2.1.1 Central Uplands Ecoregion

The Central Uplands Ecoregion includes two geographically separate but ecologically similar areas: the Madawaska Uplands in northwestern New Brunswick and the Caledonia Uplands in the southeast part of the province near the Bay of Fundy. The Caledonia Uplands area is located approximately 140 km to the southeast of the Madawaska Uplands. The PDA and majority of the Study Area are located in the south of the Madawaska Uplands.



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<p>Ecoregions of New Brunswick</p> <p>Sisson Project: Baseline Wildlife and Wildlife Habitat Technical Report Napadogan, N.B.</p>				<p>Scale: 1:2,200,000</p>	<p>Project No.: 121810356</p>	<p>Data Sources: SNB NRCAN, ESRI</p>	<p>Fig. No.: 2.1</p>	
<p>Client: Northcliff Resources Ltd.</p>	<p>Date: (dd/mm/yyyy) 09/03/2012</p>	<p>Dwn. By: JAB</p>	<p>Appd. By: DLM</p>					

The plateaus of the southern part of the Madawaska Uplands differ from the steeper slopes found in the north of the ecoregion. Generally, watercourses in the northern part of this region flow into the Saint John River whereas those in the southern part of the region primarily flow east and eventually into the Miramichi River. Rivers in the extreme south of the Madawaska Uplands are an exception; these flow into the Nashwaak River, which empties into the Saint John River. This ecoregion is at a relatively higher elevation than other ecoregions, resulting in a somewhat cooler climate that is mediated somewhat by primarily south-facing slopes. The higher elevation and cooler temperatures lead to a lower saturation vapour pressure and higher precipitation amounts than are generally found in neighbouring regions (NBDNR 2007).

Warmer south-facing slopes support some southern tree species not seen in nearby colder ecoregions, such as balsam fir (*Abies balsamea*); red, white, and black spruce (*Picea rubens*, *P. glauca*, and *P. mariana*); and tolerant hardwoods such as sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and beech (*Fagus grandifolia*) (NBDNR 2007). Eastern white cedar (*Thuja occidentalis*) is common in calcareous soils, where they occur, in particular in the Little Main Restigouche and Grand River watersheds in the northern part of the Madawaska Uplands. Common understory shrub species include mountain maple (*A. spicatum*), striped maple (*A. pensylvanicum*), and hobblebush (*Viburnum lantanoides*).

The Central Uplands Ecoregion contains many different wetland types, particularly in southern areas where the landscape is less constrained by steep slopes. Common wetland types include riparian shrub wetlands dominated by alder (*Alnus* spp.), open water wetlands, and peatlands (NBDNR 2007).

2.1.1.1 Beadle Ecodistrict

The Beadle Ecodistrict, which encompasses the PDA and the majority of the Study Area, is characterized by broad valleys and rolling hills and contains many lakes. Like the Madawaska Uplands as a whole, the Beadle Ecodistrict has a cool, wet climate, and is dominated by south-facing slopes, the result of an elevation gradient ranging from 300 metres above sea level (masl) in the south to 600 masl in the north (NBDNR 2007).

Bedrock within the ecodistrict is primarily granitic, with relatively few fractures and low porosity causing poor drainage (Colpitts *et al.* 1995). This poor drainage has resulted in more lakes, ponds, and wetlands in the ecodistrict (NBDNR 2007). Watercourses in the north of the Beadle Ecodistrict generally flow eastward, eventually into the Miramichi River; those in the south generally flow southward into the Saint John River.

Approximately 92% of the Beadle Ecodistrict is forested, including forested wetlands (NBDNR 2007). Forests in the ecodistrict transition from coniferous to tolerant hardwood stands. Granite-derived soils with imperfect to poor drainage are typically dominated by balsam fir and spruce; slopes and hilltops are dominated by sugar maple, yellow birch, and beech. Mixedwood stands are found in transition zones.

Forests in the Beadle Ecodistrict have been logged since the late 1700s (NBDNR 2007). Forestry is still the main economic industry for the region despite the recent closure of sawmills in the communities of Juniper and Deersdale. Several mineral occurrences and prospects have been found in the ecodistrict, most notably the Sisson tungsten-molybdenum deposit and the small Burnthill tungsten-
June 1, 2012

molybdenum deposit north of Napadogan that was mined for a few years in the mid-1950s (Stewart *et al.* 2011; Lang, J. Personal communication, February 24, 2012).

2.1.1.2 Brighton Ecodistrict

The Brighton Ecodistrict, to the east of the Beadle Ecodistrict, is very hilly and contains a number of mountain ranges. Because of its high elevations, the Brighton Ecodistrict tends towards cooler, wetter summers, much like the neighbouring Beadle Ecodistrict.

The Brighton Ecodistrict is composed of three lobes with distinct geology; this discussion focusses on the southern lobe, which contains the western edge of the Study Area. Although the ecodistrict as a whole is dominated by non-calcareous sedimentary rock, the southern lobe has a very diverse geology, with calcareous and non-calcareous sedimentary rocks to the west and a variety of volcanic rocks to the east, extending into the Study Area (Colpitts *et al.* 1995; NBDNR 2007). Watercourses in the southern lobe drain primarily into the Nashwaak River and Miramichi River watersheds.

Approximately 94% of the Brighton Ecodistrict is forested, including forested wetlands (NBDNR 2007). Unlike the forest composition of the neighbouring Beadle Ecodistrict, forests in the ecodistrict are primarily composed of tolerant hardwood stands. Rich mixedwood stands composed primarily of tolerant hardwoods and red and white spruce (*Picea rubens* and *P. glauca*) are common along the eastern boundary shared with the Beadle Ecodistrict.

Although the forests in the Brighton Ecodistrict have been logged since the late 1700s, only the southern third of the ecodistrict has ever been inhabited. The majority of non-forested lands are classified as wetland (48%) or agriculture (24%). The primary agricultural crop is potatoes (NBDNR 2007).

2.1.2 Valley Lowlands Ecoregion

Although the PDA and majority of the Study Area are within the Central Uplands Ecoregion, the Study Area extends into the Valley Lowlands Ecoregion on its eastern boundary.

The Valley Lowlands Ecoregion is the largest in the province. It is associated with several large river systems, including Saint John River and Kennebecasis River (NBDNR 2007). Because this ecoregion is associated with large river systems that are removed from the mediating influence of the ocean, winters are colder and summers are warmer compared to most of the province. Because of its large area and provincial coverage, this ecoregion has 12 ecodistricts, with variable geology and diverse types of forest and wetland.

2.1.2.1 Buttermilk Ecodistrict

Unlike the majority of the ecodistricts in the Valley Lowlands Ecoregion that surround the Saint John and Kennebecasis River systems, the Buttermilk Ecodistrict forms a sloped band that transitions from the Central Uplands Ecoregion to the west at an elevation of 300 masl to the Eastern Lowlands Ecoregion to the east at an elevation of 150 masl. Accordingly, the land is generally well drained, and the climate transitions between the cooler, slightly wetter climate of the Central Uplands Ecoregion and the warmer temperatures of the Eastern Lowlands Ecoregion (NBDNR 2007).

Like many other features in the ecodistrict, the bedrock transitions from west to east, with primarily non-calcareous sedimentary rocks in the western area with some granitic intrusions from the Beadle Ecodistrict to the west, and calcareous non-sedimentary rocks to the east (Colpitts 1995; NBDNR 2007). Many watercourses pass through the ecodistrict, most of which originate in the Central Uplands Ecoregion to the west. All but one watercourse, the Nashwaak River which drains to Saint John River, follow the prevailing slope and drain to the east, typically into the Miramichi River or one of its major tributaries (NBDNR 2007).

Approximately 95% of the Buttermilk Ecodistrict is forested, including forested wetlands (NBDNR 2007). Despite a higher percentage of land devoted to agriculture, the percentage of forested land is slightly higher than in the neighbouring Beadle Ecodistrict, owing primarily to a lower coverage of lakes and wetlands in the Buttermilk Ecodistrict. Higher elevation areas in the west of the ecodistrict are primarily tolerant hardwood stands dominated by species such as sugar maple (*Acer saccharum*), beech (*Fagus grandifolia*), and yellow birch (*Betula alleghaniensis*). Soils generally become more calcareous to the east, grading into different forest stands. The central area of the ecodistrict transitions to mixedwood stands dominated by red spruce (*Picea rubens*), balsam fir (*Abies balsamea*), and red maple (*Acer rubrum*). Hemlock (*Tsuga canadensis*) and eastern white pine (*Pinus strobus*) become more common at lower elevations to the east. More calcareous areas also contain some eastern white cedar (*Thuja occidentalis*), which is uncommon in the neighbouring Beadle ecodistrict due to limited calcareous bedrock (Colpitts 1995; NBDNR 2007).

As with other ecodistricts in the area, the Buttermilk Ecodistrict has a long history of forest harvesting. Several large watercourses formerly provided access to downstream sawmills facilitated transport of large timber. The calcareous bedrock also allowed for the development of agriculture and the production of lime fertilizer (NBDNR 2007).

2.1.3 Ecosites

Ecosites may contain several vegetation groups, but typically one is dominant. Three ecosites are prominent within the PDA: ecosites 2, 3, and 5 (NBDNR 2007). The majority of the PDA is classified as ecosite 2, which is composed primarily of red and white spruce (*Picea rubens* and *Picea glauca*, approximately 46%), with lesser amounts of balsam fir (*Abies balsamea*, approximately 18%) and tolerant hardwood (approximately 17%), including sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and beech (*Fagus grandifolia*). Isolated low-lying regions of the Study Area are classified as ecosite 3, which is composed primarily of red and white spruce (approximately 52%), balsam fir (approximately 23%), and black spruce (*Picea mariana*, approximately 13%). Ridges and hillsides are classified as ecosite 5, which is dominated by near-equal amounts of tolerant hardwood and red and white spruce (approximately 37% of each) and contains lesser amounts of mixed tolerant hardwood-softwood (approximately 11%) and balsam fir (approximately 9%).

The Study Area encompasses a greater number of ecosites (NBDNR 2007). West of the PDA, in the Brighton Ecodistrict, ecosite 7 is common. This ecosite is composed primarily of tolerant hardwood (approximately 70%). Ecosite 7 is also found east of the PDA; it is the second most common ecosite in the Buttermilk Ecodistrict of the Valley Lowlands Ecoregion (and the most common in the section of the ecodistrict that is within the Study Area). The eastern side of the Study Area also contains pockets of ecosite 6, which is dominated by eastern white cedar (*Thuja occidentalis*, approximately 40%) and red

and white spruce (approximately 33%), with lesser amounts of tolerant hardwood (approximately 9%). This ecosite is often associated with relatively large wetlands and wetland systems, and is not seen within or adjacent to the PDA.

2.2 GOVERNMENT AND INSTITUTIONAL INFORMATION SOURCES

Various resources were consulted to compile a list of terrestrial species that may be found within the Study Area and to determine their conservation status. The following section provides an overview of the government and institutional resources consulted for species and ecological communities of conservation concern, birds, other wildlife, and wildlife habitat.

2.2.1 Information Source for Species and Ecological Communities of Conservation Concern

The AC CDC assembles and provides data about species and ecological communities of conservation concern in Atlantic Canada. Information on wildlife and wildlife habitat in the Study Area was obtained from AC CDC occurrence records for rare and uncommon species in an area that covers most of the Study Area (AC CDC 2012). Results for species at risk and species of conservation concern are provided in Sections 2.4 and 2.5.

Included in the AC CDC data is information on environmentally significant areas (ESAs) as originally classified by the Nature Trust of New Brunswick in 1995 (Tims and Craig 1995). Between 1993 and 1995, the Nature Trust of New Brunswick identified over 900 sites of environmental importance across the province based on presence of rare species, rich species diversity, representativeness, and their geology and ecological vulnerability. While ESAs do not have legal protection, they are used by non-government organizations, consultants and government departments in project planning. One ESA classified as significant for birds is located within the Study Area. Miramichi Lake ESA (ESA #472) includes the lake and surrounding wetlands, which at the time of its designation in the mid-1990s supported one nesting pair of Bald Eagle (*Haliaeetus leucocephalus*), two nesting pair of Osprey (*Pandion haliaetus*), and a small colony (approximately six nests) of Great Blue Heron (*Ardea herodias*).

2.2.2 Information Sources for Birds

To determine the presence of birds in the Study Area, the Project team consulted the North American Breeding Bird Survey, the Maritimes Breeding Bird Atlas, and the Atlantic Canada Nocturnal Owl Surveys. Each of these is described in more detail in the following sections.

2.2.2.1 North American Breeding Bird Survey (BBS)

The North American Breeding Bird Survey (BBS) began in 1966 and is now one of the longest-running breeding bird surveys in North America. The BBS database is extensive and can be used to determine long-term population trends of breeding bird species in Canada. A search of the BBS database was conducted to obtain records of bird species observed near the Study Area (CWS 2009; USGS 2001).

The search yielded reports on trends for a local survey transect (located in Napadogan/Stanley/Tay Creek) and for the province of New Brunswick. These were reviewed and are presented in Table B.1 in Appendix B. The Stantec team examined yearly data from 1992-2010 for the transect located within

and close to the Study Area. These data consist of birds recorded from 50 survey points. Given the limited number of individuals observed for this transect, care should be taken when drawing conclusions from the data collected for the local transect.

Two species listed in *SARA* have been recorded at the local BBS transect: Olive-sided Flycatcher and Canada Warbler. Both of these species were recorded in low numbers (0-3 Olive-sided Flycatcher individuals per year and 0-4 Canada Warbler individuals per year) on the Stanley transect, which may indicate that these species are not locally common along the transect route. Overall, Olive-sided Flycatcher populations have decreased both locally and at a provincial level. Canada Warbler populations appear to be relatively stable locally but have decreased significantly within the province.

2.2.2.2 Maritimes Breeding Bird Atlas (MBBA)

The second MBBA 2006-2010 is a five-year project to update the distribution and abundance of all bird species breeding in the three Maritimes provinces. The first MBBA was conducted in from 1986-1990. The MBBA database provides information including species presence, breeding evidence, and relative abundance in a given 10 km by 10 km area (known as an “atlas square”). The MBBA (1986-1990) was also consulted.

Information about the presence of breeding bird species within the Study Area was requested from the MBBA via the NatureCounts Website (www.birdscanada.org/birdmon). The search results generated a list of species and records of highest breeding evidence for each species within the atlas squares occupied by the Project.

The Study Area lies on the border between two MBBA regions (Carleton-Victoria and Boiestown-Doaktown), largely within four atlas squares (19FM43, 19FM44, 19FM53, and 19FM54; Figure 2.2). During the atlas period 2006-2010, a total of 93 species of bird were recorded across the four squares. Table B.2 (Appendix B) presents the 93 species detected in the four central squares of the Study Area and their highest recorded breeding status. Of the 93 recorded species, 19 were confirmed as breeding, 21 were probable breeders, 53 were possible breeders, and one was only observed. The MBBA also included breeding bird point-count surveys conducted by volunteer birders. These surveys involve counting birds at a series of points or stations for a prescribed amount of time. The results of these point-count surveys completed for the atlas square 19FM44 are provided in Table B.3 (Appendix B), with 51 species recorded from 30 five-minute point counts conducted over a total of four days in 2008 and 2009. Other atlas squares within the Study Area had few, if any, point counts completed.

2.2.2.3 Atlantic Canada Nocturnal Owl Survey

The Atlantic Canada Nocturnal Owl Survey was initiated in 2001 to help monitor trends in the abundance of relatively common owls. The survey seeks to monitor the region’s owl populations and gather information about the distribution of owls in Atlantic Canada.

The Atlantic Canada Nocturnal Owl Survey database from Bird Studies Canada, accessed via the NatureCounts website (Bird Studies Canada 2012), provides basic information about the presence of owl species detected from specific points on survey routes (called “survey stops”) in a given year. Data are available from 2001 to 2007.

Survey route 23 is partially located within the Study Area, with one stop as close as 150 m from the PDA (*i.e.*, the southern end of the Fire Road Access; Figure 2.2). The following three owl species have been recorded along this route and within the Study Area:

- Barred Owl;
- Northern Saw-whet Owl; and
- Great Horned Owl.

Both Barred Owl and Great Horned Owl have been recorded at a stop located within 0.5 km of the PDA (near Fire Road). Barred Owl is the most common owl detected along survey route 23, ranging from one to four detections per year, with a mean detection of 2.60 per year. It is also the most common owl in the province, averaging from 1.50 to 3.07 Barred Owls per route from 2001 to 2007 (Campbell 2010). Northern Saw-whet Owl and Great Horned Owl were less commonly detected, each detected in only three of the seven years, and averaging 0.57 and 0.85 detections per year, respectively.

Additionally, American Woodcock and Wilson's Snipe have been detected along the route and within the Study Area.

The closest records of Boreal Owl are from survey routes 22 and 8, which are located more than 15 km southeast and west (respectively) of the Study Area.

2.2.3 Information Sources for Other Wildlife

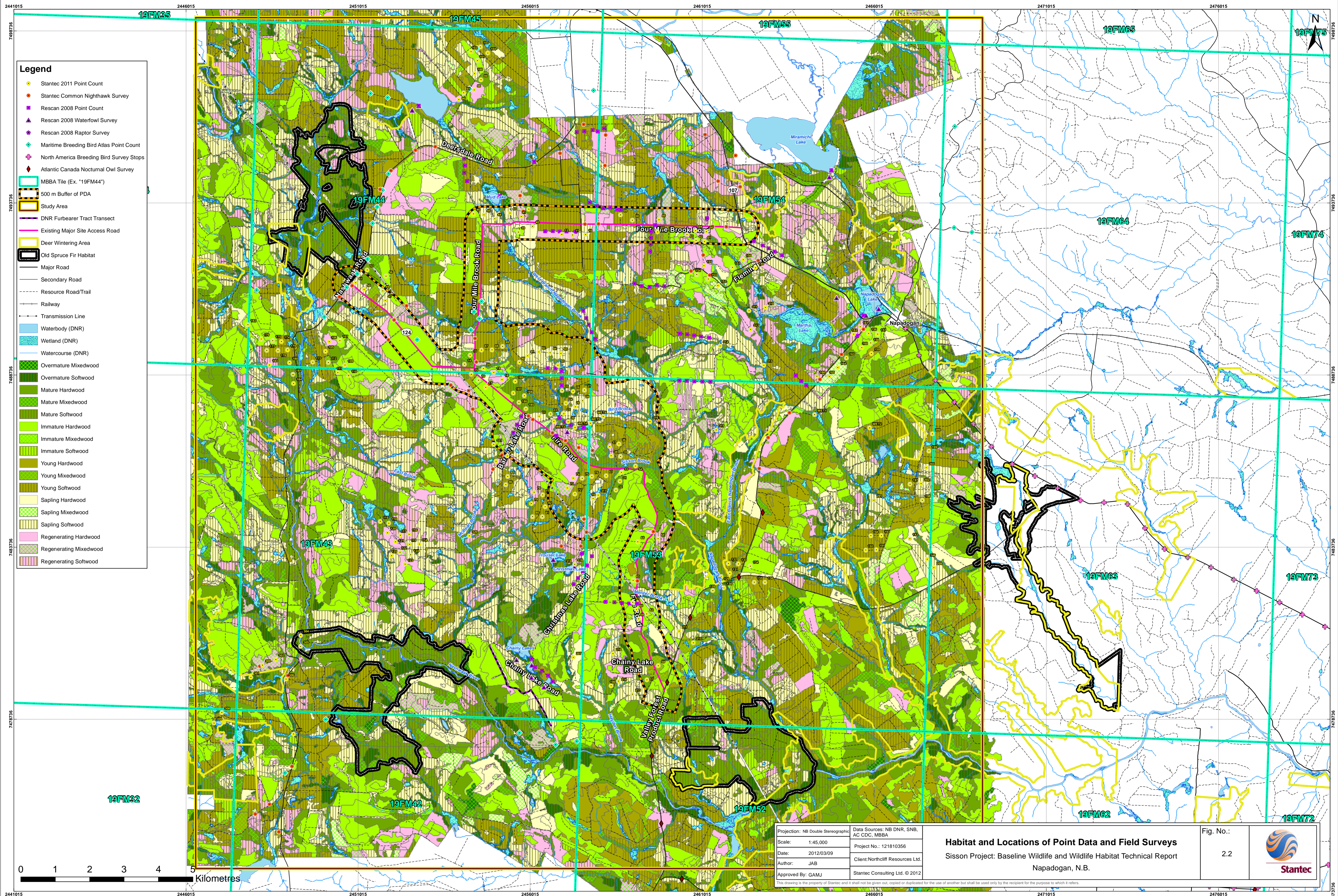
To determine the presence of other wildlife in the Study Area, the Project team consulted the New Brunswick Harvest Reports and New Brunswick Department of Natural Resources Track Transects. Each of these is described in more detail in the following sections.

2.2.3.1 New Brunswick Harvest Reports

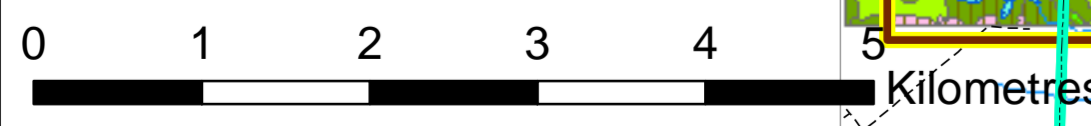
The NBDNR makes available New Brunswick harvest reports for big game and furbearing mammals on a yearly basis. The big game harvest reports provide information about the number of animals legally harvested from 27 wildlife management zones (WMZs) in a given year.

The Project Area lies within WMZ 16. In the 2010–11 season, a total of 447 deer (8.8% of the provincial harvest, and twice the average of WMZs with an open deer season), 123 moose (5.1% of the provincial harvest), and 139 black bear (7.8% of the provincial harvest) were harvested (NBDNR 2010).

The 2010–11 provincial deer harvest represents 0.10 deer harvested per km², just above the provincial average of 0.09 deer per km² (in open zones). The harvest was relatively low in 2010–11. After a particularly severe winter in 2010–11, NBDNR have reduced the number of antlerless deer tags for 2011–12 to facilitate a boost in herd growth, as deer herds have had little time to rebound following the cline of severe winters in 2007–08 and 2008–09 (NBDNR 2010).



- Legend**
- Stantec 2011 Point Count
 - Stantec Common Nighthawk Survey
 - Rescan 2008 Point Count
 - ▲ Rescan 2008 Waterfowl Survey
 - ◆ Rescan 2008 Raptor Survey
 - ◆ Maritime Breeding Bird Atlas Point Count
 - ◆ North America Breeding Bird Survey Stops
 - ◆ Atlantic Canada Nocturnal Owl Survey
 - MBBA Tile (Ex. "19FM44")
 - 500 m Buffer of PDA
 - Study Area
 - DNR Furbearer Tract Transect
 - Existing Major Site Access Road
 - Deer Wintering Area
 - Old Spruce Fir Habitat
 - Major Road
 - Secondary Road
 - Resource Road/Trail
 - Railway
 - Transmission Line
 - Waterbody (DNR)
 - Wetland (DNR)
 - Watercourse (DNR)
 - Overmature Mixedwood
 - Overmature Softwood
 - Mature Hardwood
 - Mature Mixedwood
 - Mature Softwood
 - Immature Hardwood
 - Immature Mixedwood
 - Immature Softwood
 - Young Hardwood
 - Young Mixedwood
 - Young Softwood
 - Sapling Hardwood
 - Sapling Mixedwood
 - Sapling Softwood
 - Regenerating Hardwood
 - Regenerating Mixedwood
 - Regenerating Softwood



Projection: NB Double Stereographic
 Scale: 1:45,000
 Date: 2012/03/09
 Author: JAB
 Approved By: GAMJ

Data Sources: NB DNR, SNB, AC CDC, MBBA
 Project No.: 121810356
 Client: Northcliff Resources Ltd.
 Stantec Consulting Ltd. © 2012

Habitat and Locations of Point Data and Field Surveys
 Sisson Project: Baseline Wildlife and Wildlife Habitat Technical Report
 Napadogan, N.B.

Fig. No.:	
2.2	

New Brunswick's moose population appears to be growing or stable in much of the province, with the strongest growth in the northwest (NBDNR 2010). The 2010 season had the highest resident-license harvest since 2001, and the third-highest hunting success rate ever recorded in the province. With a success rate of 75% in WMZ 16 for 2010, the license quota was increased by 13% in this zone for 2011. The 2010 moose harvest in WMZ 16 represents 0.029 moose harvested per km², just below the provincial average of 0.033 deer per km² (in zones with an open moose season).

The provincial black bear population is estimated at 16,000. The black bear harvest represents 0.033 bear harvested per km², above the provincial average of 0.024 bear per km² (in zones with an open bear season).

Furbearer reports include information on the number of pelts harvested for each species on a provincial level. Overall, the number of pelts exported by New Brunswick Trappers increased by approximately 10% in the 2010–11 season. The main species that contributed to this increase were beaver, marten, mink, and weasel. The most valuable individual pelts were those of bobcat and otter. Beaver pelts comprised the most valuable exported species from New Brunswick overall, with a total value of \$179,213.90 in the 2010–11 season (NBDNR 2011b).

2.2.3.2 NBDNR Track Transects

NBDNR conducts annual track transect surveys in the province to obtain abundance indices of furbearers and their prey across varying New Brunswick habitat types. There is one NBDNR track transect, survey route 58, within the Study Area (see Figure 2.2). This track transect is located just south of the Chainy Lakes and has been conducted annually since 2003. The following mammals have been noted by surveyors on survey route 58:

- American marten (*Martes americana*);
- fisher (*Martes pennanti*);
- Canada lynx (*Lynx canadensis*);
- red fox (*Vulpes vulpes*);
- river otter (*Lutra canadensis*);
- white-tailed deer (*Odocoileus virginianus*);
- moose (*Alces alces*);
- American mink (*Mustela vison*); and
- various small rodent species.

All of these species are ranked “Secure” by the province, with the exception of Canada lynx, a species at risk discussed in Section 2.4.

2.2.3.3 Information Sources for Wildlife Habitat

To determine the presence of wildlife habitat in the Study Area, the Project team consulted habitat data available from NBDNR. NBDNR provided data on forest habitat and wildlife management areas within the Study Area. The most current available data is from 2008. Forest inventory data in the vicinity of the PDA was updated using light detection and ranging (LiDAR) data collected in December 2010 in support of the Project design and the EIA and in conjunction with habitat data collected on the ground. These data enable the identification of new clear cuts and other forest harvesting since 2008.

The following sections describe the data obtained from NBDNR for forest inventory, interior forest, deer wintering areas, and old spruce fir habitat.

2.2.3.4 Forest Inventory Data

Table 2.1 provides a summary of the forest, wetland, and other non-forest habitats within the Study Area and within 500 m of the PDA, based on the data available (*i.e.*, for Crown land only) from NBDNR. The 500 m buffer around the PDA was selected to account for potential indirect disturbance effects on wildlife during construction or operation. The habitat in the Study Area is presented graphically in Figure 2.2.

Table 2.1 Area of Forest and Non-Forest Habitats within the Study Area

Habitat	Area (ha)			Area (%)		
	Study Area	PDA+500m	Study Area-(PDA+500m)	Study Area	PDA+500m	Study Area-(PDA+500m)
Old Forest	13,263.69	743.00	12,520.69	26.0%	16.3%	26.9%
Over-mature Mixedwood	199.11	0.75	198.36	0.4%	0.0%	0.4%
Over-mature Softwood	2,021.11	75.59	1,945.52	4.0%	1.7%	4.2%
Mature Hardwood	2,414.20	135.51	2,278.69	4.7%	3.0%	4.9%
Mature Mixedwood	1,213.28	82.30	1,130.97	2.4%	1.8%	2.4%
Mature Softwood	7,415.99	448.83	6,967.15	14.5%	9.9%	15.0%
Mid-development Forest	19,711.99	2,090.56	17,621.43	38.6%	45.9%	37.9%
Immature-old Hardwood	8,777.69	846.08	7,931.61	17.2%	18.6%	17.0%
Immature-old Mixedwood	280.67	36.70	243.97	0.5%	0.8%	0.5%
Immature-old Softwood	674.62	4.15	670.47	1.3%	0.1%	1.4%
Immature-Young Hardwood	1,637.36	111.56	1,525.79	3.2%	2.5%	3.3%
Immature-Young Mixedwood	496.59	109.76	386.83	1.0%	2.4%	0.8%
Immature-Young Softwood	7,845.06	982.31	6,862.76	15.4%	21.6%	14.7%
Young Forest	15,914.96	1,582.47	14,332.49	31.1%	34.8%	30.8%
Sapling Hardwood	1,747.56	128.67	1,618.89	3.4%	2.8%	3.5%
Sapling Mixedwood	656.29	49.34	606.95	1.3%	1.1%	1.3%
Sapling Softwood	8,123.83	772.22	7,351.61	15.9%	17.0%	15.8%
Regenerating Hardwood	1,362.33	190.43	1,171.90	2.7%	4.2%	2.5%
Regenerating Mixedwood	849.23	117.80	731.43	1.7%	2.6%	1.6%
Regenerating Softwood	3,175.73	324.02	2,851.71	6.2%	7.1%	6.1%

Table 2.1 Area of Forest and Non-Forest Habitats within the Study Area

Habitat	Area (ha)			Area (%)		
	Study Area	PDA+500m	Study Area-(PDA+500m)	Study Area	PDA+500m	Study Area-(PDA+500m)
Total Forest	48,890.64	4,416.03	44,474.61	95.7%	97.0%	95.5%
Hardwood Forest	15,939.13	1,412.25	14,526.89	31.2%	31.0%	31.2%
Mixedwood Forest	3,695.16	396.65	3,298.51	7.2%	8.7%	7.1%
Softwood Forest	29,256.35	2,607.13	26,649.22	57.3%	57.3%	57.2%
Water body	598.39	1.80	596.59	1.2%	0.04%	1.3%
Wetland	1,360.80	82.14	1,278.65	2.7%	1.8%	2.7%
Non-Forest Layer	250.63	51.50	199.13	0.5%	1.1%	0.4%
Total	51,100.46	4,551.47	46,548.98	100.0%	100.0%	100.0%

Forest and non-forest habitat data are available for approximately 511 km² (90%) of the 23 km by 24.75 km area that makes up the Study Area. The data coverage is entirely for Crown land or other lands for which the forest inventory data is publically available; data gaps are on freehold land.

The predominant land use in the Study Area is forest harvesting and other public uses of Crown land such as outdoor recreational activities including hunting, trapping, and off-road vehicle use—all conducted at the Crown's convenience. Of the available data, 95% the Study Area and 97% of the habitat within 0.5 km of the PDA are composed of forest of varying developmental stage and type. The mix of forest types near the PDA is very similar to that of the Study Area overall, with 59–60% softwood, 32–33% hardwood, and 7–9% mixedwood. Mature and over-mature forest near the PDA make up only 16.3% compared to 26.0% in the Study Area, a difference of nearly 10%.

The PDA has a higher percentage of mid-development forest and young forest compared to the Study Area. The older forests are mostly mature softwood, while the mid-development forests are dominated by immature-old hardwood and immature-young softwood. Sapling softwood makes up the majority of the young forest stands near the PDA and the Study Area overall (16–17% of the forest habitat), which are predominantly spruce and balsam fir stands originating from clear cuts. These four forest-stand types make up 67% in the Study Area and 65% of the habitat within 500 m of the PDA. Overall, the forest habitat near the PDA is similar in structure to the overall Study Area.

There is a lower percentage of NBDNR-identified wetlands near the PDA (1.8% of total area) than the overall Study Area, with 2.7% of total area. There are few water bodies in the PDA (1.8 ha; 0.04% of the total area), and 1.2% of the Study Area is covered by water bodies. However, the PDA has a higher percentage of non-forest habitats, including transmission line right-of-way and open pit.

2.2.3.4.1 Interior Forest

A subset of the forest-cover data was used to identify interior forest, which is important habitat for a number of wildlife species in New Brunswick. Interior forest is defined as continuous stands of mature forest greater than 10 hectares (ha) that are free of edge effect (*i.e.*, more than 100 m from an edge); this definition is based upon discussions with the Canadian Wildlife Service (CWS) and has been used in past studies and environmental assessments.

Table 2.2 provides summary statistics on the amount of interior forest calculated from the current data set as well as the predicted case with the PDA. Figure 2.3 shows interior forest in the Study Area.

Table 2.2 Interior Forest Statistics for the Study Area

Interior Forest Statistics	Study Area
Number of Stands	184
Minimum Area (ha)	9.9
Largest Area (ha)	367.6
Total Area in Study Area (ha)	8776.0
Average Stand Size (ha)	47.7
% of Mature Forest Area	66.2%
% of Study Area	17.2%

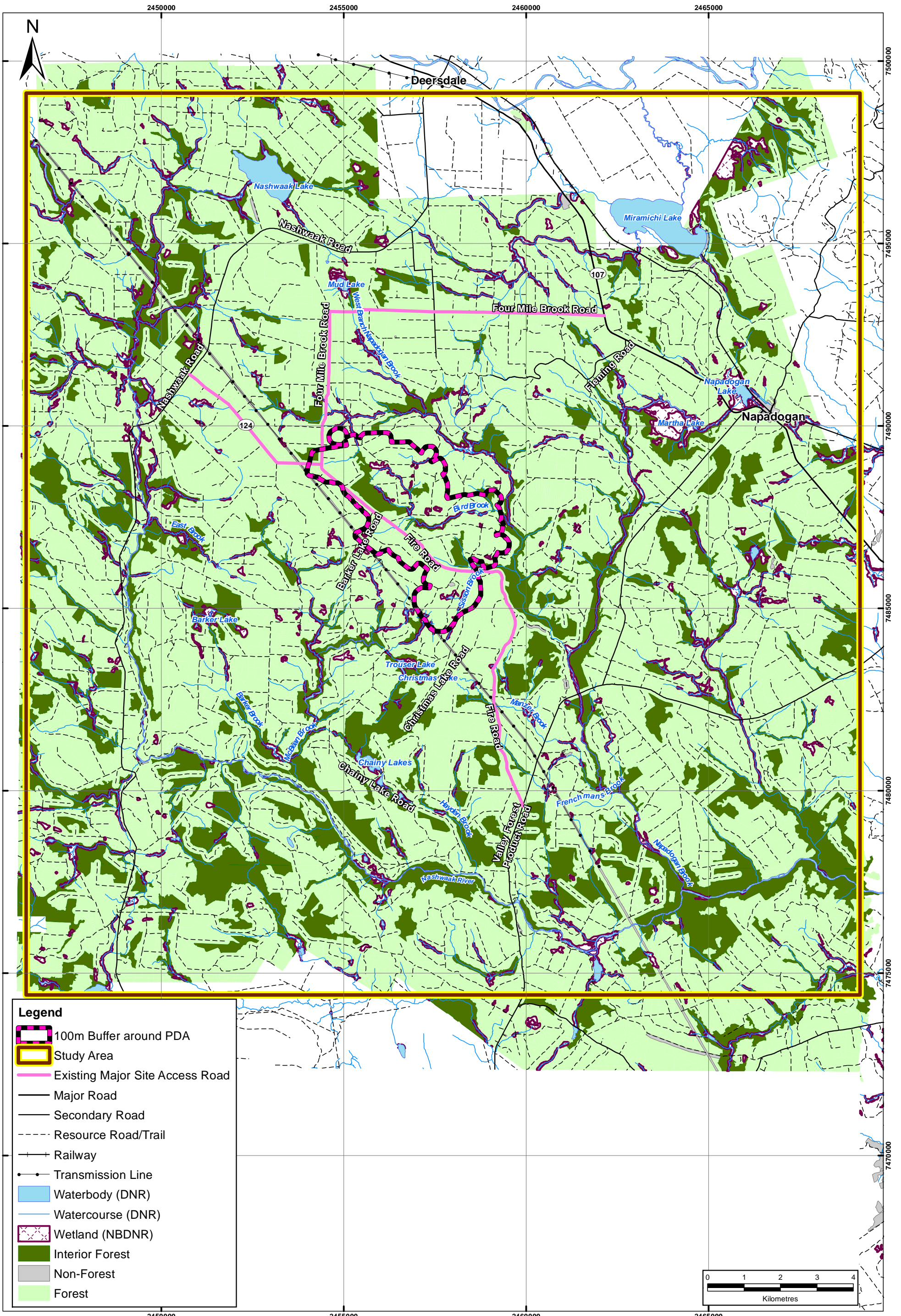
There are 184 interior forest areas within the Study Area which range from 10 ha to 367.6 ha, for a total of 8,776 ha or 66.2% of the mature/overmature forest and 17.2% of the Study Area. Of the 184 interior forest stands, seven are located at least in part within the PDA. Six of these stands range between 10 and 73.9 ha and are all or mostly within the PDA, while the seventh is 179.2 ha, with only a few ha within the PDA.

2.2.3.5 Deer Wintering Areas

The NBDNR has identified 14 deer wintering areas (DWAs) located at least partially within the Study Area, ranging in size from 38.5 ha (Little Clearwater Brook) to 1,714 ha (Nashwaak; 1,054 ha within the Study Area). All are located outside the PDA, and all are associated with watercourses or water bodies (Figure 2.2). The DWA closest to the PDA is the Napadogan Brook DWA, a 446-ha DWA located predominantly along the East Branch Napadogan Brook, and partially along the West Branch Napadogan Brook. This DWA is 0.5 km east of the Fire Road, a potential Project access road.

2.2.3.6 Old Spruce Fir Habitat

The NBDNR has identified Old Spruce Fir Habitat (OSFH) blocks within the Study Area, all located outside the PDA, with a fourth partially (12%) within the Study Area at its eastern edge (Figure 2.2). Two of these overlap with DWAs within the Study Area (Gorby Gulch, Lake Brook and Nashwaak DWAs). These two OSFH blocks are within 0.6 km of the potential access roads, but all three are between four and six km from the main Project components. The three OSFH blocks range between 743 and 776 ha in area.



NOTE: THIS DRAWING ILLUSTRATES SUPPORTING INFORMATION SPECIFIC TO A STANTEC PROJECT AND SHOULD NOT BE USED FOR OTHER PURPOSES.

<p align="center">Interior Forest</p> <p align="center">Sisson Project: Baseline Wildlife and Wildlife Habitat Technical Report</p> <p align="center">Napadogan, N.B.</p>		Scale:	Project No.:	Data Sources:	Fig. No.:
		1:95,000	121810356	NBDNR, SNB	2.3
Client:	Northcliff Resources Ltd.	Date:	Dwn. By:	Appd. By:	
		09/03/2012	JAB	GAMJ	

2.3 2008 FIELD STUDIES

Baseline wildlife studies were conducted within the Study Area in 2008. The objective of the 2008 studies was to characterize the terrestrial ecology of the Project area and adjacent areas in order to facilitate an assessment of the potential impacts of development on wildlife and wildlife habitat (Rescan™ 2010). A total of 11 field survey days were spent focusing on wildlife, including surveys for ungulates, amphibians, reptiles, waterfowl, raptors, and forest breeding birds. The following sections provide a summary of the methods and results of this preliminary field work conducted before the PDA was defined. All observations below are as documented in Rescan™ (2010).

2.3.1 Ungulates

Pellet count surveys were conducted June 11-12, 2008. Surveyors walked transects to visually identify the presence of scat or pellets from moose and deer. They observed evidence of moose and white-tailed deer during pellet count. No pellets from deer were observed; however a number of tracks were present along the transects. Signs of both moose and deer were noted incidentally throughout the wildlife field program.

2.3.2 Amphibians and Reptiles

Ground surveys for herpetile species (*i.e.*, amphibians and reptiles) were conducted between June 5-10, 2008 in conjunction with waterfowl and forest breeding bird surveys. Herpetile species were identified incidentally and in targeted potential habitats based on visual characteristics, and in the case of some frog species, auditory cues.

At least nine species of amphibians and one species of reptile were observed during the 2008 herpetile ground surveys. These included the following species:

- yellow-spotted or blue-spotted salamander (*Ambystoma* sp.);
- Eastern newt (*Notophthalmus viridescens*);
- red-backed salamander (*Plethodon cinereus*);
- spring peeper (*Pseudacris crucifer*);
- mink frog (*Rana septentrionalis*);
- wood frog (*Rana sylvatica*);
- green frog (*Rana clamitans*);
- bullfrog (*Rana catesbeiana*);
- American toad (*Bufo americanus*); and
- Maritime garter snake (*Thamnophis sirtalis sirtalis*).

All of the species observed during the 2008 surveys are relatively common and widespread throughout New Brunswick.

2.3.3 Forest Breeding Birds

Forest breeding bird surveys were conducted June 7-12, 2008. A total of 82 five-minute point counts were conducted along 17 transects, including seven that were at least partially within the PDA. Surveys began at dawn and were completed no later than 10:30 am. Information collected included date, start time, wind condition, habitat, and temperature. Surveyors recorded the bird species they observed, and the distance to each bird was noted in 10 m increments, up to a maximum distance of 100 m. Behaviour of the birds was also noted (e.g., singing, flying). Over 80 species were recorded, including three with species at risk designations (Canada Warbler, Common Nighthawk, and Olive-sided Flycatcher), one species with "Special Concern" designation (Rusty Blackbird), and one species with a provincial general status rank of "Sensitive" (Eastern Bluebird). These designations will be discussed in Sections 2.4 and 2.5.

Forest breeding bird surveys were conducted in three broad habitat types: Forested, Open, and Riparian. Forested habitats included young and mature forest stands of mixed wood, hardwood, and softwood. Open habitats were typically recent clear cuts. Riparian habitats included various forest types adjacent to lakes and watercourses. There were a total of 57 point counts conducted in Forested habitat, 15 point counts conducted in Open habitat, and 10 point counts conducted in Riparian habitat.

Table B.4 (Appendix B) presents the average number of birds (within 100 m) per point count and the average calculated density per 100 ha for each bird species observed during the 2008 surveys, by broad habitat type.

A total of 47 species were recorded in the forest habitats during point counts. The most abundant species observed in the forest-type habitats were Magnolia Warbler (33.52 individuals per 100 ha), and White-throated Sparrow (32.41 individuals per 100 ha).

A total of 26 species were recorded in the open habitats during point counts. The most abundant species observed in the open type habitats were White-throated Sparrow (65.82 individuals per ha), and Magnolia Warbler (45.71 individuals per 100 ha).

A total of 29 species were recorded in the riparian habitats during point counts. The most abundant species observed in the riparian type habitats were Magnolia Warbler (28.66 individuals per 100 ha) and Ovenbird (22.29 individuals per 100 ha).

Open habitats had the highest number of birds per point count, with 11.53 (367.30 birds per 100 ha), followed by forest habitat with 8.33 (265.39 birds per 100 ha), and riparian with 6.80 (216.56 birds per 100 ha).

2.3.4 Waterfowl

In order to obtain data on waterfowl, the June 2008 field studies involved visiting eight locations at major water bodies in areas surrounding the Project (Miramichi Lake, Mud Lake, Napadogan Lake, Nashwaak Lake, and Christmas Lake). Twelve sites were surveyed in September 2008. Data

collected during each survey included date, start time, temperature and sky condition, habitat type, and any species of waterfowl present.

Eight different species of waterfowl were observed in the various open-water wetlands and lakes in the Study Area during the waterfowl surveys. These species included:

- Canada Goose (*Branta canadensis*);
- Wood Duck (*Aix sponsa*);
- American Black Duck (*Anas rubripes*);
- Green-winged Teal (*Anas crecca*);
- Ring-necked Duck (*Aythya collaris*);
- Common Merganser (*Mergus merganser*);
- Common Loon (*Gavia immer*); and
- Pied-billed Grebe (*Podilymbus podiceps*).

All of these species are relatively common and generally widespread throughout New Brunswick, with the exception of Pied-billed Grebe (MBBA 2011). All have a general status rank of “Secure”, with the exception of Canada Goose, which is considered “Exotic”.

2.3.5 Raptors

The 2008 field studies included four one-hour stand watches in late morning or early afternoon. Surveys were conducted between June 7-10, 2008. Playback calls (*i.e.*, broadcasting calls and songs of target species using an iPod with amplified speaker) were performed for Northern Goshawk, Red-tailed hawk, and Red-shouldered Hawk. All observed raptors were recorded during the watch period. The date, start and end time, wind and sky conditions, temperature, habitat type, direction of travel, and distance to the raptor were also noted.

There were no raptor responses recorded during playback. Three species were recorded during stand watches which took place during the same time period, including:

- Turkey Vulture (*Cathartes aura*);
- Broad-winged Hawk (*Buteo platypterus*); and
- Red-tailed Hawk (*Buteo jamaicensis*).

Incidental observations included low numbers of records of additional raptors, including:

- American Kestrel (*Falco sparverius*);

- Bald Eagle;
- Merlin (*Falco columbarius*);
- Northern Goshawk (*Accipiter gentilis*); and
- Northern Harrier (*Circus cyaneus*).

American Kestrel were recorded in two locations near open forests (off Nashwaak Road south of Deersdale, and south of Napadogan). There was one record of Merlin north of the PDA on the north side of West Branch Napadogan River, one record of Northern Goshawk near mature softwood riparian forest north of Four Mile Brook Road, and a record of Northern Harrier at Martha Lake (bog). The Bald Eagle was observed at Miramichi Lake.

With the exception of Bald Eagle, these species are relatively common and widespread throughout New Brunswick and are ranked “Secure” in the province.

2.4 SPECIES AT RISK

Species at risk are defined as any wildlife species listed in Schedule 1 of the federal SARA as “Extirpated”, “Endangered”, or “Threatened”, or listed by NBDNR as “At Risk” under the NB ESA. Appendix A contains a glossary that lists these rankings under SARA, NB ESA, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and other conservation listings.

Based on data supplied by AC CDC, eight species at risk have been identified which have the potential to be found within the Study Area. These species and their associated conservation status are presented in Table 2.3.

Table 2.3 Species At Risk with Records Within or Near the Study Area

Common Name	Scientific Name	NBDNR Status	NB ESA	COSEWIC Status	SARA Status
Canada Lynx	<i>Lynx Canadensis</i>	At Risk	Regionally Endangered	Not At Risk	N/A
Eastern Cougar	<i>Puma Concolor</i>	Undetermined	Endangered	Data Deficient	N/A
Wood Turtle	<i>Glyptemys Insculpta</i>	At Risk	-	Threatened	Schedule 1 (Threatened)
Bald Eagle	<i>Haliaeetus Leucocephalus</i>	At Risk	Regionally Endangered	Not At Risk	N/A
Common Nighthawk	<i>Chordeiles Minor</i>	At Risk	-	Threatened	Schedule 1 (Threatened)
Chimney Swift	<i>Chaetuar Pelagica</i>	At Risk	-	Threatened	Schedule 1 (Threatened)
Olive-sided Flycatcher	<i>Contopus Cooperi</i>	At Risk	-	Threatened	Schedule 1 (Threatened)
Canada Warbler	<i>Wilsonia Canadensis</i>	At Risk	-	Threatened	Schedule 1 (Threatened)

Surveyors did not observe Canada lynx, Eastern cougar, wood turtles, or Chimney Swift during 2008 field surveys. Canada Warbler, Olive-sided Flycatcher, and Common Nighthawk were all observed in the Study Area during point count surveys conducted in 2008. An incidental observation of Bald Eagle was also made during the 2008 survey.

2.4.1 Mammal Species at Risk

Mammal species at risk protected under the NB *ESA* include Canada lynx (*Lynx canadensis*), and Eastern cougar (*Puma concolor*). No New Brunswick mammal species are listed on Schedule 1 of *SARA*.

2.4.1.1 Canada Lynx

In New Brunswick, Canada lynx tend to inhabit forested wilderness areas, favouring mature forests with a dense undercover of thickets and windfalls. They will inhabit other types of habitat as long as they contain minimal forest cover and adequate numbers of prey (e.g., varying hare). In New Brunswick, lynx are reported to inhabit mostly the northern portion of the Saint John River basin. There are two records of Canada lynx in the AC CDC data near Deersdale. Lynx tracks have also been detected once (2004) since NBDNR winter track transects started being conducted south of Chainy Lakes in 2003. No lynx were recorded during 2008 field surveys.

2.4.1.2 Eastern Cougar

AC CDC data show a record for Eastern cougar near Deersdale. The eastern population of cougar is listed as “Endangered” under the NB *ESA*. The species is not listed under *SARA*, as it is considered “Data Deficient”. It is assessed as “Status Undetermined” by NBDNR (NBDNR 2011a; CESCC 2011). Cougars were not confirmed in New Brunswick until 1992, when a cougar was sighted in Juniper (Cumberland and Dempsey 1994), just north of the Study Area. It is not confirmed if this was an eastern cougar. Biologists are now uncertain whether there was ever a subspecies of cougar, and now refer to eastern cougar as cougar (*Felis concolor*, now called *Puma concolor*). A recent five-year review of eastern cougar was undertaken by the United States Fish and Wildlife Service, which concluded that the sub-species may no longer be a valid taxonomic entity (Mark McCollough 2011).

The habitat requirements of the cougar in New Brunswick are not known. However, in their normal range, cougars have been found in a variety of habitats, ranging from large swampy areas to dense coniferous stands.

2.4.2 Herpetile Species at Risk

The only herpetile species at risk protected under the NB *ESA* is the Leatherback Turtle (*Dermochelys coriacea*). This species is listed as Endangered on Schedule 1 of *SARA* and as Endangered under the NB *ESA*. The leatherback turtle is a marine reptile species, and consequently would not be found near the Project.

2.4.2.1 Wood Turtle

Wood turtle is the only herpetile species listed as “Threatened” on Schedule 1 of *SARA* and as At Risk by NBDNR. There is one AC CDC record of wood turtle near the Study Area, near the J.D. Irving sawmill in Deersdale on the north side of the Southwest Miramichi River, north of Route 107.

The wood turtle is a medium-sized freshwater turtle. It is found throughout northeastern North America, with a non-continuous Canadian range from western Nova Scotia through New Brunswick, Quebec, and Ontario (COSEWIC 2007a). Though semi-aquatic, the wood turtle spends more time in the terrestrial environment than most other freshwater turtles. The main aquatic habitat for this species is typically meandering watercourses with moderate current and sand or gravel bottoms (COSEWIC 2007a). The preferred terrestrial habitat is generally riparian areas with diverse and patchy cover. The species has also been observed in a variety of other habitat types, including bogs, beaver ponds, coniferous and mixed forests, and agricultural fields.

The main threats to wood turtles include increased mortality on roads and trails; destruction and alteration of riparian habitats; loss of nesting and hibernacula habitat due to stream bank alteration, flooding, and shoreline stabilization; construction of forestry roads; and collection of individuals for the pet trade.

2.4.3 Bird Species at Risk

There are records of five bird species at risk within or near the Study Area, including Bald Eagle, Common Nighthawk, Chimney Swift, Olive-sided Flycatcher, and Canada Warbler.

2.4.3.1 Bald Eagle

Bald Eagle is considered “Not at Risk” by COSEWIC and has no schedule or status under *SARA*. The species is considered “At Risk” by NBDNR. Most Canadian populations of Bald Eagle are now stable or increasing. Declines noticed in the past, especially in the Maritime Provinces, have been reversed (COSEWIC 2011a). The BBS reports that, across Canada, populations of this species are increasing (Environment Canada 2011).

Bald Eagle was recorded within the Study Area during 2008 surveys, near Miramichi Lake.

2.4.3.2 Common Nighthawk

The Common Nighthawk is a medium-sized bird which nests in almost all of North America and in some parts of Central America. This species occurs in all of the Canadian provinces and territories except Nunavut (COSEWIC 2007b). The Common Nighthawk is considered “Threatened” under Schedule 1 of *SARA* and “At Risk” by NBDNR. The BBS (Environment Canada 2011) reports that this species is in decline both nation- and province-wide.

Common Nighthawk is most commonly observed in a wide range of open, vegetation-free habitats including beaches, recently cleared forests, rocky outcrops, and grasslands (*SARA* 2011). The species has probably benefited from newly-opened habitats created by the forestry industry (COSEWIC 2007b).

Common Nighthawk was recorded within the Study Area during the MBBA and during the 2008 field surveys. It was recorded in atlas square 19FM44 as a possible breeder.

The exact causes for the decline of this species are not well understood. The decline may be related to the widespread decrease in insect populations upon which this species relies for food. This theory is supported by the widespread declines observed among many other insectivorous bird species (COSEWIC 2007b).

2.4.3.3 Chimney Swift

The Chimney Swift is a small, swallow-like bird which breeds mainly in eastern North America. Approximately one quarter of this species' breeding range is in Canada, including southern New Brunswick. It is estimated that there are approximately 900 breeding individuals in the Maritimes (COSEWIC 2007c). The Chimney Swift is listed as "Threatened" under Schedule 1 of SARA, and "At Risk" by NBDNR. The BBS (Environment Canada 2011) reports that this species is in decline both nation- and province-wide.

The Chimney Swift is mainly associated with urban and rural areas, where the birds use chimneys as nesting and roosting sites. A small portion of the population likely continues to use natural nesting sites such as hollow trees (COSEWIC 2007c). Chimney Swift was recorded during the MBBA within the Study Area (atlas square 19FM53) as a possible breeder.

The most significant threat to the Chimney Swift population seems to be the decreasing number of both natural and anthropogenic nesting sites. The decline in some insect populations may also play a role by decreasing the available food for these birds.

2.4.3.4 Olive-sided Flycatcher

The Olive-sided Flycatcher is a mid-sized passerine that breeds throughout much of forested Canada. Approximately 54% of its breeding range is in Canada (COSEWIC 2007d). This species is ranked as "Threatened" on Schedule 1 of SARA and "At Risk" by NBDNR. The BBS (Environment Canada 2011) reports that this species is in decline both nation- and province-wide.

The Olive-sided Flycatcher is most often found in open areas within coniferous or mixed forests that contain large trees or snags, on which the males perch while singing. The open areas may include forest openings, forest edges near natural or anthropogenic clearings, and semi-open mature forest stands (COSEWIC 2007d).

Olive-sided Flycatcher was recorded within the Study Area by the AC CDC, MBBA, and during the 2008 field surveys. Olive-sided Flycatcher was observed in atlas squares 19FM43 and 19FM44 as a possible and probable breeder respectively.

It is unclear why Olive-sided Flycatcher populations continue to decline given the potential for the species to respond positively to forest management (such as timber harvest), which would increase the availability of habitat with sparse canopy cover. Evidence from the western United States suggests that the species experiences a considerable drop in nest success in harvested stands versus fire origin

stands (COSEWIC 2007d). Habitat loss at migration stopovers and wintering grounds (Central and South America) may also be a contributing factor in population declines.

2.4.3.5 Canada Warbler

The Canada Warbler is a small and brightly colored passerine. Approximately 80% of the entire breeding range for this warbler is located in Canada (COSEWIC 2008a), where it can be found breeding in every province and territory except Newfoundland and Labrador and Nunavut. Canada Warbler is ranked as “Threatened” on Schedule 1 of SARA and “At Risk” by NBDNR. The BBS (Environment Canada 2011) reports that this species is in decline Canada-wide and at a province-wide level in NB.

The Canada Warbler can be found in a wide range of forest types, including deciduous, coniferous, and mixedwood forests. It is often associated with moist mixedwood forest and riparian shrub forests on slopes and ravines (COSEWIC 2008a). The presence of a well-developed shrub layer also seems to be associated with preferred Canada Warbler habitat.

Canada Warbler was recorded within the Study Area by the AC CDC, MBBA, and the 2008 surveys. Canada Warbler was observed in the MBBA squares 19FM44, and 19FM53, as a probable and possible breeder respectively.

Potential factors for the decline of this species are the loss of habitat in the wintering range (*i.e.*, forests of the northern Andes , primarily Colombia) and the conversion of swamp and forests to agricultural and urban lands in the species’ breeding range.

2.5 SPECIES OF CONSERVATION CONCERN

Species of conservation concern (SOCC) are listed wildlife species not under the protection of SARA or the NB ESA (*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 “May Be At Risk” or “Sensitive” by NBDNR).

A search of the AC CDC, MBBA, and BBS databases revealed records of eight species of conservation concern near the Study Area. These species include:

- Rusty Blackbird (*Euphagus carolinus*);
- American Three-toed Woodpecker (*Picoides dorsalis*);
- Great Crested Flycatcher (*Myiarchus crinitus*);
- Barn Swallow (*Hirundo rustica*);
- Eastern Bluebird (*Sialia sialis*);
- Northern Mockingbird (*Mimus polyglottos*);
- Rose-breasted Grosbeak (*Pheucticus ludovicianus*); and

- Pine Grosbeak (*Pinicola enucleator*).

Rusty Blackbird and Pine Grosbeak were each noted in one of the four MBBA squares during the second atlas, and Rose-breasted Grosbeak was reported in three of the four MBBA squares. Barn Swallow and Eastern Bluebird have been recorded along the Napadogan BBS route as recently as 2010.

Snapping turtle (*Chelydra serpentina*) is also discussed in this section as it is a new addition to SARA, but has little potential to be found in the Study Area.

2.5.1 Rusty Blackbird

The Rusty Blackbird is a mid-sized passerine which breeds in most Canadian provinces, including New Brunswick. The Canadian range of this species extends from the Yukon to Newfoundland and includes all Canadian provinces and territories. This species is designated as “Special Concern” under Schedule 1 of SARA and “May be at Risk” by NBDNR. The BBS (Environment Canada 2011) reports that this species is in decline both nation- and province-wide. Rusty Blackbird was confirmed a breeder in atlas square 19FM54 during the second MBBA.

The breeding habitat of Rusty Blackbird is primarily forest wetlands such as slow-moving streams, peat bogs, and beaver ponds (COSEWIC 2006). This species rarely uses interior forest (Whitaker and Montevecchi 1999). Rusty Blackbird overwinters primarily in damp woodlands or cultivated fields. During winter, this species can only be found in the most southerly parts of the Canadian provinces, while most of the population overwinters in the United States.

The most serious threat to Rusty Blackbird is wintering habitat converting to agricultural and urban lands (COSEWIC 2006).

2.5.2 American Three-toed Woodpecker

The American Three-toed Woodpecker is a medium-sized woodpecker that is not frequently seen. This species breeds farther north than any other North American woodpecker and can be found in most Canadian provinces, including New Brunswick (Cornell Lab of Ornithology 2011). It is ranked as “Sensitive” by NBDNR.

This woodpecker species prefers to inhabit mature coniferous and spruce forests with an abundance of snags and insect-infested trees (Cornell Lab of Ornithology 2011). This species is sensitive to forest fragmentation and forestry activities that remove the snags and trees it depends on for food.

American Three-toed Woodpecker has not been recorded in the Study Area since the first MBBA in 1989.

2.5.3 Great Crested Flycatcher

Great Crested Flycatcher breeds in Canada from east-central Alberta to Nova Scotia. Nests are often constructed in old woodpecker holes or in decayed logs. This species is ranked as “Sensitive” by NBDNR and currently has no COSEWIC or SARA status. Great Crested Flycatchers are typically

found in open deciduous forests, riparian corridors, and wooded swamps where insect prey are abundant (Cornell Lab of Ornithology 2011). BBS trends indicate the Canadian population of this species has remained fairly stable since 1970. In New Brunswick, the population has increased slightly since 1970. Great Crested Flycatcher was only previously recorded in the Study Area as a possible breeder in atlas square 19FM44 during the first MBBA.

2.5.4 Barn Swallow

The Barn Swallow is a mid-sized passerine that is closely associated with rural human settlements. This species is the most widespread swallow in the world and is known to breed in all provinces and territories in Canada (COSEWIC 2011b). The Barn Swallow is ranked as “Threatened” by COSEWIC and “Sensitive” by NBDNR. It has no SARA rank at this time.

Following European settlement of North America, Barn Swallows shifted from nesting in caves and ledges to nesting largely in man-made structures. This species prefers open habitats for foraging, such as pastoral lands, shorelines, and cleared rights-of-way.

A record of Barn Swallow was included in the AC CDC data report, reported in the first MBBA in 1986.

The BBS data indicates that the Barn Swallow is undergoing a decline in population, although the species is still common and widespread (COSEWIC 2011b). The main threats to the species are loss of nesting and foraging habitats, large-scale declines in some insect populations, and mortality due to an increase in cold snaps on breeding territories.

2.5.5 Eastern Bluebird

The Eastern Bluebird is a small thrush. Males are a vivid, deep blue above, with a rusty throat and breast. This species occurs in the southern regions of New Brunswick and Ontario. Eastern Bluebird is ranked as “Sensitive” by NBDNR.

This ground-foraging, insectivorous species prefers open and grassland habitats, which facilitate locating and capturing prey (Cornell Lab of Ornithology 2011). Competition with introduced European Starlings and House Sparrows may have contributed to the decline of this species.

Eastern Bluebird was recorded in the Napadogan BBS, and a pair was observed in the Study Area during the 2008 surveys, outside the PDA.

2.5.6 Northern Mockingbird

The Northern Mockingbird is a medium-sized songbird, well known for its ability to mimic the sounds of other birds. This species occurs in the southern-most regions of many of the Canadian provinces. The Northern Mockingbird is ranked as “Sensitive” by NBDNR. This species is common and widespread in North America and has rebounded from over collection for the pet trade in the 19th century (Cornell Lab of Ornithology, 2011).

The preferred habitat of the Northern Mockingbird is open areas with shrubby vegetation, including urban areas. This bird has not been recorded in the Study Area since the first MBBA, in 1986.

2.5.7 Rose-breasted Grosbeak

Rose-breasted Grosbeak breeds in most southern Canadian provinces, including New Brunswick. The preferred habitat of this grosbeak is deciduous and mixed forests near edges or second-growth woodlands. This species is ranked as “Sensitive” by NBDNR and currently has no COSEWIC or SARA status. BBS data indicates that the population of this species is relatively stable in Canada, whereas in New Brunswick, the population has decreased slightly since 1970. Rose-breasted Grosbeak was recorded as a possible breeder in three of the four MBBA atlas squares wholly within the Study Area.

2.5.8 Pine Grosbeak

Pine Grosbeak is one of the largest of the grosbeak species. Typically a bird of boreal forests, it is found across much of North America. Pine Grosbeak breed in open coniferous forests, feeding on seeds, buds, fruit, and the occasional insect (Cornell Lab of Ornithology 2011). This species is dependent upon the seeds and fruits of trees, especially during the winter months. Variability in food availability causes flocks of this species to be quite mobile, making it difficult to accurately assess populations.

Pine Grosbeak is considered to be “Sensitive” by NBDNR and is not ranked by COSEWIC. The second MBBA contains a 2010 record of Pine Grosbeak in atlas square 19FM44, where it was observed in suitable habitat.

2.5.9 Snapping Turtle

Snapping turtles was added to Schedule 1 of SARA as a “Special Concern” species in 2011. It is Canada’s largest species of freshwater turtle. This species is widespread from Nova Scotia to southeastern Saskatchewan. It is absent from the northern parts of many of the provinces in its range, as summers are likely too cool for embryonic turtles to successfully complete their development (COSEWIC 2008b). The Study Area may be in a borderline area of this species’ distribution; however, there is low potential for this species to occur in the Study Area, given the relatively cool climate typically associated with the higher elevations of the Central Uplands Ecoregion.

The preferred habitat of snapping turtles is slow-moving water with soft, muddy bottoms and dense aquatic vegetation; however this species has been observed in shallow water in a wide variety of freshwater habitats (COSEWIC 2008b). Nesting typically occurs on sand or gravel banks along watercourses or roadways.

Some of the major threats to snapping turtles include legal and illegal harvesting of adults; illegal wildlife trade in turtles for food, medicine, and pets; vehicular collisions, particularly during nesting season; and ongoing habitat loss.

2.6 IDENTIFIED GAPS IN DATA

Based on the existing information gathered for this Project, including desktop research and a review of field studies conducted in 2008, a number of data gaps in the coverage of baseline information for wildlife and wildlife habitat were identified, including:

- limited data on species at risk, particularly bird species at risk, within the PDA and Study Area;
- limited data on forest bird densities within the PDA;
- limited data for ungulates and deer wintering areas; and
- limited data on furbearing mammals.

Follow-up studies were conceived and carried out in the 2011 field season to fill these data gaps. Surveys targeting forest breeding birds were also carried out during the 2011 field season, using a protocol which allowed for estimation of species densities near the PDA and within the larger Study Area. To gather more information on bird species at risk, surveys targeting species at risk, including Canada Warbler, Olive-sided Flycatcher, Rusty Blackbird and Common Nighthawk were also carried out in the 2011 field season.

To gather information regarding ungulates and deer wintering areas, aerial ungulate surveys are planned for winter 2012. In addition, track transect surveys are in progress to gather information on the species of furbearing mammals present within the PDA. These surveys are being done by the New Brunswick Trappers & Fur Harvesters Federation on behalf of Northcliff. Data from these surveys will be reported separately from this Technical Report.

3.0 2011 FIELD STUDIES

Stantec conducted wildlife field studies in 2011 that were designed to supplement the existing information summarized in Section 2 of this report. The focus of these field studies was on breeding birds, with a concentration on the avian species at risk identified in the 2008 surveys. Incidental observations of other wildlife were made by all field staff while in the field, including during vegetation and wetland surveys.

3.1 METHODS

This section describes the methods used to conduct the 2011 field studies. The methods used to survey wildlife, early breeding birds, nocturnal breeding birds, forest breeding birds, waterfowl, and species at risk are outlined below.

3.1.1 Wildlife

Stantec field crews conducting field surveys of the PDA collected baseline wildlife information by observing animals and animal sounds. These included the terrestrial and aquatic investigations for the Project during the spring and summer field season in 2011.

Incidental observations were made beginning in April 2011, and continued through until the end of September 2011. When a wildlife species was observed, information, including the species and location of the observation, was recorded.

3.1.2 Early Breeding Birds

Recent baseline information on early breeding species in the Study Area was collected. Surveys conducted on May 3 and 4, 2011 targeted early breeding species (e.g., Woodpeckers and Raptors). Surveys were conducted only when the wind speed was no more than wind strength 3 on the Beaufort scale (referred to as Beaufort 3, which is indicative of gentle winds with wind speed less than 20 km/h), and when precipitation was no heavier than a light drizzle. The Beaufort scale is shown in Table 3.1.

Table 3.1 Beaufort Scale

Beaufort Wind Strength	Description	Wind Speed (km/h)	Characteristics
0	Calm	<2	Smoke rises vertically.
1	Light	2 – 6	Wind direction shown by smoke drift.
2		7 – 12	Wind felt on face, leaves rustle.
3	Moderate	13 – 19	Small branches move.
4		20 – 30	Small trees sway.
5	Strong	31 – 40	Large branches move.

Source: MBBA (2006).

Stantec field crews visited areas of mature forests or older forests with mature trees to search for evidence of breeding woodpecker or raptor species. The field crews used playback calls of

woodpeckers and raptors in an attempt to solicit a response from these species. Species, number of individuals and breeding evidence was noted for all species encountered.

3.1.3 Nocturnal Breeding Birds

This section describes the methods used to survey owls and nightjars, both nocturnal breeding birds.

3.1.3.1 Owls

Stantec field crews conducted nocturnal owl surveys in April 2011 to detect breeding owl species in the area. Surveys were conducted in accordance with the Guidelines for Nocturnal Owl Monitoring in North America (Takats *et al.* 2001) document, and included a 2 minute silent listening period followed by an 11 minute period of alternating playbacks and silent listening periods. Where owls were detected, it was noted at which point in the playback series the owl was observed. Other information including the general noise level, and presence of other nocturnal species (*e.g.*, American Woodcock), was also recorded.

Surveys began approximately 30 minutes after sunset, and were completed prior to midnight. Survey stations were located approximately 2 km apart along passable roads. Locations with distractions such as flowing water were avoided.

3.1.3.2 Nightjars

Between June 11 and July 8, 2011, Stantec conducted nocturnal nightjar surveys targeting Common Nighthawks, as this is the only species of nightjar expected to be present in the Study Area. Survey stations were established along traversable roads near suitable habitats – typically open areas such as clear cuts. Surveys began near sunset and were conducted only when temperatures remained above 7°C, and wind conditions were at or below Beaufort 3.

Upon arriving at a survey site, all vehicle lights were turned off, and a one-minute wait period was established to allow any effects of disturbance to subside. Field crews used six-minute listening periods at each station to conduct the survey, consistent with the protocols of United States Nightjar Survey Network (2010). Data collected included date, time, weather, and background noise level. If Common Nighthawks were observed, the following information was recorded:

- the direction and estimated distance (m) to the bird;
- whether the bird was seen, heard, or both;
- the call type (*i.e.*, “peenting” or “booming”) to aid in sex determination.

3.1.4 Forest Breeding Birds

Stantec conducted forest breeding bird surveys between June 11 and July 8, 2011, which is within the recommended time period for conducting songbird breeding surveys.

Survey stations were chosen in various habitat types using a modified stratified random approach within 500 m of the PDA and within the Study Area. Any sites that were inaccessible were eliminated from consideration. Survey stations were established with a minimum distance of 200 m between points (typically greater than 300 m), and 100 m from edges of other habitat types, where possible. To maximize the number of points that could be done per day, and to minimize travel between points, points were typically conducted in groups of 8 to 10 points, encompassing one or more habitat types. Points were initially selected by forest type (hardwood, mixedwood, and softwood) and development stage (regenerating, sapling, immature-young, immature-old, mature, and over-mature), with the number of points dependent on the relative amount of the habitat type in the Study Area. Additional points were selected in the field to sample wetland and riparian habitats that would otherwise be missed by the sampling protocols.

Forest breeding bird point counts were based on methods for modified fixed radius sampling procedures (Bibby *et al.* 2000). Field crews conducted a 10 minute point count at each survey station. Surveys began at dawn and continued until 10:00 AM. Data collected included date, time, weather conditions (precipitation, cloud cover, wind condition), and detailed habitat information. For each bird observation, the distance to the individual was recorded in distance categories of 0-50 m, 50-100 m, and >100 m. The highest observed breeding evidence for each species was also recorded. Where species at risk were observed, the bearing and approximate distance to the individual bird were also estimated.

3.1.4.1 Incidental Surveys

Stantec completed incidental surveys in targeted habitats that would maximize the potential for detecting Canada Warbler, Rusty Blackbird, and Olive-sided Flycatcher. Most of the locations where species at risk were recorded in 2008 were revisited to ascertain if the species was still present in the areas where it had been detected previously. Surveyed habitats also included habitats which were selected opportunistically while in the field. Observers conducted look-and-listen searches, broadcasted species-specific calls and songs in each area for 10 to 20 minutes, and recorded species listed by SARA and species not commonly recorded during morning point counts.

Using the distance and bearing information recorded during the field surveys, the field crew estimated the actual location of each SARA-listed bird detected. This allowed each individual bird to be associated with a specific habitat type.

3.1.5 Waterfowl

Waterfowl species were recorded opportunistically during field surveys conducted near water bodies. Whenever the field crew observed waterfowl, they recorded data including the species, habitat, and location.

3.1.6 Species at Risk

When bird species at risk were encountered during point counts and playback surveys in targeted habitats, information including the estimated distance and bearing to the individual bird was collected. This information was used to plot the estimated locations of these birds.

3.2 RESULTS AND DISCUSSION

Results and discussion of the 2011 field studies for wildlife, early breeding birds, owls, nightjars, forest breeding birds, species at risk, species of conservation concern and waterfowl and waterbirds are described below.

3.2.1 Wildlife

Stantec field crews observed a total of 20 wildlife species (or evidence thereof) in the Study Area, excluding birds. Twelve species of mammals were observed, including:

- moose (*Alces alces*);
- white-tailed deer (*Odocoileus virginianus*);
- black bear (*Ursus americanus*);
- eastern coyote (*Canis latrans*);
- bobcat (*Lynx rufus*);
- beaver (*Castor canadensis*);
- snowshoe hare (*Lepus americanus*);
- red squirrel (*Tamiasciurus hudsonicus*);
- deer mouse (*Peromyscus maniculatus*);
- woodland jumping mouse (*Napaeozapus insignis*);
- northern short tailed shrew (*Blarina brevicauda*); and
- southern red-backed vole (*Myodes gapperi*).

Stantec field crews observed eight herpetile species in the Study Area including:

- red-backed salamander (*Plethodon cinereus*);
- spring peeper (*Pseudacris crucifer*);
- pickerel frog (*Rana palustris*);
- wood frog (*Rana sylvatica*);
- green frog (*Rana clamitans*);
- bullfrog (*Rana catesbeiana*);

- American toad (*Bufo americanus*); and
- Maritime garter snake (*Thamnophis sirtalis sirtalis*).

All of these species are common and widespread throughout New Brunswick, and have a general status rank of “Secure” in the province. Habitat does not appear to be a limiting factor to their presence or abundance.

3.2.2 Early Breeding Birds

Surveys conducted in May 2011 detected the presence of five woodpecker species, and one raptor species. Table 3.2 summarizes the woodpecker and raptor species detected and indicates their breeding status as observed in the field.

Table 3.2 Summary of Early Breeding Species Detected in the Study Area

Common Name	Scientific Name	Breeding Evidence	Highest MBBA Breeding Evidence
Osprey	<i>Pandion Haliaetus</i>	Possible	Possible
Yellow-bellied Sapsucker	<i>Sphyrapicus Varius</i>	Possible	Confirmed
Downy Woodpecker	<i>Picoides Pubescens</i>	Possible	Confirmed
Hairy Woodpecker	<i>Picoides Villosus</i>	Possible	Confirmed
Northern Flicker	<i>Colaptes auratus</i>	Possible	Possible
Pileated Woodpecker	<i>Dryocopus Pileatus</i>	Possible	Possible

3.2.3 Owls

Due to poor weather and site access conditions in April and early May 2011, owl surveys were limited. Surveys conducted in early May detected the presence of one species of owl in the Study Area, Barred Owl (*Strix varia*). Additionally, Great Horned Owl (*Bubo virginianus*) was observed incidentally during Common Nighthawk surveys in June.

3.2.4 Nightjars

In total, Stantec visited 61 survey locations that targeted nightjars between June 11 and July 6, 2011. Of the 61 survey locations, 26 were located within 500 m of the PDA, while the remaining 35 were located elsewhere in the Study Area. A total of 20 Common Nighthawks were observed at 14 of the survey locations. Five Common Nighthawks were observed at four points within 500 m of the PDA, while 15 were observed at 10 points elsewhere in the Study Area. The result is a success rate for detecting Common Nighthawks of 15% for surveys within 500 m of the PDA, and 29% for elsewhere in the Study Area. The field crew found a comparative density of 0.19 and 0.42 birds per point count, respectively. Table 3.3 summarizes the dates on which surveys were conducted.

Table 3.3 Common Nighthawk Survey Details

Survey Date	Average Temperature (°C) at Time of Survey	Average Wind Speed (Beaufort scale) at Time of Survey	# of Point Counts Completed	
			Within 500 m of the PDA	Study Area, more than 500 m from the PDA
June 11, 2011	9	0	7	1
June 13, 2011	9	3	5	1
June 14, 2011	13	2	0	6
June 21, 2011	16	1	3	10
June 28, 2011	19	1	11	4
July 5, 2011	17	1	0	7
July 6, 2011	24	3	0	6

The range of distance of the Common Nighthawks to the survey stations was 75-600 m, and on average, the birds were 280 m away. All of the Common Nighthawks were observed flying over or near clear cut and regenerating forest habitat, as well as within transmission line corridors. The field crew observed many individuals vocalizing and performing wing booms, indicating that this species is possibly breeding within the Study Area.

Overall, the Study Area contains a high proportion of suitable habitat (e.g., recently logged areas, open forests, anthropogenic features). The detection of 20 Common Nighthawks during the 2011 surveys is consistent with expected habitat use by this species.

3.2.5 Forest Breeding Birds

Stantec conducted forest breeding bird surveys between June 11 and July 8, 2011. A total of 208 10-minute point counts were completed. The surveys originally targeted an equal number of point counts to be conducted within 500 m of the PDA, as well as outside of this area within the Study Area. However, at the time of the surveys, the PDA included alternate locations of potential Project components, as described in the Project Description (Stantec 2011). As a result, a total of 86 surveys were conducted within 500 m of the current PDA, and 122 were conducted outside this area, within the Study Area. Surveys were conducted by two experienced bird surveyors, both of whom conducted nearly an equal number of surveys.

The field crew only completed point counts on days where weather conditions were suitable. Table 3.4 summarizes the weather conditions encountered during field survey days.

Table 3.4 Weather Conditions During Forest Breeding Bird Surveys

Survey Date	Average Temperature (°C) During the Surveys	Average Wind Speed (Beaufort scale) During the Surveys	Precipitation During the Surveys	Average Cloud Cover (%) During the Surveys
June 11, 2011	10	2	None	10
June 12, 2011	10	2	None	100
June 14, 2011	10	3	None	100
June 15, 2011	11	2	None	70
June 16, 2011	13	1	None	58
June 17, 2011	12	1	None	80
June 20, 2011	11	2	None	55
June 21, 2011	15	2	None	25

Table 3.4 Weather Conditions During Forest Breeding Bird Surveys

Survey Date	Average Temperature (°C) During the Surveys	Average Wind Speed (Beaufort scale) During the Surveys	Precipitation During the Surveys	Average Cloud Cover (%) During the Surveys
June 22, 2011	16	2	None	80
June 23, 2011	16	1	None	60
June 24, 2011	12	1	None	45
June 27, 2011	16	2	None	80
June 28, 2011	16	2	None	35
June 29, 2011	16	1	None	70
July 5, 2011	18	1	None	25
July 6, 2011	20	2	None	5
July 7, 2011	19	2	None	95
July 8, 2011	16	1	None	30

The weather during morning surveys had skies that were mainly overcast, with an average temperature ranging from 11°C to 16°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 Beaufort 3.

Stantec sampled a range of habitat types inside and outside of the PDA. These habitat types included softwood, mixedwood, and hardwood stands of various ages, as defined by the NBDNR forest inventory data. They also included additional wetland habitats, which were typically edges encompassing wetlands and adjacent forest habitat. Surveyed habitats were grouped into 19 habitat types, including 16 forest habitats and 3 wetland habitats. Table 3.5 provides statistics on the habitats, including the number of point counts conducted. The relative numbers of point counts conducted in each forested habitat type approximate the proportions of the habitat in the Study Area (see sub-section 2.2.4.1.1).

Table 3.5 Habitat Types Sampled During Point Counts in 2011

Habitat Types	Number of Point Counts Completed			Proportion of Point Counts (%)			Proportion of Forest Habitat (%)		
	Study Area	PDA+500m	Study Area-(PDA+500m)	Study Area	PDA+500m	Study Area-(PDA+500m)	Study Area	PDA+500m	Study Area-(PDA+500m)
Old Forest	37	17	20	19.4%	21.0%	18.2%	27.13%	16.83%	28.15%
Over-mature Mixedwood	0	0	0	0%	0%	0%	0.41%	0.02%	0.45%
Over-mature Softwood	7	2	5	3.7%	2.5%	4.5%	4.13%	1.71%	4.37%
Mature Hardwood	7	4	3	3.7%	4.9%	2.7%	4.94%	3.07%	5.12%
Mature Mixedwood	2	2	0	1.0%	2.5%	0%	2.48%	1.86%	2.54%
Mature Softwood	21	9	12	11.0%	11.1%	10.9%	15.17%	10.16%	15.67%
Mid-development Forest	80	30	50	41.9%	37.0%	45.5%	40.32%	47.34%	39.62%
Immature Hardwood	29	11	18	15.2%	13.6%	16.4%	17.95%	19.16%	17.83%
Immature Mixedwood	2	2	0	1.0%	2.5%	0.0%	0.57%	0.83%	0.55%
Immature Softwood	1	0	1	0.5%	0.0%	0.9%	1.38%	0.09%	1.51%
Young Hardwood	4	2	2	2.1%	2.5%	1.8%	3.35%	2.53%	3.43%
Young Mixedwood	4	2	2	2.1%	2.5%	1.8%	1.02%	2.49%	0.87%
Young Softwood	40	13	27	20.9%	16.0%	24.5%	16.05%	22.24%	15.43%
Young Forest	74	34	40	38.7%	42.0%	36.4%	32.55%	35.83%	32.23%
Sapling Hardwood	4	2	2	2.1%	2.5%	1.8%	3.57%	2.91%	3.64%
Sapling Mixedwood	6	3	3	3.1%	3.7%	2.7%	1.34%	1.12%	1.36%
Sapling Softwood	30	15	15	15.7%	18.5%	13.6%	16.62%	17.49%	16.53%
Regenerating Hardwood	15	7	8	7.9%	8.6%	7.3%	2.79%	4.31%	2.63%
Regenerating Mixedwood	7	2	5	3.7%	2.5%	4.5%	1.74%	2.67%	1.64%
Regenerating Softwood	12	5	7	6.3%	6.2%	6.4%	6.50%	7.34%	6.41%
Forest Habitats	191	81	110	100%	100%	100%	100%	100%	100%
Riparian Wetland	12	4	8	5.8%	4.7%	6.6%			
Freshwater Marsh	3	1	2	1.4%	1.2%	1.6%			
Shrub Wetland	2	0	2	1.0%	0.0%	1.6%			
Total	208	86	122						

The field crew observed a total of 78 bird species during the 2011 forest breeding bird point count surveys. Fifty-nine species were observed within 500 m of the PDA, and 75 species were observed in the remainder of the Study Area. An additional 13 species were observed only incidentally. Table C.1 in Appendix C lists the species observed during point counts, as well as species observed incidentally in 2011.

Summary results of the point count surveys are also presented in Appendix C (Table C.2), and include the number of individuals from each species recorded within 100 m of point-count locations, by habitat, and total counts within 500 m of the PDA, and farther than 500 m from the PDA. For the analysis of forest breeding birds to associate species richness and relative densities to habitats, waterfowl and waterbirds are not analyzed as their primary habitat is not forest. Raptors are also excluded, as their territory size is typically much greater than the area being sampled at point counts. All fly-by observations are also excluded. Therefore, the analysis is restricted to passerines and woodpeckers, and excludes colonial species such as colonial swallows.

3.2.5.1 Forest Breeding Bird Richness and Density

Species richness (defined as the number of different species recorded) was calculated for each of the habitat types found within 500 m of the PDA, and elsewhere in the Study Area (Table 3.6). Care should be taken when comparing the richness values of the habitats within 500 m of the PDA and elsewhere in the Study Area, as in many cases there were more sites sampled outside of the PDA. The habitats outside the PDA may, in some cases, have slightly higher richness values due to the higher amount of survey effort expended.

Table 3.6 Species Richness by Habitat Type

Habitat Type	Within 500 m of PDA		Study Area -(PDA+500m)	
	Number of Species within 100 m of Points	Sample Size	Number of Species within 100 m of Points	Sample Size
Old Forest	32	17	43	20
Overmature Softwood	12	2	22	5
Mature Hardwood	15	4	17	3
Mature Mixedwood	13	2	0	0
Mature Softwood	28	9	38	12
Mid-Development Forest	43	30	47	50
Immature Hardwood	30	11	33	18
Immature Mixedwood	15	2	0	0
Immature Softwood	0	0	2	1
Young Hardwood	10	2	14	2
Young Mixedwood	11	2	11	2
Young Softwood	35	13	37	27
Young Forest	44	34	48	40
Sapling Hardwood	12	2	15	2
Sapling Mixedwood	20	3	19	3
Sapling Softwood	36	15	33	15
Regenerating Hardwood	28	7	24	8
Regenerating Mixedwood	19	2	20	5
Regenerating Softwood	26	5	22	7

Table 3.6 Species Richness by Habitat Type

Habitat Type	Within 500 m of PDA		Study Area -(PDA+500m)	
	Number of Species within 100 m of Points	Sample Size	Number of Species within 100 m of Points	Sample Size
Wetland	27	5	38	12
Wetland (excluding shrub)	27	5	37	10
Riparian Wetland	22	4	25	8
Freshwater Marsh	9	1	30	2
Shrub Wetland	0	0	16	2
Total	52	86	63	122

The sample sizes from old forest habitat were roughly similar between those within 500 m of the PDA (17), and those elsewhere in the Study Area (20). Point counts in mature mixedwood were not taken farther than 500 m from the PDA. Despite these two conditions, there was a higher richness of species in old forest habitats reported for sites greater than 500 m from the PDA (43), than for sites within 500 m of the PDA (32). This trend of higher overall richness in survey results from point counts sampled more than 500 m from the PDA also occurred in both mid-development and young forests, and near wetlands as well. Sample sizes were low for freshwater marsh, and resulted in dramatic differences in overall species richness, and may not be representative. While the overall richness of younger forests was higher more than 500 m from the PDA, two thirds of the habitats has higher richness within 500 m of the PDA.

Stantec calculated breeding densities of the selected forest birds for each habitat type as territories (within 100 m) per point count and territories per 100 ha. Territories are generally defined as singing males, pairs, or family groups. The overall counts and bird densities are presented in Table 3.7.

Table 3.7 Summary of Bird Counts and Densities by Habitat Type

Habitat Type	Total Count of Birds			Number of Point Counts			Territories per Point Count			Territories per 100 ha		
	PDA	Study Area-PDA	Study Area	PDA	Study Area-PDA	Study Area	PDA	Study Area-PDA	Study Area	PDA	Study Area-PDA	Study Area
Over-mature Softwood	18	46	64	2	5	7	9.00	9.20	9.14	286.62	292.99	291.17
Mature Hardwood	43	34	77	4	3	7	10.75	11.33	11.00	342.36	360.93	350.32
Mature Mixedwood	21		21	2		2	10.50		10.50	334.39		334.39
Mature Softwood	85	100	185	9	12	21	9.44	8.33	8.81	300.78	265.39	280.56
Immature Hardwood	92	148	240	11	18	29	8.36	8.22	8.28	266.36	261.85	263.56
Immature Mixedwood	20		20	2		2	10.00		10.00	318.47		318.47
Immature Softwood		2	2		1	1		2.00	2.00		63.69	63.69
Young Hardwood	19	19	38	2	2	4	9.50	9.50	9.50	302.55	302.55	302.55
Young Mixedwood	18	16	34	2	2	4	9.00	8.00	8.50	286.62	254.78	270.70
Young Softwood	142	177	319	13	27	40	10.92	6.56	7.98	347.87	208.78	253.98
Sapling Hardwood	19	22	41	2	2	4	9.50	11.00	10.25	302.55	350.32	326.43
Sapling Mixedwood	41	27	68	3	3	6	13.67	9.00	11.33	435.24	286.62	360.93
Sapling Softwood	199	106	305	15	15	30	13.27	7.07	10.17	422.51	225.05	323.78
Regenerating Hardwood	88	74	162	7	8	15	12.57	9.25	10.80	400.36	294.59	343.95
Regenerating Mixedwood	32	61	93	2	5	7	16.00	12.20	13.29	509.55	388.53	423.11
Regenerating Softwood	60	55	115	5	7	12	12.00	7.86	9.58	382.17	250.23	305.20
Riparian Wetland	55	92	147	4	8	12	13.75	11.50	12.25	437.90	366.24	390.13
Freshwater Marsh	12	72	84	1	2	3	12.00	36.00	28.00	382.17	1146.50	891.72
Shrub Wetland		22	22		2	2		11.00	11.00		350.32	350.32
Total/Overall	964	1073	2037	86	122	208	11.21	8.80	9.79	356.98	280.10	311.89
Total Forest Only	897	887	1784	81	110	191	11.07	8.06	9.34	352.68	256.80	297.46
Notes:												
Shaded cells indicate no surveys conducted, or not applicable.												

3.2.6 Species at Risk

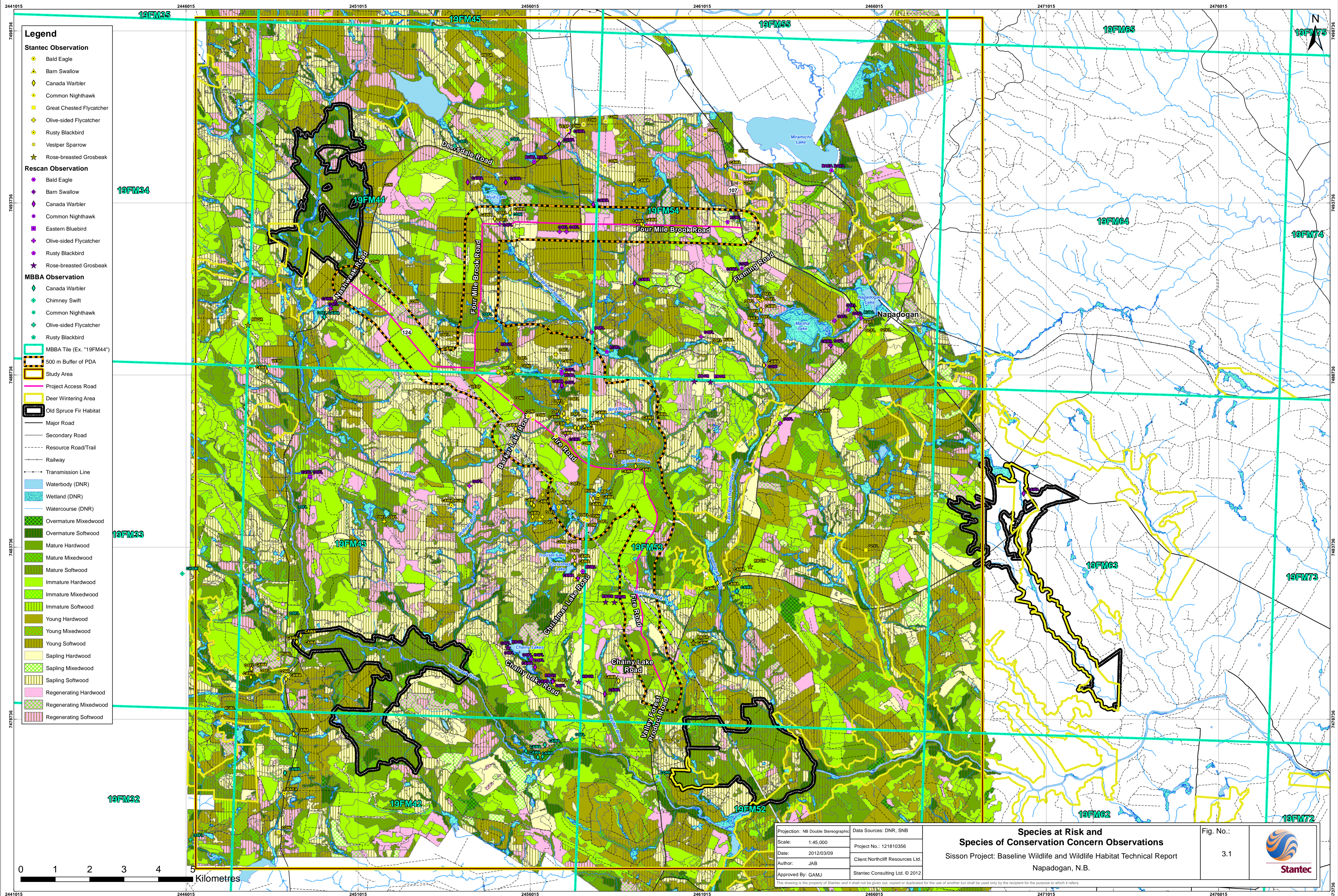
Species at risk recorded during the 2011 forest breeding bird surveys include:

- Canada Warbler;
- Olive-sided Flycatcher; and
- Bald Eagle.

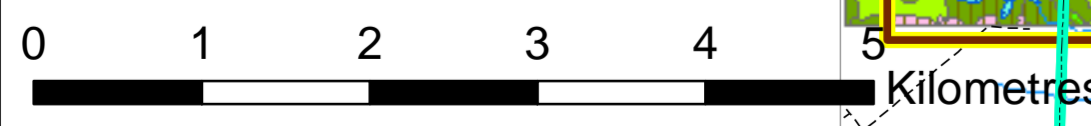
3.2.6.1 Canada Warbler

A total of 31 male Canada Warbler detections occurred in the Study Area during 2011 point counts. The field crew detected 13 within 500 m of the PDA, and 18 further than 500 m from the PDA. Within 500 m of the PDA, all 13 detections were made less than 100 m from the point count station; however, four in the remainder of the Study Area occurred more than 100 m from the point count station. Canada Warbler detections occurring within 100 m of point count stations were used to estimate the population density of species found within the Study Area (Table 3.8). The overall estimated densities of Canada Warbler were 4.81 territories/100 ha within 500 m of the PDA, and 3.65 territories/100 ha in the remainder of the Study Area. However, the overall frequency at which Canada Warblers were detected during point counts within 500 m of the PDA (12.8%) is lower than the frequency in the remainder of the Study Area (13.9%). Canada Warbler densities were highest at points near freshwater marshes, near riparian wetland, and in mixedwood forests of sapling and immature-young development stages, which typically have thick understories. They were also detected in softwood stands of most development stages. Looking at the location of detections relative to watercourses and wetlands (Figure 3.1), 73% and 82% of the points where Canada Warbler were detected (within 500 m of the PDA and elsewhere in the Study Area, respectively) are within 150 m of a watercourse and/or wetland. This is compared to detection levels of 28% of all point counts within 500 m of the PDA and 19% of all point counts elsewhere in the Study Area.

Nineteen Canada Warblers were detected during incidental surveys (11 within 500 m of the Study Area and eight elsewhere in the Study Area); however, these birds were not included in the estimations of density. The locations of these detections support habitat associations indicated by the point count data, although they were also noted in immature-old and mature hardwood stands. In 100% of the incidental observation locations within 500 m of the Study Area and 75% of locations elsewhere in the Study Area, Canada Warbler were detected within 150 m of a watercourse or wetland. In the remaining 25% of locations elsewhere in the Study Area, all detections of Canada Warbler were made within 250 m of a watercourse or wetland. Table 3.8 shows the population density of Canada Warbler in habitats within the Study Area.



- Legend**
- Stantec Observation**
- Bald Eagle
 - Barn Swallow
 - Canada Warbler
 - Common Nighthawk
 - Great Chested Flycatcher
 - Olive-sided Flycatcher
 - Rusty Blackbird
 - Vesper Sparrow
 - Rose-breasted Grosbeak
- Rescan Observation**
- Bald Eagle
 - Barn Swallow
 - Canada Warbler
 - Common Nighthawk
 - Eastern Bluebird
 - Olive-sided Flycatcher
 - Rusty Blackbird
 - Rose-breasted Grosbeak
- MBBA Observation**
- Canada Warbler
 - Chimney Swift
 - Common Nighthawk
 - Olive-sided Flycatcher
 - Rusty Blackbird
- Map Features**
- MBBA Tile (Ex. "19FM44")
 - 500 m Buffer of PDA
 - Study Area
 - Project Access Road
 - Deer Wintering Area
 - Old Spruce Fir Habitat
 - Major Road
 - Secondary Road
 - Resource Road/Trail
 - Railway
 - Transmission Line
 - Waterbody (DNR)
 - Wetland (DNR)
 - Watercourse (DNR)
- Forest Habitat**
- Overmature Mixedwood
 - Overmature Softwood
 - Mature Hardwood
 - Mature Mixedwood
 - Mature Softwood
 - Immature Hardwood
 - Immature Mixedwood
 - Immature Softwood
 - Young Hardwood
 - Young Mixedwood
 - Young Softwood
 - Sapling Hardwood
 - Sapling Mixedwood
 - Sapling Softwood
 - Regenerating Hardwood
 - Regenerating Mixedwood
 - Regenerating Softwood



Projection: NB Double Stereographic	Data Sources: DNR, SNB
Scale: 1:45,000	Project No.: 121810356
Date: 2012/03/09	Client: Northcliff Resources Ltd.
Author: JAB	Stantec Consulting Ltd. © 2012
Approved By: GAMJ	

**Species at Risk and
Species of Conservation Concern Observations**

Sisson Project: Baseline Wildlife and Wildlife Habitat Technical Report
Napadogan, N.B.

Fig. No.:	
3.1	

Table 3.8 Canada Warbler Densities (Territories per 100 ha) in Habitats Within the Study Area

	Regenerating	Sapling	Immature-Young	Immature-Old	Mature	Over-mature	Riparian	Freshwater Marsh
Within 500 m of the PDA								
Hardwood	0 (7)	0 (2)	0 (2)	0 (11)	0 (4)			
Mixedwood	0 (2)	21.23 (3)	0 (2)	0 (2)	0 (2)			
Softwood	6.37 (5)	8.49 (15)	0 (13)		7.08 (9)	0 (2)		
Wetland							23.89 (4)	31.85(1)
Study Area, more than 500 m from the PDA								
Hardwood	0 (8)	0 (2)	0 (2)	0 (18)	0 (3)			
Mixedwood	0 (5)	0 (3)	15.92 (2)					
Softwood	0 (7)	2.12 (15)	1.18 (27)	0 (1)	7.96 (12)	6.37 (5)		
Wetland							23.89 (8)	15.92 (2)
Notes: Bracketed numbers indicate the number of point counts conducted at the given habitat type. Shaded cells indicate no surveys conducted, or not applicable.								

3.2.6.2 Olive-sided Flycatcher

Stantec detected a total of 18 male Olive-sided Flycatcher during point counts in the Study Area in 2011. The field crew made eight detections within 500 m of the PDA, and ten more than 500 m from the PDA. Of the 18 detections, two occurred within 100 m of the point count station, and 16 occurred greater than 100 m from the point count station. There were also 11 incidental detections of this species. The detections of this species typically occurred at edge areas near watercourses or open water wetlands. Due to the low numbers of this species detected within 100 m during point counts, density estimates are not likely to be meaningful.

3.2.6.3 Bald Eagle

Two individual Bald Eagles were recorded incidentally in 2011. Both birds were observed flying over the Study Area 3.5 km and 11.5 km from the PDA, and no active nest sites were detected.

3.2.7 Species of Conservation Concern

Five species of conservation concern were recorded during the 2011 field season, including:

- Rusty Blackbird;
- Barn Swallow;
- Rose-breasted Grosbeak;
- Great Crested Flycatcher; and
- Vesper Sparrow (*Pooecetes gramineus*).

Rusty Blackbird, Barn Swallow and Rose-breasted Grosbeak have recently been recorded in the vicinity of the Study Area; Great Crested Flycatcher was recorded in the Study Area during the first MBBA and more recently along the Napadogan BBS route, and Vesper Sparrow had not previously been recorded in the area.

3.2.7.1 Rusty Blackbird

The field crew detected a total of nine Rusty Blackbirds within 100 m of point counts in the Study Area during 2011, two within 500 m of the PDA and seven more than 500 m from the PDA. These detections occurred in the three freshwater marsh point counts, conducted in early July. An additional 13 detections of this species were made incidentally. During the breeding bird survey period, the field crew recorded five birds in three locations more than 500 m from the PDA. In mid-July, two flocks of four birds each were recorded during wetland and rare plant surveys conducted within 500 m of the PDA. All of the detections of this species occurred in or adjacent to riparian wetland areas and beaver ponds. As Rusty Blackbirds were detected in all three of the freshwater marsh point count locations, density estimates by habitat type are likely to be overestimated. The overall density calculation considering all points conducted is 0.37 territories/100 ha within 500 m of the PDA, 0.52 territories/100 ha more than 500 m from the PDA, and 0.46 territories/100 ha in the Study Area, which is comparable to the 0.39 territories/100 ha recorded overall during the 2008 5-minute point counts.

3.2.7.2 Barn Swallow

Stantec recorded three individual Barn Swallows (see Section 2.7) in 2011 during a point count within the Study Area, more than 500 m from the PDA. These birds were observed together foraging over a regenerating clear cut. The closest suitable nesting habitat for this species would be in Deersdale, where several abandoned buildings were identified.

3.2.7.3 Rose-breasted Grosbeak

During the 2011 surveys, six individual Rose-breasted Grosbeak were observed. The field crew recorded five during point counts in hardwood and mixedwood habitats more than 500 m from the PDA, and one incidental observation in early July (no evidence of breeding) within the PDA.

3.2.7.4 Great Crested Flycatcher

Three individual Great Crested Flycatchers were observed during the 2011 surveys. Two of these records in immature-old tolerant hardwood forest near Napadogan could potentially be the same individual, recorded first incidentally and again a week later during a scheduled point count. The third record was made more than 100 m from a point count well east of the PDA, and south of Napadogan.

3.2.7.5 Vesper Sparrow

There were four records of Vesper Sparrow in 2011, all within regenerating forest. A single individual was detected during a point count in 6-year old regenerating softwood stand in late June, well outside the PDA. Two were detected incidentally in early July within one location in the PDA, and another well

outside the PDA off Nashwaak Road. The fourth individual was recorded on June 11 during a Common Nighthawk survey, in a regenerating hardwood stand within the PDA.

The Vesper Sparrow is a relatively large sparrow species which typically inhabits grasslands and fields. This species may be found all across Canada. Vesper Sparrow is ranked as “May Be At Risk” by NBDNR, but currently has no COSEWIC or SARA status. BBS data indicates that the Canadian population of this species has generally been in decline since 1970. In New Brunswick, the population has experienced a noticeable decline since 1972 (CWS 2009).

3.2.8 Waterfowl and Waterbirds

Incidental observations recorded the presence of five waterfowl species within the Study Area, including:

- Redhead (*Aythya americana*);
- Common Loon (*Gavia immer*);
- Common Merganser (*Mergus merganser*);
- Canada Goose (*Branta Canadensis*); and
- American Black Duck (*Anas rubripes*).

Great Blue Heron (*Ardea herodias*), a waterbird, was also recorded incidentally.

4.0 SUMMARY

This Baseline Wildlife and Wildlife Habitat Technical Report was prepared as background information for the Environmental Impact Assessment (EIA) for the Sisson Project (the Project). The purpose of this Technical Report is to describe the baseline conditions of wildlife and wildlife habitat in the terrestrial environment in the vicinity of the Project.

This report focussed on evaluating the terrestrial environment near the Project in two key areas: the Project Development Area (PDA) and the surrounding Study Area. The PDA is the area of physical disturbance associated with the construction and operation of the Project. The Study Area is the area around the PDA, within which wildlife field studies have been undertaken in areas with available terrestrial habitat information (*i.e.*, Crown land). This Technical Report presents background data obtained and field studies conducted within the Study Area.

The Stantec team consulted informational sources to compile a list of terrestrial species and designated wildlife habitats that may be found within the Study Area and to describe the available wildlife habitat. These sources included the Atlantic Canada Conservation Data Centre (AC CDC), North American Breeding Bird Survey (BBS), Maritimes Breeding Bird Atlas (MBBA), New Brunswick Department of Natural Resources (NBDNR), and 2008 field studies conducted in support of the Project.

The mix of forest types near the PDA are very similar to that of the Study Area overall, with 59–60% softwood, 32–33% hardwood, and 7–9% mixedwood. Mature and over-mature forest near the PDA account for 16.3% of the habitat, nearly 10% less compared to the 26% of the overall Study Area. NBDNR-mapped wetlands make up only 2–3% of the habitat. There are 184 interior forest areas available in the Study Area, seven of which are partially located within the PDA.

The Study Area includes 14 deer wintering areas (DWAs) that are at least partially within the Study Area, ranging in size from 38.5 to 1,714 ha. All of the DWAs are located outside the PDA and surrounding areas, and are associated with watercourses or water bodies. There are three identified old spruce fir habitat blocks within the Study Area, all of which are located outside the PDA. Two of the old spruce fir habitat (OSFH) blocks overlap DWAs within the Study Area, but are between 4 and 6 km from the main Project components.

Based on the existing information gathered for this Project, gaps in the information were identified, and field studies were conceived and carried out in the 2011 field season, or are planned for 2012. The 2011 field studies focused on breeding birds, especially the species at risk identified in the 2008 surveys.

Forest breeding bird surveys consisting of 10-minute point counts were conducted within 500 m of the PDA, and elsewhere in the Study Area. Seventy-eight species were detected over 208 point counts in the Study Area. Fifty-nine species were detected in the PDA, while 73 species were detected elsewhere in the Study Area. Of the species observed in the Study Area, four were in Schedule 1 of SARA (Common Nighthawk, Olive-sided Flycatcher, Canada Warbler and Rusty Blackbird), and one was an “At Risk” species (Bald Eagle) listed on the NB *ESA*. Four bird species of conservation concern were also observed including Barn Swallow, Great-crested Flycatcher, Rose-breasted Grosbeak, and

Vesper Sparrow. Within the last five years, several additional at-risk bird species and species of conservation concern have been observed in low numbers within the Study Area. These include Chimney Swift, Eastern Bluebird, and Pine Grosbeak.

The existing data sources identified a combined total of 114 bird species in the area near the Project (Table C.2, Appendix C). The MBBA reported the presence of 93 species of bird in the area near the Project. The 2008 field studies reported the presence of 78 bird species. The 2011 field studies recorded 93 bird species (82% of all species recorded), the same overall number as the MBBA and 15 more species than Rescan™ in 2008. However, only 79 species (85%) were common to the MBBA and 2011 surveys, and 70 species were common between the 2008 and 2011 surveys.

Twenty Common Nighthawks were observed at 14 of 61 locations surveyed in 2011. Five Common Nighthawks were observed at four locations out of 26 surveyed within 500 m of the PDA, while 15 were observed at 10 points out of 35 surveyed elsewhere in the Study Area. This equates to a comparative density of 0.19 birds per point count within 500 m of the PDA and 0.42 birds per point count elsewhere in the Study Area.

A total of 31 male Canada Warbler detections occurred in the Study Area during 2011 point counts: 13 within 500 m of the PDA, and 18 in the remainder of the Study Area outside of the PDA. Within 500 m of the PDA, all 13 detections were within 100 m of the point count station. However, four detections occurred more than 100 m from the point count station. In general, Canada Warblers were most commonly observed within riparian wetland and near freshwater marsh habitats, and all detections within forest point counts were within 250 m of watercourses and wetlands.

Eighteen male Olive-sided Flycatchers were observed during point counts in the Study Area during 2011: 8 within 500 m of the PDA and 10 in the remainder of the Study Area more than 500 m from the PDA. Of the 18 detections, two occurred within 100 m of the point count station, and 16 occurred more than 100 m from the point count station. The detections of this species typically occurred at edge areas which were near watercourses or open water wetlands. Due to the low numbers of this species detected within 100 m during point counts, density estimates are not likely to be meaningful.

Nine Rusty Blackbird detections occurred within 100 m of point counts in the Study Area during 2011: two within the Project area, and seven outside of the Project area. An additional 13 detections of this species were made incidentally. All of the detections of this species occurred in or adjacent to riparian wetland areas and beaver ponds. As Rusty Blackbirds were detected in all three of the freshwater marsh point count locations, density estimates by habitat type is likely an overestimate. The overall density calculation considering all points conducted is 0.37 territories/100 hectares (ha) within 500 m of the PDA, 0.52 territories/100 ha more than 500 m from the PDA, and 0.46 territories/100 ha in the Study Area, which is comparable to the 0.39 territories/100 ha recorded overall during the 2008 five-minute point counts.

Other species at risk and species of conservation concern, including Bald Eagle, Barn Swallow, Rose-breasted Grosbeak, Great Crested Flycatcher, and Vesper Sparrow were detected in the Study Area during 2011 surveys. These species were all detected in low numbers, with an even smaller number (two Bald Eagles, one Rose-breasted Grosbeak, and three Vesper Sparrows) having been detected within 500 m of the PDA.

A total of 18 mammals have been recorded in the Study Area, according to existing reports and/or recorded as incidental observations in 2011. Two mammal species at risk (Canada lynx and Eastern cougar) were previously recorded in the Study Area (outside the PDA), but not recorded during summer field surveys in 2011. All other species are common and widespread in New Brunswick.

All 11 herpetiles recorded incidentally during 2008 and/or 2011 field surveys are considered secure in New Brunswick. Wood turtle, a “Threatened” species, was not recorded during field programs, but have been previously reported from the Study Area, north of the PDA, in the South Miramichi River Watershed.

To gather information regarding ungulates and DWAs, aerial ungulate surveys are planned for winter 2012. In addition, track transect surveys are in progress to gather information on the species of furbearing mammals present within the PDA. These data will be reported separately from this Technical Report.

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Appendix A

Glossary and List of Acronyms and Units

GLOSSARY

Term	Definition
baseline	Background, pre-activity, pre-construction, or pre-Project environmental conditions.
claim block	The mineral claim block within which HDI/Northcliff has rights of mineral exploration.
Project Development Area (PDA)	The area of physical disturbance associated with the construction and operation of the Project, an area of approximately 12 km ² that includes the area of physical disturbance associated with the open pit, processing facility, and storage areas for tailings and waste rock, plus access roads.
species at risk	Species at risk include species that are listed under Schedule 1 of the <i>Species at Risk Act (SARA)</i> as “extirpated”, “endangered”, or “threatened” and/or listed under the New Brunswick <i>Endangered Species Act (NB ESA)</i> as “Endangered” or “Regionally Endangered”.
species of conservation concern	Species of conservation concern includes those listed species that are not currently under the protection of <i>SARA</i> or the <i>NB ESA</i> (<i>i.e.</i> , are listed as “special concern” in Schedule 1 of <i>SARA</i> ; listed in Schedule 2 or 3 of <i>SARA</i> ; listed as “special concern”, “threatened” or “endangered” by COSEWIC but not yet listed in Schedule 1 of <i>SARA</i> ; or ranked as S1, S2, or S3 by AC CDC; and/or ranked as “May Be At Risk” or “Sensitive” in the <i>NB ESA</i>).
Study Area	The geographic area within which wildlife field studies have been undertaken in areas with available terrestrial habitat information (<i>i.e.</i> , Crown land), the Study Area includes terrestrial environments within a 23 km by 24.75 km area around the PDA (which encompasses the potential access roads within the claim block).
terrestrial wildlife species	A terrestrial wildlife species is one that inhabits a terrestrial ecosystem for the majority of its lifecycle.
wildlife species	As defined in the federal <i>Species at Risk Act (SARA)</i> , “wildlife species” means a species, subspecies, variety or geographically or genetically distance population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and (a) is native to Canada; or (b) has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.

AC CDC Status Rank Definitions	
S1	Extremely rare: May be especially vulnerable to extirpation (typically 5 or fewer occurrences or very few remaining individuals).
S2	Rare: May be vulnerable to extirpation due to rarity or other factors (6 to 20 occurrences or few remaining individuals).
S3	Uncommon, or found only in a restricted range, even if abundant at some locations (21 to 100 occurrences).
S4	Usually widespread, fairly common, and apparently secure with many occurrences, but of longer-term concern (e.g., watch list) (100+ occurrences).
S5	Widespread, abundant, and secure, under present conditions.
S#S#	Numeric range rank: A range between two consecutive ranks for a species/community. Denotes uncertainty about the exact rarity (e.g., S1S2).
SH	Historical: Previously occurred in the province but may have been overlooked during the past 20-70 years. Presence is suspected and will likely be rediscovered; depending on species/community.
SU	Unrankable: Possibly in peril, but status is uncertain - need more information.
SX	Extinct/Extirpated: believed to be extirpated from its former range.
S?	Unranked: not yet ranked.
SA	Accidental: Accidental or casual, infrequent and far outside usual range. Includes species (usually birds or butterflies) recorded once or twice, or only at very great intervals, hundreds or even thousands of miles outside their usual range.
SE	Exotic: An exotic established in the province (e.g., Purple Loosestrife or Coltsfoot); may be native in nearby regions.
SE#	Exotic numeric: An established exotic that has been assigned a rank.
SP	Potential: Potentially occurs, but no occurrences have been reported.
SR	Reported but without persuasive documentation (e.g., misidentified specimen).

AC CDC Status Rank Definitions	
SRF	Reported falsely: erroneously reported and the error has persisted in the literature.
SZ	Zero: not of practical conservation concern because there are no definable occurrences, although the species is native and appears regularly. An SZ rank is generally used for long distance migrants that pass through the province occasionally.
Qualifiers	
B	Breeding (Migratory species).
N	Non-breeding (Migratory species).
?	Inexact or uncertain (the "?" qualifies the character immediately preceding it in the S-rank).
C	Captive or cultivated.

Provincial General Status Rank Definitions	
At Risk	Species for which a formal assessment has been completed, and determined to be at risk of extirpation or extinction. Includes species either listed as “Endangered” or “Threatened” by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), or as Endangered or Regionally Endangered under the NB <i>ESA</i> and accompanying regulations.
May Be At Risk	Species or populations that may be at risk of extirpation or extinction, and are therefore candidates for a detailed risk assessment.
Sensitive	Species which are not believed to be at risk of extirpation or extinction, but which may require special attention or protection to prevent them from becoming at risk.
Secure	Species that are not believed to be “At Risk”, “May Be At Risk”, or “Sensitive”. These were generally species that were widespread and/or abundant.
Status Undetermined	Species for which there is insufficient data, information, or knowledge available to evaluate their status. These are usually species for which there were few documented occurrences in New Brunswick.

Provincial General Status Rank Definitions

Not Assessed	Species known or believed to be present in New Brunswick but which have not yet been assessed.
Exotic	Species that have been introduced to the province as a result of human activity (<i>i.e.</i> , non-native).
Extirpated	Species that are no longer thought to be present in New Brunswick, although they exist elsewhere.
Extinct	Species that are no longer thought to exist anywhere.
Accidental	Vagrants, or species occurring infrequently and unpredictably, for which New Brunswick is outside of their usual range. For NBDNR general status ranks it was used only for birds and dragonflies.
Occurrence Not Verified	Species which have been reported in New Brunswick, but for which there is no documented evidence, or species which are suspected to occur in New Brunswick because they occur in neighbouring provinces or states.

COSEWIC/SARA Status Definitions

Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
Special Concern (SC)	A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.

LIST OF ACRONYMS AND UNITS

Acronym/Unit	Definition
°C	degree Celsius
AC CDC	Atlantic Canada Conservation Data Centre
BBS	breeding bird survey
CEAA	<i>Canadian Environmental Assessment Act</i>
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DWA	Deer wintering areas
e.g.,	for example
EIA/EA	environmental impact assessment/environmental assessment
ESA	environmentally significant area
GIS	geographic information system
ha	hectare
i.e.,	that is
km	kilometre (1,000 metres)
LAA	Local Assessment Area
LiDAR	Light detection and ranging
m	metre
masl	metres above sea level
MBBA	Maritimes Breeding Bird Atlas
NBDNR	New Brunswick Department of Natural Resources
OSFH	Old Spruce Fir Habitat
PDA	Project Development Area

Acronym/Unit	Definition
SARA	<i>Species at Risk Act</i>
VEC	valued environmental component
WMZ	wildlife management zones

Appendix B

Summary Tables of Bird Data from Existing Information Sources

Table B.1 Local and Provincial Trends of Breeding Birds from the BBS

Common Name	Local Trend ¹ (1992 – 2010)	Provincial Trend ² (1989 – 2009)	Significance of Provincial Trend
Canada Goose	Observed	Increased	*
American Black Duck	Observed	Decreased	
Ruffed Grouse	Not Observed	Decreased	
Common Loon	Observed	Stable	
American Bittern	Observed	Decreased	
Broad-winged Hawk	Observed	Increased	
American Kestrel	Relatively Unchanged	Decreased	
Merlin	Observed	Data Not Available	
Killdeer	Relatively Unchanged	Decreased	*
Spotted Sandpiper	Not Observed	Decreased	
Wilson's Snipe	Relatively Unchanged	Decreased	*
American Woodcock	Observed	Data Not Available	
Rock Pigeon	Relatively Unchanged	Increased	
Mourning Dove	Increased	Increased	*
Black-billed Cuckoo	Observed	Increased	
Barred Owl	Observed	Data Not Available	
Common Nighthawk	Observed	Decreased	*
Chimney Swift	Relatively Unchanged	Decreased	
Ruby-throated Hummingbird	Relatively Unchanged	Increased	*
Belted Kingfisher	Observed	Decreased	
Yellow-bellied Sapsucker	Decreased	Decreased	
Downy Woodpecker	Relatively Unchanged	Decreased	
Hairy Woodpecker	Relatively Unchanged	Increased	n
Black-backed Woodpecker	Observed	Data Not Available	
Northern Flicker	Relatively Unchanged	Increased	
Pileated Woodpecker	Relatively Unchanged	Increased	
Olive-sided Flycatcher	Decreased	Decreased	*
Eastern Wood-Pewee	Relatively Unchanged	Decreased	*
Yellow-bellied Flycatcher	Relatively Unchanged	Decreased	*
Alder Flycatcher	Increased	Decreased	*
Least Flycatcher	Relatively Unchanged	Decreased	
Eastern Phoebe	Relatively Unchanged	Increased	n
Great Crested Flycatcher	Observed	Decreased	
Eastern Kingbird	Observed	Decreased	*
Blue-headed Vireo	Relatively Unchanged	Increased	*
Red-eyed Vireo	Increased	Increased	*
Gray Jay	Not Observed	Decreased	n
Blue Jay	Relatively Unchanged	Increased	
American Crow	Relatively Unchanged	Increased	n
Common Raven	Relatively Unchanged	Decreased	
Tree Swallow	Relatively Unchanged	Decreased	*
Bank Swallow	Observed	Decreased	*
Cliff Swallow	Relatively Unchanged	Decreased	n
Barn Swallow	Decreased	Decreased	*
Black-capped Chickadee	Relatively Unchanged	Increased	
Boreal Chickadee	Observed	Increased	
Red-breasted Nuthatch	Relatively Unchanged	Decreased	*

Table B.1 Local and Provincial Trends of Breeding Birds from the BBS

Common Name	Local Trend ¹ (1992 – 2010)	Provincial Trend ² (1989 – 2009)	Significance of Provincial Trend
White-breasted Nuthatch	Observed	Data Not Available	
Brown Creeper	Observed	Increased	
Winter Wren	Relatively Unchanged	Decreased	n
Golden-crowned Kinglet	Relatively Unchanged	Decreased	
Ruby-crowned Kinglet	Relatively Unchanged	Decreased	*
Eastern Bluebird	Observed	Data Not Available	
Veery	Relatively Unchanged	Decreased	*
Swainson's Thrush	Relatively Unchanged	Decreased	*
Hermit Thrush	Relatively Unchanged	Decreased	
American Robin	Relatively Unchanged	Decreased	
Gray Catbird	Relatively Unchanged	Decreased	*
European Starling	Relatively Unchanged	Decreased	*
Cedar Waxwing	Relatively Unchanged	Decreased	
Tennessee Warbler	Decreased	Decreased	*
Nashville Warbler	Increased	Increased	*
Northern Parula	Relatively Unchanged	Increased	*
Yellow Warbler	Relatively Unchanged	Decreased	*
Chestnut-sided Warbler	Increased	Increased	
Magnolia Warbler	Relatively Unchanged	Decreased	n
Cape May Warbler	Relatively Unchanged	Decreased	*
Black-throated Blue Warbler	Increased	Increased	*
Yellow-rumped Warbler	Relatively Unchanged	Increased	
Black-throated Green Warbler	Relatively Unchanged	Decreased	
Blackburnian Warbler	Relatively Unchanged	Decreased	*
Palm Warbler	Observed	Increased	
Bay-breasted Warbler	Relatively Unchanged	Decreased	*
Black-and-white Warbler	Relatively Unchanged	Decreased	*
American Redstart	Decreased	Decreased	*
Ovenbird	Decreased	Decreased	*
Northern Waterthrush	Relatively Unchanged	Decreased	*
Mourning Warbler	Relatively Unchanged	Decreased	*
Common Yellowthroat	Relatively Unchanged	Decreased	*
Wilson's Warbler	Observed	Decreased	*
Canada Warbler	Relatively Unchanged	Decreased	*
Scarlet Tanager	Observed	Data Not Available	
Chipping Sparrow	Relatively Unchanged	Decreased	*
Savannah Sparrow	Relatively Unchanged	Decreased	n
Song Sparrow	Increased	Increased	
Lincoln's Sparrow	Relatively Unchanged	Decreased	*
Swamp Sparrow	Relatively Unchanged	Increased	
White-throated Sparrow	Relatively Unchanged	Increased	
Dark-eyed Junco	Relatively Unchanged	Decreased	
Rose-breasted Grosbeak	Relatively Unchanged	Decreased	*
Bobolink	Relatively Unchanged	Decreased	*
Red-winged Blackbird	Relatively Unchanged	Decreased	*
Common Grackle	Relatively Unchanged	Increased	
Brown-headed Cowbird	Relatively Unchanged	Decreased	*

Table B.1 Local and Provincial Trends of Breeding Birds from the BBS

Common Name	Local Trend ¹ (1992 – 2010)	Provincial Trend ² (1989 – 2009)	Significance of Provincial Trend
Baltimore Oriole	Observed	Data Not Available	
Pine Grosbeak	Observed	Data Not Available	
Purple Finch	Increased	Increased	n
Red Crossbill	Observed	Data Not Available	
White-winged Crossbill	Observed	Increased	
Pine Siskin	Relatively Unchanged	Decreased	n
American Goldfinch	Relatively Unchanged	Increased	
Evening Grosbeak	Relatively Unchanged	Decreased	*
House Sparrow	Relatively Unchanged	Decreased	*

Notes:

¹ Source: Raw BBS data from Route 56021 (Napadogan) downloaded from <https://www.pwrc.usgs.gov/BBS/PublicDataInterface/index.cfm?fuseaction=PublicDataInterface.viewRouteSummaryReport>. Run Method: Standard BBS. Species Status: Breeder. Accessed: November 9, 2011.

² Source: CWS 2009. Species for which BBS trend data are available: New Brunswick – Canadian Bird Trends. URL: www.cws-scf.ec.gc.ca/mgbc/trends/index.cfm?lang=e&go=info.SpeciesListByProvince&provid=9 Last updated August 19, 2009.

* = A probability of occurrence less than 5% (* = p<0.05).

n = A probability of occurrence between 5 and 10% (n =0.05<P<-0.1).

Blank cells indicates no significant provincial trend.

Table B.2 Birds Recorded by the Maritimes Breeding Bird Atlas

Common Name	Highest Breeding Status per Atlas Square				Overall
	19FM43*	19FM44*	19FM53*	19FM54*	
Wood Duck				Confirmed	Confirmed
American Black Duck		Possible			Possible
Green-winged Teal		Possible			Possible
Ring-necked Duck				Confirmed	Confirmed
Hooded Merganser		Possible			Possible
Ruffed Grouse		Possible			Possible
Common Loon		Possible		Confirmed	Confirmed
Great Blue Heron				Possible	Possible
Osprey				Possible	Possible
Broad-winged Hawk				Possible	Possible
Red-tailed Hawk		Possible			Possible
American Kestrel		Possible	Possible		Possible
Merlin		Possible			Possible
Wilson's Snipe		Possible		Possible	Possible
American Woodcock		Possible			Possible
Mourning Dove				Possible	Possible
Great Horned Owl		Possible			Possible
Barred Owl			Possible		Possible
Northern Saw-whet Owl		Possible			Confirmed
Common Nighthawk		Possible			Possible
Chimney Swift			Possible		Possible
Ruby-throated Hummingbird	Probable	Probable	Possible		Probable
Belted Kingfisher		Confirmed	Possible		Confirmed
Yellow-bellied Sapsucker	Confirmed	Probable	Possible	Possible	Confirmed
Downy Woodpecker	Possible	Probable	Confirmed		Confirmed
Hairy Woodpecker	Possible	Confirmed	Possible		Confirmed

Table B.2 Birds Recorded by the Maritimes Breeding Bird Atlas

Common Name	Highest Breeding Status per Atlas Square				Overall
	19FM43*	19FM44*	19FM53*	19FM54*	
Black-backed Woodpecker		Possible			Possible
Northern Flicker		Possible	Possible	Possible	Possible
Pileated Woodpecker		Possible	Possible		Possible
Olive-sided Flycatcher	Possible	Possible			Possible
Eastern Wood-Pewee		Possible	Possible	Possible	Possible
Yellow-bellied Flycatcher		Possible	Possible		Possible
Alder Flycatcher		Possible	Possible		Possible
Least Flycatcher		Possible	Possible		Possible
Blue-headed Vireo	Possible	Probable	Probable	Possible	Probable
Philadelphia Vireo		Possible			Possible
Red-eyed Vireo	Possible	Probable	Possible	Possible	Probable
Gray Jay		Confirmed	Possible		Confirmed
Blue Jay	Possible	Possible		Probable	Probable
American Crow				Possible	Possible
Common Raven		Possible	Confirmed	Possible	Confirmed
Black-capped Chickadee	Possible	Possible	Possible		Possible
Boreal Chickadee		Possible			Possible
Red-breasted Nuthatch	Possible	Confirmed	Possible		Confirmed
White-breasted Nuthatch			Possible		Possible
Brown Creeper			Possible		Possible
Winter Wren	Possible	Possible	Possible	Possible	Possible
Golden-crowned Kinglet	Possible	Possible	Possible		Possible
Ruby-crowned Kinglet		Possible		Possible	Possible
Veery		Possible		Probable	Probable
Swainson's Thrush	Possible	Probable	Possible		Probable
Hermit Thrush	Possible	Probable	Possible	Possible	Probable
American Robin	Possible	Probable	Possible	Probable	Probable
Gray Catbird				Possible	Possible
Cedar Waxwing	Possible	Possible	Possible	Possible	Possible
Tennessee Warbler		Possible			Possible
Nashville Warbler	Possible	Probable	Possible	Possible	Probable
Northern Parula	Possible	Probable	Possible	Possible	Probable
Yellow Warbler		Possible		Possible	Possible
Chestnut-sided Warbler		Possible	Possible		Possible
Magnolia Warbler	Possible	Probable	Possible	Possible	Probable
Cape May Warbler		Possible			Possible
Black-throated Blue Warbler	Possible	Probable	Possible	Possible	Probable
Yellow-rumped Warbler		Confirmed	Probable	Possible	Confirmed
Black-throated Green Warbler	Confirmed	Possible	Possible	Possible	Confirmed
Blackburnian Warbler		Possible	Possible	Possible	Possible
Palm Warbler		Probable			Possible
Bay-breasted Warbler		Possible	Possible		Possible
Blackpoll Warbler		Observed			Observed
Black-and-white Warbler		Possible			Possible
American Redstart		Probable	Possible	Possible	Probable
Ovenbird		Probable	Possible	Possible	Probable
Northern Waterthrush		Probable	Possible	Confirmed	Probable

Table B.2 Birds Recorded by the Maritimes Breeding Bird Atlas

Common Name	Highest Breeding Status per Atlas Square				Overall
	19FM43*	19FM44*	19FM53*	19FM54*	
Mourning Warbler		Possible			Possible
Common Yellowthroat	Confirmed	Probable	Possible	Possible	Confirmed
Wilson's Warbler		Probable			Probable
Canada Warbler		Probable	Possible		Probable
Scarlet Tanager		Possible	Possible		Possible
Chipping Sparrow		Possible			Possible
Fox Sparrow		Possible			Possible
Song Sparrow		Probable	Confirmed	Possible	Confirmed
Lincoln's Sparrow	Possible	Probable	Confirmed		Confirmed
Swamp Sparrow		Possible		Possible	Possible
White-throated Sparrow	Possible	Confirmed	Confirmed	Possible	Confirmed
Dark-eyed Junco	Confirmed	Probable	Possible	Possible	Confirmed
Rose-breasted Grosbeak		Possible		Possible	Possible
Rusty Blackbird				Confirmed	Confirmed
Common Grackle		Probable	Possible	Possible	Probable
Pine Grosbeak		Possible			Possible
Purple Finch		Probable		Possible	Probable
Red Crossbill		Possible			Possible
White-winged Crossbill		Probable	Possible	Probable	Probable
American Goldfinch	Possible		Possible	Probable	Probable

Notes:
* Refer to atlas coordinate squares found in the Maritime Breeding Bird Atlas.

Table B.3 Results of Point Counts conducted in Square 19FM44 for the MBBA

Common Name	Number of Point Counts with Species	Percent of Point Counts with Species	Average number of Birds per Point Count	Number Observed
Ruffed Grouse	1	3.33	0.0333	1
American Kestrel	1	3.33	0.0333	1
Wilson's Snipe	1	3.33	0.0333	1
Yellow-bellied Sapsucker	3	10	0.1	3
Downy Woodpecker	1	3.33	0.0333	1
Northern Flicker	1	3.33	0.0333	1
Olive-sided Flycatcher	1	3.33	0.0333	1
Eastern Wood-Pewee	1	3.33	0.0333	1
Yellow-bellied Flycatcher	7	23.33	0.2667	8
Alder Flycatcher	9	30	0.3	9
Least Flycatcher	1	3.33	0.0333	1
Blue-headed Vireo	10	33.33	0.4333	13
Red-eyed Vireo	9	30	0.4333	13
Gray Jay	1	3.33	0.0333	1
Blue Jay	4	13.33	0.1667	5
Common Raven	3	10	0.1	3
Black-capped Chickadee	5	16.67	0.2	6
Boreal Chickadee	2	6.67	0.0667	2
Red-breasted Nuthatch	3	10	0.1	3

Table B.3 Results of Point Counts conducted in Square 19FM44 for the MBBA

Common Name	Number of Point Counts with Species	Percent of Point Counts with Species	Average number of Birds per Point Count	Number Observed
Winter Wren	8	26.67	0.3	9
Golden-crowned Kinglet	4	13.33	0.1333	4
Ruby-crowned Kinglet	10	33.33	0.4	12
Veery	1	3.33	0.0333	1
Swainson's Thrush	18	60	0.9	27
Hermit Thrush	8	26.67	0.4	12
American Robin	10	33.33	0.5	15
Cedar Waxwing	1	3.33	0.2333	7
Nashville Warbler	11	36.67	0.6	18
Northern Parula	11	36.67	0.4	12
Chestnut-sided Warbler	4	13.33	0.1333	4
Magnolia Warbler	16	53.33	0.7333	22
Black-throated Blue Warbler	4	13.33	0.1667	5
Yellow-rumped Warbler	8	26.67	0.3333	10
Black-throated Green Warbler	9	30	0.3667	11
Blackburnian Warbler	1	3.33	0.0333	1
Palm Warbler	7	23.33	0.3	9
Bay-breasted Warbler	3	10	0.1333	4
Blackpoll Warbler	1	3.33	0.0333	1
American Redstart	13	43.33	0.6333	19
Ovenbird	9	30	0.5333	16
Northern Waterthrush	4	13.33	0.1667	5
Mourning Warbler	2	6.67	0.0667	2
Common Yellowthroat	8	26.67	0.4333	13
Wilson's Warbler	1	3.33	0.0667	2
Canada Warbler	1	3.33	0.0667	2
Fox Sparrow	4	13.33	0.1667	5
Lincoln's Sparrow	2	6.67	0.1333	4
Swamp Sparrow	2	6.67	0.1	3
White-throated Sparrow	26	86.67	2.2667	68
Dark-eyed Junco	14	46.67	0.6667	20
Scarlet Tanager	1	3.33	0.0333	1
Common Grackle	1	3.33	0.0333	1
Purple Finch	3	10	0.1333	4
Red Crossbill	1	3.33	0.0667	2
Total	30	100	14.17	425

Table B.4 Average Number and Density of Bird Species from the 2008 Surveys

Common Name	Average Individuals within 100 m per Point Count				Density (Birds per 100 ha)			
	Forest	Open	Riparian	Overall	Forest	Open	Riparian	Overall
Yellow-bellied Sapsucker	0.02	0.00	0.00	0.01	0.56	0.00	0.00	0.39
Hairy Woodpecker	0.04	0.00	0.00	0.02	1.12	0.00	0.00	0.78
Olive-sided Flycatcher	0.07	0.20	0.20	0.11	2.23	6.37	6.37	3.50
Yellow-bellied Flycatcher	0.30	0.00	0.30	0.24	9.50	0.00	9.55	7.77
Alder Flycatcher	0.19	0.53	0.00	0.23	6.15	16.99	0.00	7.38
Least Flycatcher	0.11	0.00	0.10	0.09	3.35	0.00	3.18	2.72
Blue-headed Vireo	0.26	0.20	0.30	0.26	8.38	6.37	9.55	8.16
Warbling Vireo	0.04	0.00	0.00	0.02	1.12	0.00	0.00	0.78
Philadelphia Vireo	0.04	0.00	0.00	0.02	1.12	0.00	0.00	0.78
Red-eyed Vireo	0.37	0.27	0.00	0.30	11.73	8.49	0.00	9.71
Gray Jay	0.02	0.00	0.00	0.01	0.56	0.00	0.00	0.39
Blue Jay	0.12	0.00	0.20	0.11	3.91	0.00	6.37	3.50
Black-capped Chickadee	0.04	0.00	0.00	0.02	1.12	0.00	0.00	0.78
Boreal Chickadee	0.04	0.00	0.10	0.04	1.12	0.00	3.18	1.17
Winter Wren	0.11	0.33	0.10	0.15	3.35	10.62	3.18	4.66
Golden-crowned Kinglet	0.14	0.00	0.20	0.12	4.47	0.00	6.37	3.88
Ruby-crowned Kinglet	0.30	0.33	0.10	0.28	9.50	10.62	3.18	8.93
Veery	0.09	0.00	0.00	0.06	2.79	0.00	0.00	1.94
Swainson's Thrush	0.33	0.27	0.10	0.29	10.62	8.49	3.18	9.32
Hermit Thrush	0.30	0.20	0.30	0.28	9.50	6.37	9.55	8.93
American Robin	0.14	0.33	0.30	0.20	4.47	10.62	9.55	6.21
Nashville Warbler	0.46	0.60	0.40	0.48	14.53	19.11	12.74	15.15
Northern Parula	0.21	0.07	0.10	0.17	6.70	2.12	3.18	5.44
Chestnut-sided Warbler	0.19	0.73	0.10	0.28	6.15	23.35	3.18	8.93
Magnolia Warbler	1.05	1.47	0.90	1.11	33.52	46.71	28.66	35.34
Black-throated Blue Warbler	0.11	0.80	0.20	0.24	3.35	25.48	6.37	7.77
Yellow-rumped Warbler	0.16	0.00	0.20	0.13	5.03	0.00	6.37	4.27
Black-throated Green Warbler	0.09	0.00	0.10	0.07	2.79	0.00	3.18	2.33
Blackburnian Warbler	0.02	0.00	0.00	0.01	0.56	0.00	0.00	0.39
Bay-breasted Warbler	0.04	0.00	0.10	0.04	1.12	0.00	3.18	1.17
Black-and-white Warbler	0.16	0.13	0.10	0.15	5.03	4.25	3.18	4.66
American Redstart	0.40	0.33	0.10	0.35	12.85	10.62	3.18	11.26
Ovenbird	0.51	0.53	0.70	0.54	16.20	16.99	22.29	17.09
Northern Waterthrush	0.11	0.00	0.10	0.09	3.35	0.00	3.18	2.72
Mourning Warbler	0.07	0.07	0.00	0.06	2.23	2.12	0.00	1.94
Common Yellowthroat	0.40	1.00	0.20	0.49	12.85	31.85	6.37	15.54
Canada Warbler	0.02	0.07	0.20	0.05	0.56	2.12	6.37	1.55
Fox Sparrow	0.04	0.20	0.00	0.06	1.12	6.37	0.00	1.94
Swamp Sparrow	0.00	0.00	0.20	0.02	0.00	0.00	6.37	0.78
White-throated Sparrow	1.02	2.07	0.60	1.16	32.41	65.82	19.11	36.90
Dark-eyed Junco	0.11	0.67	0.00	0.20	3.35	21.23	0.00	6.21
Rose-breasted Grosbeak	0.07	0.00	0.00	0.05	2.23	0.00	0.00	1.55

Table B.4 Average Number and Density of Bird Species from the 2008 Surveys

Common Name	Average Individuals within 100 m per Point Count				Density (Birds per 100 ha)			
	Forest	Open	Riparian	Overall	Forest	Open	Riparian	Overall
Rusty Blackbird	0.02	0.00	0.00	0.01	0.56	0.00	0.00	0.39
Common Grackle	0.00	0.00	0.20	0.02	0.00	0.00	6.37	0.78
Purple Finch	0.05	0.13	0.00	0.06	1.68	4.25	0.00	1.94
Woodpecker sp.	0.02	0.00	0.00	0.01	0.56	0.00	0.00	0.39
Total	8.33	11.53	6.80	8.73	265.39	367.30	216.56	278.08

Appendix C

Summary Tables of Surveys Conducted in 2011

Table C.1 Species Observed During 2011 Forest Breeding Bird Surveys

Common Name	Scientific Name	NBDNR Status**	AC CDC Rank**
American Black Duck	<i>Anas Rubripes</i>	Secure	S5B,S4N
Green-winged Teal*	<i>Anas Crecca</i>	Secure	S4S5B
Redhead*	<i>Aythya Americana</i>	Accidental	SNA
Ring-necked Duck	<i>Aythya Collaris</i>	Secure	S5B
Common Merganser*	<i>Mergus Merganser</i>	Secure	S5B,S4N
Ruffed Grouse	<i>Bonasa Umbellus</i>	Secure	S5
Spruce Grouse*	<i>Falci pennis Canadensis</i>	Secure	S5
Common Loon	<i>Gavia Immer</i>	Secure	S4B,S5M,S4N
Great Blue Heron	<i>Ardea Herodias</i>	Secure	S4B
Turkey Vulture*	<i>Cathartes Aura</i>	Secure	S3B
Osprey	<i>Pandion Haliaeetus</i>	Secure	S4S5B
Bald Eagle*	<i>Haliaeetus Leucocephalus</i>	At Risk	S3B
Northern Harrier*	<i>Circus Cyaneus</i>	Secure	S4B
Broad-winged Hawk	<i>Buteo Platypterus</i>	Secure	S5B
Red-tailed Hawk	<i>Buteo Jamaicensis</i>	Secure	S4B
American Kestrel	<i>Falco Sparverius</i>	Secure	S4B
Greater Yellowlegs*	<i>Tringa Melanoleuca</i>	Secure	S5M
Wilson's Snipe*	<i>Gallinago Delicata</i>	Secure	S4B
American Woodcock*	<i>Scolopax Minor</i>	Secure	S5B
Mourning Dove	<i>Zenaida Macroura</i>	Secure	S5B
Great Horned Owl*	<i>Bubo Virginianus</i>	Secure	S4S5
Common Nighthawk	<i>Chordeiles Minor</i>	At Risk	S3B
Ruby-throated Hummingbird	<i>Archilochus Colubris</i>	Secure	S5B
Belted Kingfisher	<i>Ceryle Alcyon</i>	Secure	S5B
Yellow-bellied Sapsucker	<i>Sphyrapicus Varius</i>	Secure	S5B
Downy Woodpecker	<i>Picoides Pubescens</i>	Secure	S5
Hairy Woodpecker	<i>Picoides Villosus</i>	Secure	S5
Northern Flicker	<i>Colaptes Auratus</i>	Secure	S5B
Pileated Woodpecker	<i>Dryocopus Pileatus</i>	Secure	S5
Olive-sided Flycatcher	<i>Contopus Cooperi</i>	At Risk	S3S4B
Eastern Wood-Pewee	<i>Contopus Virens</i>	Secure	S4B
Yellow-bellied Flycatcher	<i>Empidonax Flaviventris</i>	Secure	S4S5B
Alder Flycatcher	<i>Empidonax Alnorum</i>	Secure	S5B
Least Flycatcher	<i>Empidonax Minimus</i>	Secure	S5B
Great Crested Flycatcher	<i>Myiarchus Crinitus</i>	Sensitive	S3B
Blue-headed Vireo	<i>Vireo Solitarius</i>	Secure	S5B
Red-eyed Vireo	<i>Vireo Olivaceus</i>	Secure	S5B
Gray Jay	<i>Perisoreus Canadensis</i>	Secure	S4B
Blue Jay	<i>Cyanocitta Cristata</i>	Secure	S5
Common Raven	<i>Corvus Corax</i>	Secure	S5
Tree Swallow	<i>Tachycineta Bicolor</i>	Secure	S4B
Barn Swallow	<i>Hirundo Rustica</i>	Sensitive	S3B
Black-capped Chickadee	<i>Poecile Atricapillus</i>	Secure	S5
Boreal Chickadee	<i>Poecile Hudsonica</i>	Secure	S4
Red-breasted Nuthatch	<i>Sitta Canadensis</i>	Secure	S5
Brown Creeper	<i>Certhia Americana</i>	Secure	S5B
Winter Wren	<i>Troglodytes Troglodytes</i>	Secure	S5B
Golden-crowned Kinglet	<i>Regulus Satrapa</i>	Secure	S5

Table C.1 Species Observed During 2011 Forest Breeding Bird Surveys

Common Name	Scientific Name	NBDNR Status**	AC CDC Rank**
Ruby-crowned Kinglet	<i>Regulus Calendula</i>	Secure	S4S5B
Veery	<i>Catharus Fuscescens</i>	Secure	S4B
Swainson's Thrush	<i>Catharus Ustulatus</i>	Secure	S5B
Hermit Thrush	<i>Catharus Guttatus</i>	Secure	S5B
American Robin	<i>Turdus Migratorius</i>	Secure	S5B
Gray Catbird	<i>Dumetella Carolinensis</i>	Secure	S4B
Cedar Waxwing	<i>Bombycilla Cedrorum</i>	Secure	S5B
Tennessee Warbler	<i>Vermivora Peregrina</i>	Secure	S4B
Nashville Warbler	<i>Vermivora Ruficapilla</i>	Secure	S5B
Northern Parula	<i>Parula Americana</i>	Secure	S5B
Yellow Warbler	<i>Dendroica Petechia</i>	Secure	S5B
Chestnut-sided Warbler	<i>Dendroica Pensylvanica</i>	Secure	S5B
Magnolia Warbler	<i>Dendroica Magnolia</i>	Secure	S5B
Cape May Warbler	<i>Dendroica Tigrina</i>	Secure	S4B
Black-throated Blue Warbler	<i>Dendroica Caerulescens</i>	Secure	S5B
Yellow-rumped Warbler	<i>Dendroica Coronata</i>	Secure	S5B
Black-throated Green Warbler	<i>Dendroica Virens</i>	Secure	S5B
Blackburnian Warbler	<i>Dendroica Fusca</i>	Secure	S5B
Pine Warbler	<i>Dendroica Pinus</i>	Secure	S4B
Palm Warbler	<i>Dendroica Palmarum</i>	Secure	S5B
Bay-breasted Warbler	<i>Dendroica Castanea</i>	Secure	S4B
Black-and-white Warbler	<i>Mniotilta Varia</i>	Secure	S5B
American Redstart	<i>Setophaga Ruticilla</i>	Secure	S5B
Ovenbird	<i>Seiurus Aurocapilla</i>	Secure	S5B
Northern Waterthrush	<i>Seiurus Noveboracensis</i>	Secure	S4S5B
Mourning Warbler	<i>Oporornis Philadelphia</i>	Secure	S4B
Common Yellowthroat	<i>Geothlypis Trichas</i>	Secure	S5B
Canada Warbler	<i>Wilsonia Canadensis</i>	At Risk	S3S4B
Scarlet Tanager	<i>Piranga Olivacea</i>	Secure	S3S4B
Chipping Sparrow	<i>Spizella Passerina</i>	Secure	S5B
Vesper Sparrow	<i>Poocetes Gramineus</i>	May Be At Risk	S2B
Savannah Sparrow*	<i>Passerculus Sandwichensis</i>	Secure	S5B
Song Sparrow	<i>Melospiza Melodia</i>	Secure	S5B
Lincoln's Sparrow	<i>Melospiza Lincolnii</i>	Secure	S4B
Swamp Sparrow	<i>Melospiza Georgiana</i>	Secure	S5B
White-throated Sparrow	<i>Zonotrichia Albicollis</i>	Secure	S5B
Dark-eyed Junco	<i>Junco Hyemalis</i>	Secure	S5B
Rose-breasted Grosbeak	<i>Pheucticus Ludovicianus</i>	Sensitive	S4B
Rusty Blackbird	<i>Euphagus Carolinus</i>	May Be At Risk	S3B
Common Grackle	<i>Quiscalus Quiscula</i>	Secure	S5B
Purple Finch	<i>Carpodacus Purpureus</i>	Secure	S4S5B
White-winged Crossbill*	<i>Loxia Leucoptera</i>	Secure	S4
American Goldfinch	<i>Carduelis Tristis</i>	Secure	S5
Evening Grosbeak	<i>Coccothraustes Vespertinus</i>	Secure	S3S4B,S4S5N

Notes:

* Incidental observation only.

** Status/ranking definitions are provided in Appendix A.

Table C.2 Summary of 2011 Survey Point Counts by Habitat Type

Common Name	Total Number Observed	Number of Individuals Observed within 100 m of the Surveyor by Habitat Type																			Total Number Observed Within 500 m of the PDA	Number Observed Elsewhere in the Study Area	
		Overmature Softwood	Mature Hardwood	Mature Mixedwood	Mature Softwood	Immature Hardwood	Immature Mixedwood	Immature Softwood	Young Hardwood	Young Mixedwood	Young Softwood	Sapling Hardwood	Sapling Mixedwood	Sapling Softwood	Regenerating Hardwood	Regenerating Mixedwood	Regenerating Softwood	Riparian Wetland	Freshwater Marsh	Shrub Wetland			All Habitats Combined
Number of Point Counts	208	7	7	2	21	29	2	1	4	4	40	4	6	30	15	7	12	12	3	2	208	86	122
American Black Duck	2																		2		2	2	
Ring-necked Duck	2																		2		2		2
Ruffed Grouse	9				1	1			1		4		1								8		9
Common Loon	1																				0	1	
Great Blue Heron	1																				0		1
Osprey	1																			1	1		1
Broad-winged Hawk	1					1															1		1
Red-tailed Hawk	3																				0	2	1
American Kestrel	1																1				1		1
Mourning Dove	1				1																1	1	
Ruby-throated Hummingbird	10		1			2	1				1		1	1	1	1					9	5	5
Belted Kingfisher	1																				0		1
Yellow-bellied Sapsucker	44	2	3	1	4	9	1		1	1		2		2	4	1	1	1			33	26	18
Downy Woodpecker	9	3									2			1	1		1				8	4	5
Hairy Woodpecker	21		3		1	4					2	1		3		1		2	1		18	8	13
Northern Flicker	21					2					1		3	2	2	1	1	2	1		15	10	11
Pileated Woodpecker	4																				0	2	2
Olive-sided Flycatcher	18				1						1										2	8	10
Eastern Wood-Pewee	2					2															2	1	1
Yellow-bellied Flycatcher	3										3										3		3
Alder Flycatcher	48					2					1		3	17	11	6	3	1			44	26	22
Least Flycatcher	32			1	3	7				1	7			5	2	1	1	1			29	18	14
Great Crested Flycatcher	2					1															1		2
Blue-headed Vireo	48	3			5	5	1				8		2	4	6	3	1	3	2	1	44	18	30
Red-eyed Vireo	104	1	12		1	29	3		6	2	19	5	1	5	2	4	2		1		93	49	55
Gray Jay	5	2																		2	4	2	3
Blue Jay	34				1	6			3		8		1	6	3		1				31	13	21
Common Raven	10																				0	6	4
Tree Swallow	7																				2	2	7
Barn Swallow	3																				0		3
Black-capped Chickadee	26				5	2			1		7	1	2	4	1		2	1			26	16	10
Boreal Chickadee	10				1						5		1	2	1						10	6	4
Red-breasted Nuthatch	44	3	2	1	9	4					6		3	3			1	7	2		41	20	24
Brown Creeper	8	1	1		3	1					2										8	4	4
Winter Wren	80	7	1	2	9	1				2	6	2	2	15	4	2	4	10		1	68	31	49
Golden-crowned Kinglet	54	4		1	17	1		1			15		1	6				6		1	53	23	31
Ruby-crowned Kinglet	33		2	1	3						11			6			2	1		1	27	15	18

Table C.2 Summary of 2011 Survey Point Counts by Habitat Type

Common Name	Total Number Observed	Number of Individuals Observed within 100 m of the Surveyor by Habitat Type																			Total Number Observed Within 500 m of the PDA	Number Observed Elsewhere in the Study Area		
		Overmature Softwood	Mature Hardwood	Mature Mixedwood	Mature Softwood	Immature Hardwood	Immature Mixedwood	Immature Softwood	Young Hardwood	Young Mixedwood	Young Softwood	Sapling Hardwood	Sapling Mixedwood	Sapling Softwood	Regenerating Hardwood	Regenerating Mixedwood	Regenerating Softwood	Riparian Wetland	Freshwater Marsh	Shrub Wetland			All Habitats Combined	
Number of Point Counts	208	7	7	2	21	29	2	1	4	4	40	4	6	30	15	7	12	12	3	2	208	86	122	
Veery	15				1	5				3	2		1	2							14	9	6	
Swainson's Thrush	111	4	1		12	5	2		2		18	2	2	17	2		3	18	2	2	92	64	47	
Hermit Thrush	108	1	5		4	11			2		26	3	1	18	5	2	3	1	3	2	87	45	63	
American Robin	58		2		3	10	1		1	4	4			5	3	2	1	2	2	1	41	22	36	
Gray Catbird	1													1							1		1	
Cedar Waxwing	49				1	6	1		1	3	2			4	6	3		3	2		32	20	29	
Tennessee Warbler	16				2						6			4			1	2			15	3	13	
Nashville Warbler	103	2			8	2			1	2	31	1	4	24	2	3	6	11	1	2	100	38	65	
Northern Parula	61	3	7	2	6	9	1				3		2	1	6	3	4	8			55	23	38	
Yellow Warbler	1														1						1		1	
Chestnut-sided Warbler	44				1	3					1	1	1	7	15	6	5				40	27	17	
Magnolia Warbler	154	5	7	2	21	8	1		1	3	30	3	5	26	4	3	9	17	2	2	149	68	86	
Cape May Warbler	1				1																1		1	
Black-throated Blue Warbler	81	5	11	2	14	29	1		1		4	2		6	1		4				80	37	44	
Yellow-rumped Warbler	13				2						6			2				2			12	7	6	
Black-throated Green Warbler	74	4	3	2	6	13	3	1	7	2	15		4	2	2		3	2	1	1	71	39	35	
Blackburnian Warbler	16	2	2	2	3	1	1				1							3	1		16	7	9	
Pine Warbler	1										1										1		1	
Palm Warbler	22					1							3	5	1	4	7				21	9	13	
Bay-breasted Warbler	8	1			1						5			1							8	6	2	
Black-and-white Warbler	41				2	4			1	2	11	1	1	6	3	3	2	4			40	23	18	
American Redstart	32	1	2		1	8	1		3	1	2	4		2	2	1	2	1	1		32	17	15	
Ovenbird	104	2	9	2	7	32	1		4	4	16	3	3	5	7		2	1		1	99	62	42	
Northern Waterthrush	8	1			2						1			1							5	3	5	
Mourning Warbler	13	1	1			2									9						13	7	6	
Common Yellowthroat	103				1	1					4	3	4	28	15	12	9	9	6	1	93	42	61	
Canada Warbler	31	1			5					1	1		2	5			1	9	2		27	13	18	
Scarlet Tanager	5	1				3															4	3	2	
Chipping Sparrow	16					2					1					2	1	1	2	4	1	14	2	14
Vesper Sparrow	1																1				1		1	
Song Sparrow	1																1				1		1	
Lincoln's Sparrow	12													3	2	5			1		11	5	7	
Swamp Sparrow	7	2			2						1				1						6	5	2	
White-throated Sparrow	244	5	3	2	4	5	1		2	3	8	5	13	52	25	22	29	15	4	1	199	101	143	
Dark-eyed Junco	35				7	1					5			10	4	2	4				33	7	28	
Rose-breasted Grosbeak	5					3				1		1									5		5	
Rusty Blackbird	9														4				2		6	2	7	

Table C.2 Summary of 2011 Survey Point Counts by Habitat Type

Common Name	Total Number Observed	Number of Individuals Observed within 100 m of the Surveyor by Habitat Type																			Total Number Observed Within 500 m of the PDA	Number Observed Elsewhere in the Study Area	
		Overmature Softwood	Mature Hardwood	Mature Mixedwood	Mature Softwood	Immature Hardwood	Immature Mixedwood	Immature Softwood	Young Hardwood	Young Mixedwood	Young Softwood	Sapling Hardwood	Sapling Mixedwood	Sapling Softwood	Regenerating Hardwood	Regenerating Mixedwood	Regenerating Softwood	Riparian Wetland	Freshwater Marsh	Shrub Wetland			All Habitats Combined
Number of Point Counts	208	7	7	2	21	29	2	1	4	4	40	4	6	30	15	7	12	12	3	2	208	86	122
Common Grackle	7										1			2			1	1			5	3	4
Purple Finch	19				1	1					8	1	1	7							19	5	14
American Goldfinch	2				1																1		2
Evening Grosbeak	11				1	1			1		4										7	1	10
All Species	2346	67	78	21	185	246	20	2	39	35	327	41	68	320	166	93	117	150	47	23	###	1042	1304

Appendix D

Summary of Bird Presence By Data Source

Table D.1 Summary of Bird Presence By Data Source

MBBA Code	Common Name	Data Sources									Scientific Name	**AC CDC S-Rank	**NB General Status Rank	NB ESA	**COSEWIC (*SARA)
		Institutional			2008 Rescan				2011 Stantec						
		AC CDC	MBBA	ACNOS (OWLS)	Point Counts	Raptor Survey	Waterfowl Survey	Incidental	Point Counts	Incidentals					
CAGO	Canada Goose										<i>Branta Canadensis</i>	SNAB,S4M	Exotic		
WODU	Wood Duck										<i>Aix Sponsa</i>	S4B	Secure		
ABDU	American Black Duck										<i>Anas Rubripes</i>	S5B,S4N	Secure		
GWTE	Green-winged Teal										<i>Anas Crecca</i>	S4S5B	Secure		
REDH	Redhead										<i>Aythya Americana</i>	SNA	Accidental		
RNDU	Ring-necked Duck										<i>Aythya Collaris</i>	S5B	Secure		
HOME	Hooded Merganser										<i>Lophodytes Cucullatus</i>	S4B	Secure		
COME	Common Merganser										<i>Mergus Merganser</i>	S5B,S4N	Secure		
RUGR	Ruffed Grouse										<i>Bonasa Umbellus</i>	S5	Secure		
SPGR	Spruce Grouse										<i>Falcapennis Canadensis</i>	S5	Secure		
COLO	Common Loon										<i>Gavia Immer</i>	S4B,S5M,S4N	Secure		NAR
GBHE	Great Blue Heron										<i>Ardea Herodias</i>	S4B	Secure		
TUVU	Turkey Vulture										<i>Cathartes Aura</i>	S3B	Secure		
OSPR	Osprey										<i>Pandion Haliaetus</i>	S4S5B	Secure		
BAEA	Bald Eagle										<i>Haliaeetus Leucocephalus</i>	S3B	At Risk	Reg. Endangered	NAR
NOHA	Northern Harrier										<i>Circus Cyaneus</i>	S4B	Secure		NAR
NOGO	Northern Goshawk										<i>Accipiter Gentilis</i>	S4	Secure		NAR
BWHA	Broad-winged Hawk										<i>Buteo Platypterus</i>	S5B	Secure		
RTHA	Red-tailed Hawk										<i>Buteo Jamaicensis</i>	S4B	Secure		NAR
AMKE	American Kestrel										<i>Falco Sparverius</i>	S4B	Secure		
MERL	Merlin										<i>Falco Columbarius</i>	S5B	Secure		NAR
GRYE	Greater Yellowlegs										<i>Tringa Melanoleuca</i>	S5M	Secure		
WISN	Wilson's Snipe										<i>Gallinago Delicata</i>	S4B	Secure		
AMWO	American Woodcock										<i>Scolopax Minor</i>	S5B	Secure		
MODO	Mourning Dove										<i>Zenaida Macroura</i>	S5B	Secure		
GHOW	Great Horned Owl										<i>Bubo Virginianus</i>	S4S5	Secure		
BDOW	Barred Owl										<i>Strix Varia</i>	S5	Secure		
NSWO	Northern Saw-whet Owl										<i>Aegolius Acadicus</i>	S4B,S4N	Secure		
CONI	Common Nighthawk										<i>Chordeiles Minor</i>	S3B	At Risk		T*
CHSW	Chimney Swift										<i>Chaetura Pelagica</i>	S2S3B	At Risk		T*
RTHU	Ruby-throated Hummingbird										<i>Archilochus Colubris</i>	S5B	Secure		
BEKI	Belted Kingfisher										<i>Ceryle Alcyon</i>	S5B	Secure		
YBSA	Yellow-bellied Sapsucker										<i>Sphyrapicus Varius</i>	S5B	Secure		
DOWO	Downy Woodpecker										<i>Picoides Pubescens</i>	S5	Secure		
HAWO	Hairy Woodpecker										<i>Picoides Villosus</i>	S5	Secure		
ATTW	American Three-toed Woodpecker										<i>Picoides Dorsalis</i>	S3?	Sensitive		
BBWO	Black-backed Woodpecker										<i>Picoides Arcticus</i>	S4	Secure		
NOFL	Northern Flicker										<i>Colaptes Auratus</i>	S5B	Secure		
PIWO	Pileated Woodpecker										<i>Dryocopus Pileatus</i>	S5	Secure		
OSFL	Olive-sided Flycatcher										<i>Contopus Cooperi</i>	S3S4B	At Risk		T*
EAWP	Eastern Wood-Pewee										<i>Contopus Virens</i>	S4B	Secure		
YBFL	Yellow-bellied Flycatcher										<i>Empidonax Flaviventris</i>	S4S5B	Secure		
ALFL	Alder Flycatcher										<i>Empidonax Alnorum</i>	S5B	Secure		

Table D.1 Summary of Bird Presence By Data Source

MBBA Code	Common Name	Data Sources									Scientific Name	**AC CDC S-Rank	**NB General Status Rank	NB ESA	**COSEWIC (*SARA)
		Institutional			2008 Rescan				2011 Stantec						
		AC CDC	MBBA	ACNOS (OWLS)	Point Counts	Raptor Survey	Waterfowl Survey	Incidental	Point Counts	Incidentals					
LEFL	Least Flycatcher										<i>Empidonax Minimus</i>	S5B	Secure		
EAPH	Eastern Phoebe										<i>Sayornis Phoebe</i>	S5B	Secure		
GCFL	Great Crested Flycatcher										<i>Myiarchus Crinitus</i>	S3B	Sensitive		
BHVI	Blue-headed Vireo										<i>Vireo Solitarius</i>	S5B	Secure		
WAVI	Warbling Vireo										<i>Vireo Gilvus</i>	S4B	Secure		
PHVI	Philadelphia Vireo										<i>Vireo Philadelphicus</i>	S5B	Secure		
REVI	Red-eyed Vireo										<i>Vireo Olivaceus</i>	S5B	Secure		
GRAJ	Gray Jay										<i>Perisoreus Canadensis</i>	S4B	Secure		
BLJA	Blue Jay										<i>Cyanocitta Cristata</i>	S5	Secure		
AMCR	American Crow										<i>Corvus Brachyrhynchus</i>	S5	Secure		
CORA	Common Raven										<i>Corvus Corax</i>	S5	Secure		
TRES	Tree Swallow										<i>Tachycineta Bicolor</i>	S4B	Secure		
BARS	Barn Swallow										<i>Hirundo Rustica</i>	S3B	Sensitive		T
BCCH	Black-capped Chickadee										<i>Poecile Atricapillus</i>	S5	Secure		
BOCH	Boreal Chickadee										<i>Poecile Hudsonica</i>	S4	Secure		
RBNU	Red-breasted Nuthatch										<i>Sitta Canadensis</i>	S5	Secure		
WBNU	White-breasted Nuthatch										<i>Sitta Carolinensis</i>	S5	Secure		
BRCR	Brown Creeper										<i>Certhia Americana</i>	S5B	Secure		
WIWR	Winter Wren										<i>Troglodytes Troglodytes</i>	S5B	Secure		
GCKI	Golden-crowned Kinglet										<i>Regulus Satrapa</i>	S5	Secure		
RCKI	Ruby-crowned Kinglet										<i>Regulus Calendula</i>	S4S5B	Secure		
EABL	Eastern Bluebird										<i>Sialia Sialis</i>	S4B	Sensitive		NAR
VEER	Veery										<i>Catharus Fuscescens</i>	S4B	Secure		
SWTH	Swainson's Thrush										<i>Catharus Ustulatus</i>	S5B	Secure		
HETH	Hermit Thrush										<i>Catharus Guttatus</i>	S5B	Secure		
AMRO	American Robin										<i>Turdus Migratorius</i>	S5B	Secure		
GRCA	Gray Catbird										<i>Dumetella Carolinensis</i>	S4B	Secure		
NOMO	Northern Mockingbird										<i>Mimus Polyglottos</i>	S3B	Sensitive		
CEDW	Cedar Waxwing										<i>Bombycilla Cedrorum</i>	S5B	Secure		
TEWA	Tennessee Warbler										<i>Vermivora Peregrina</i>	S4B	Secure		
NAWA	Nashville Warbler										<i>Vermivora Ruficapilla</i>	S5B	Secure		
NOPA	Northern Parula										<i>Parula Americana</i>	S5B	Secure		
YWAR	Yellow Warbler										<i>Dendroica Petechia</i>	S5B	Secure		
CSWA	Chestnut-sided Warbler										<i>Dendroica Pensylvanica</i>	S5B	Secure		
MAWA	Magnolia Warbler										<i>Dendroica Magnolia</i>	S5B	Secure		
CMWA	Cape May Warbler										<i>Dendroica Tigrina</i>	S4B	Secure		
BTBW	Black-throated Blue Warbler										<i>Dendroica Caerulescens</i>	S5B	Secure		
YRWA	Yellow-rumped Warbler										<i>Dendroica Coronata</i>	S5B	Secure		
BTNW	Black-throated Green Warbler										<i>Dendroica Virens</i>	S5B	Secure		
BLBW	Blackburnian Warbler										<i>Dendroica Fusca</i>	S5B	Secure		
PIWA	Pine Warbler										<i>Dendroica Pinus</i>	S4B	Secure		
PAWA	Palm Warbler										<i>Dendroica Palmarum</i>	S5B	Secure		
BBWA	Bay-breasted Warbler										<i>Dendroica Castanea</i>	S4B	Secure		
BLPW	Blackpoll Warbler										<i>Dendroica Striata</i>	S4B	Secure		

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MBBA Code	Common Name	Data Sources									Scientific Name	**AC CDC S-Rank	**NB General Status Rank	NB ESA	**COSEWIC (*SARA)
		Institutional			2008 Rescan				2011 Stantec						
		AC CDC	MBBA	ACNOS (OWLS)	Point Counts	Raptor Survey	Waterfowl Survey	Incidental	Point Counts	Incidentals					
BAWW	Black-and-white Warbler										<i>Mniotilta Varia</i>	S5B	Secure		
AMRE	American Redstart										<i>Setophaga Ruticilla</i>	S5B	Secure		
OVEN	Ovenbird										<i>Seiurus Aurocapilla</i>	S5B	Secure		
NOWA	Northern Waterthrush										<i>Seiurus noveboracensis</i>	S4S5B	Secure		
MOWA	Mourning Warbler										<i>Oporornis Philadelphia</i>	S4B	Secure		
COYE	Common Yellowthroat										<i>Geothlypis Trichas</i>	S5B	Secure		
WIWA	Wilson's Warbler										<i>Wilsonia Pusilla</i>	S4B	Secure		
CAWA	Canada Warbler										<i>Wilsonia Canadensis</i>	S3S4B	At Risk		T*
SCTA	Scarlet Tanager										<i>Piranga Olivacea</i>	S3S4B	Secure		
CHSP	Chipping Sparrow										<i>Spizella Passerina</i>	S5B	Secure		
VESP	Vesper Sparrow										<i>Poocetes Gramineus</i>	S2B	May Be At Risk		
SAVS	Savannah Sparrow										<i>Passerculus Sandwichensis</i>	S5B	Secure		
FOSP	Fox Sparrow										<i>Passerella Iliaca</i>	S4S5B	Secure		
SOSP	Song Sparrow										<i>Melospiza Melodia</i>	S5B	Secure		
LISP	Lincoln's Sparrow										<i>Melospiza Lincolnii</i>	S4B	Secure		
SWSP	Swamp Sparrow										<i>Melospiza Georgiana</i>	S5B	Secure		
WTSP	White-throated Sparrow										<i>Zonotrichia Albicollis</i>	S5B	Secure		
DEJU	Dark-eyed Junco										<i>Junco Hyemalis</i>	S5B	Secure		
RBGR	Rose-breasted Grosbeak										<i>Pheucticus Ludovicianus</i>	S4B	Sensitive		
RUBL	Rusty Blackbird										<i>Euphagus Carolinus</i>	S3B	May Be At Risk		SC*
COGR	Common Grackle										<i>Quiscalus Quiscula</i>	S5B	Secure		
PIGR	Pine Grosbeak										<i>Pinicola Enucleator</i>	S2S3B,S4S5N	Sensitive		
PUFI	Purple Finch										<i>Carpodacus Purpureus</i>	S4S5B	Secure		
RECR	Red Crossbill										<i>Loxia Curvirostra</i>	S3	Secure		
WWCR	White-winged Crossbill										<i>Loxia Leucoptera</i>	S4	Secure		
AMGO	American Goldfinch										<i>Carduelis Tristis</i>	S5	Secure		
EVGR	Evening Grosbeak										<i>Coccothraustes Vespertinus</i>	S3S4B,S4S5N	Secure		
Count (out of 114)		10	94	5	48	4	7	58	78	41					

Notes:
 Shaded cells indicate presence, and blank cells indicate absence.
 * COSEWIC ranking that has been added to Schedule 1 of SARA.
 ** Status/ranking definitions are provided in Appendix A.