Wildlife Study: Avifauna and Mammals

Proposed Bay d'Espoir to Western Avalon Transmission Line (TL 267)

FINAL REPORT

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EXECUTIVE SUMMARY

Newfoundland and Labrador Hydro (Hydro) is proposing to construct and operate a new 230 kilovolt (kV) transmission line (TL 267, or the Project) in south-central and eastern Newfoundland that will connect the existing Bay d'Espoir and Western Avalon Terminal Stations. The new transmission line will be approximately 188 km in length, and will run parallel to existing transmission lines in the region.

The purpose of this study is to provide an overview of the occurrence, abundance, distribution, movements and habitat associations of wildlife species (including avifauna and mammals) that are known or are likely to occur in vicinity of the proposed Project, with special emphasis given to any species at risk that do or may occur in the area. A key objective of this study is also to identify and describe any key and potentially sensitive areas (habitats) and time periods with respect to avifauna and mammals.

The study approach and methods involved the identification, review, analysis and summary of existing and available information and datasets on avifauna and mammal species in the region, including published and unpublished reports, journal articles, research theses, government documents and datasets and other information sources. This included species accounts from various sources, including the Atlantic Canada Conservation Data Centre, Environment Canada Breeding Bird Surveys and the Newfoundland and Labrador Small Mammal Monitoring Network. Given the overall lack of direct and focused field investigations and surveys for wildlife in parts of the region, inferences on species occurrence is based largely on their known presence and distribution within similar habitats at the ecoregion scale or beyond.

The proposed transmission line will pass through a variety of terrestrial and aquatic habitat types, including dense coniferous forest, open scrub forest, upland barrens, wetlands, lakes and rivers. The Project will pass through the southern portion of the Bay du Nord Wilderness Reserve, a vast and remote landscape of ponds, rivers, barrens, bogs and fens, forests and thickets, as well as crossing key landscape features in the region such as the Bay du Nord River watershed and others. It will also occur within three of the Ecoregions that have been identified on the Island of Newfoundland, including (primarily) the large Maritime Barrens Ecoregion, along with smaller portions of the Western Newfoundland Forest Ecoregion and the Central Newfoundland Forest Ecoregion. This overall habitat diversity results in a diverse range of wildlife species and functional groups being present in the region.

With regard to avifauna, a number of taxonomic and functional groups are well represented in this region, including waterfowl, shorebirds, wood warblers, birds of prey, sparrows and finches. Common species that are known to breed in the area include American black duck, Canada goose, greater yellowlegs, spotted sandpiper, yellow-rumped warbler, blackpoll warbler, yellow-bellied flycatcher, osprey, white-throated sparrow and pine grosbeak.

Mammal species that are known or likely to occur in the region include small mammals (such as meadow voles and red squirrels), furbearers and mid-trophic level carnivores (including short-tailed weasels and American mink), ungulate browsers (moose and woodland caribou), and upper-trophic level predators (such as black bear). In total, 14 out of a possible 22 mammals

that occur in natural habitats on the Island of Newfoundland have been identified in the general region through which the proposed transmission line will extend. Individual species that that are expected to be the most common and widely distributed in the area include snowshoe hare, red squirrel, meadow vole, beaver, red fox and eastern coyote. Mammal species that are not known or expected to occur in the area include those with a restricted distribution on the Island (such as deer mouse and Arctic hare) and for which site specific information is largely lacking (including bats).

There are 14 bird species at risk that are listed (and therefore protected) under the federal *Species at Risk Act* and/or the provincial *Endangered Species Act* that either breed on insular Newfoundland or occasionally occur here during migration periods. Of this group, seven listed avifauna species have been observed within several kilometers of the proposed transmission line, including harlequin duck, barrow's goldeneye, olive-sided flycatcher, gray-cheeked thrush, red knot, rusty blackbird and red crossbill. Various species are also protected and/or managed by the federal *Migratory Birds Convention Act* or the provincial *Wild Life Act*. Listed (protected) mammal species in insular Newfoundland include the Newfoundland marten, little brown bat and northern long-eared bat, although the occurrence of these species in the region (and most parts of the Island) is largely unknown.

While most of the terrestrial and aquatic habitats in the region may be used by one or more wildlife species at particular times of the year (including in some cases for key life history stages such as reproduction), wetland and riparian habitats are considered to be the most ecologically important and sensitive areas for wildlife (especially birds) given the key functional roles that these areas play for many species. Riparian habitats are generally food-rich and structurally complex, which results in their use by a range of species for a variety of purposes including as nesting sites for birds, and foraging habitat for furbearers. The inter-tidal, estuarine habitats near Come by Chance and Bellevue Beach have also been identified as important areas for shorebirds, particularly during autumn migration. In addition, there are several known nesting areas sites for Canada goose in adjacent areas within the Bay du Nord Wilderness Reserve.

The information provided through this study is intended to support the Project's Environmental Assessment registration and review, and will be used in its on-going planning and design and eventual permitting and implementation.

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1.0 INTRODUCTION

Newfoundland Labrador Hydro (Hydro) owns and operates an extensive electrical generation and transmission system on the Island of Newfoundland, which includes a 613 megawatt (MW) hydroelectric generation station at Bay d'Espoir in the south-central portion of the Island, as well as several transmission lines that extend between it and other electrical infrastructure and load centres across Newfoundland. This includes two existing transmission lines that run from that facility to Sunnyside (TL 202 and TL 206) which were constructed in the late 1960s, as well as an existing transmission system between Sunnyside and Chapel Arm.

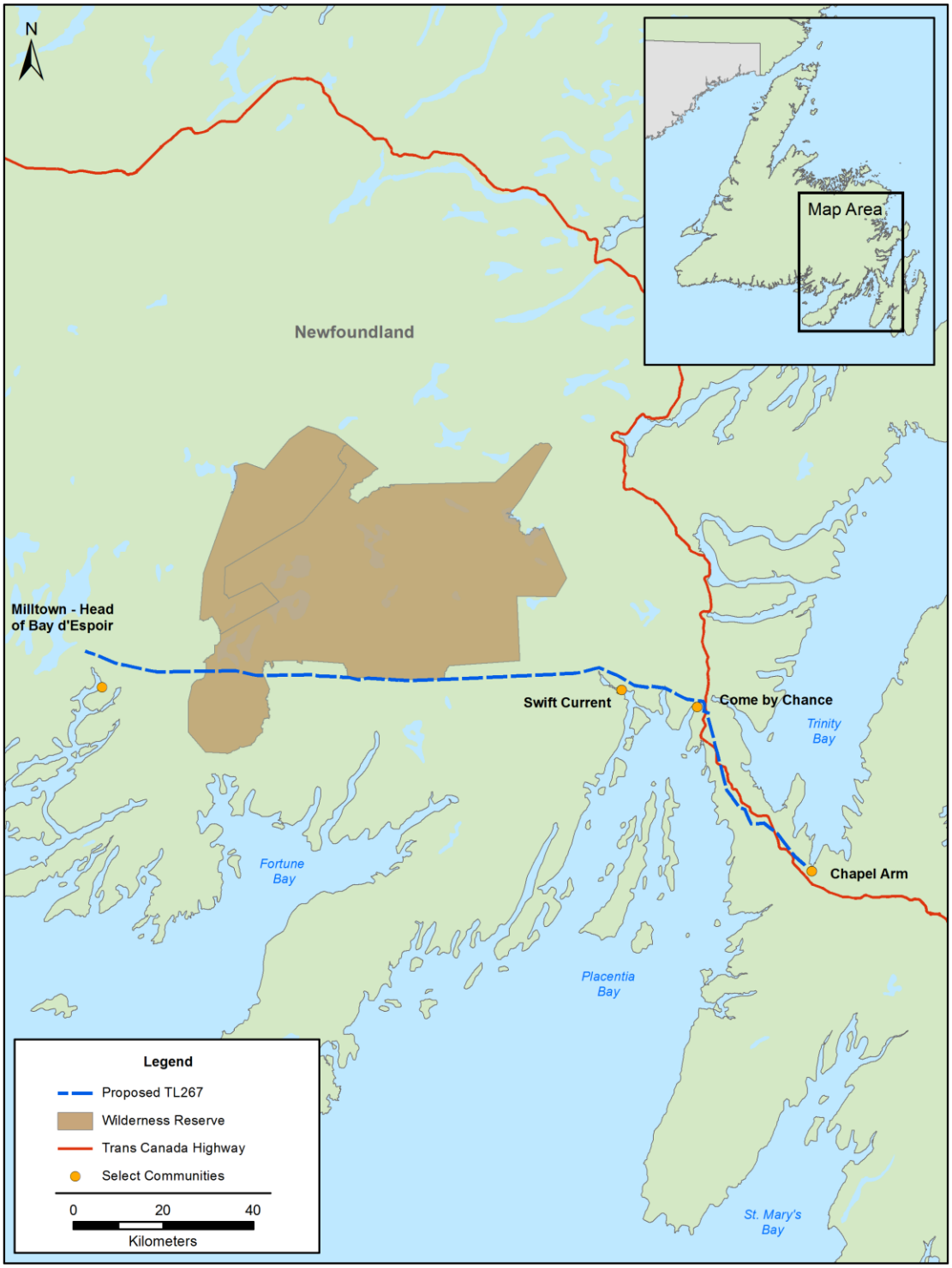
The proposed development project that is the subject of this study includes the construction and operation of a new 230 kilovolt (kV) transmission line that will be approximately 188 km long and will connect the existing Bay d'Espoir and Western Avalon Terminal Stations (hereinafter also referred to as the "Project" or "TL 267"). The proposed TL 267 will parallel existing transmission line infrastructure (TL 202 and TL 206) from Bay d'Espoir to Come by Chance and will further parallel TL 203 from Come by Chance to the Western Avalon substation in Chapel Arm (Figure 1). Along with the proposed development of TL 267, upgrades to existing infrastructure at the Bay d'Espoir and Western Avalon Terminal Stations will also be completed. The existing transmission lines (TL 202, 203 and 206) were cleared and constructed within the boundaries of the easement granted to Hydro by Government at the time of their development, as will the proposed TL 267.

Given that this new transmission line and associated infrastructure will entirely follow along existing transmission lines and other infrastructure in the region, the Project is expected to have few if any environmental issues associated with it. Hydro is, however, committed to ensuring that Project construction and operations are conducted in an environmentally acceptable manner, in full compliance with associated environmental regulations and permits, as well as the company's own environmental policies, plans and standards.

The Proponent has therefore planned and completed an environmental study program in relation to the proposed Project, in order to obtain and compile information on key aspects of the existing biophysical and socioeconomic environments within and near the Project area. The information provided through this study program is intended to support the Project's Environmental Assessment (EA) registration and review, and will be used in its on-going planning and design.

This Wildlife Study comprises one component of that environmental study program. Its purpose is to provide a desk-top analysis and overview of the occurrence, abundance, distribution, movements and habitat associations of wildlife species (including avifauna and mammals) that are known or likely to occur in vicinity of the proposed Project. It has a particular focus on any species at risk that do or may occur in the area, as well as on identifying and describing any key and potentially sensitive habitats and time periods with respect to these species. The study therefore focuses primarily upon those species and issues that have the most relevance for the larger planning and design processes related to the Project, including the associated identification of mitigation. Caribou and freshwater fish are addressed individually in separate environmental baseline reports.

Figure 1 - The Proposed Bay d'Espoir to Western Avalon Transmission Line (TL 267)



2.0 APPROACH AND METHODS

The following sections describe the general approach and methodology that were used in the planning and completion of this Study, including the associated Study Areas, data sources, and the overall methods used to compile and present the resulting environmental information.

2.1 Study Areas and Regional Ecological Setting

As noted previously, the proposed Project will include construction and operation of a new electrical transmission system along existing transmission lines and roadways in south-central and eastern Newfoundland, for a total distance of approximately 188 km. Given the location and geographic extent of the Project, and the landscape level at which many wildlife populations exist and function, a regional scale was used in assessing and describing the known presence, abundance, spatial and temporal distribution of wildlife in relation to the Project.

In completing the analysis, the study has focused upon identifying, reviewing and presenting information at a number of geographic scales, including (where relevant):

> *Project Area* or *Transmission Line Right of Way* (ROW): A specific routing has been selected for the transmission line, which will involve a cleared ROW approximately 40 m wide.
>
> *Study Area*: A larger (10 km wide) Study Area was also established that forms the key focus of the study. The Study Area extends 5 km on either side of the centre line of the identified ROW for the proposed TL 267 as described above. This surrounding area is considered in order to provide relevant, regional ecological context for the analysis, as well as address the potential for some Project-related activities to occur outside the 40 m wide transmission line routing itself. The particular area considered in the study is somewhat variable and iterative as required to account for the distributions, activities and home ranges of individual species as relevant. As described in a later section, this larger search area also provided a more comprehensive and regional scale query for the Atlantic Canada Conservation Data Centre (ACCDC) database regarding listed and rare species.
>
> *Regional Area*: Where relevant, the study and its associated analysis also considers the larger region of south-central and eastern Newfoundland that surrounds the Project and Study Areas described above, and generally encompasses the overall geographic extent and movements of any wildlife (individuals or populations) that may interact with the Project.

The proposed transmission line extends through south-central and eastern portions of the Island of Newfoundland, and in doing so, will cross through a portion of the Boreal Shield Ecozone of Canada (Canada Committee on Ecological Land Classification 1989). The Boreal Shield Ecozone consists of a base of ancient bedrock covered by gravel, sand and other glacial deposits. Regional topography is comprised of broadly rolling uplands that form poorly drained

depressions covered by lakes, ponds and wetlands. The climate of the Ecozone is generally continental in nature, with long cold winters, short warm summers and abundant precipitation. Cool temperatures and a short growing season along with acidic soils influence the resultant vegetation community composition, distribution and abundance. The landscape configuration consists primarily of forested cover dominated by coniferous species intermixed with hardwoods. Bogs, marshes and other wetlands comprise the remaining landscape matrix of vegetation communities.

At the provincial scale, the proposed transmission line will also pass through three of the Ecoregions that have been identified on the Island of Newfoundland (Damman 1983), including (primarily) the large Maritime Barrens Ecoregion (79 percent of the transmission line's linear distance), along with smaller portions of the Central Newfoundland Forest Ecoregion (18 percent) and Western Newfoundland Forest Ecoregion (three percent) at its ends (Figure 2). Within the Maritime Barrens Ecoregion, the proposed ROW occurs primarily within the Central Barrens Subregion with a smaller portion on the Avalon Peninsula falling within the Southeastern Subregion. The section of the transmission line within the Central Newfoundland Ecoregion crosses two Subregions, Twillick Steady near Bay d'Espoir and Northcentral near the Isthmus of the Avalon Peninsula.

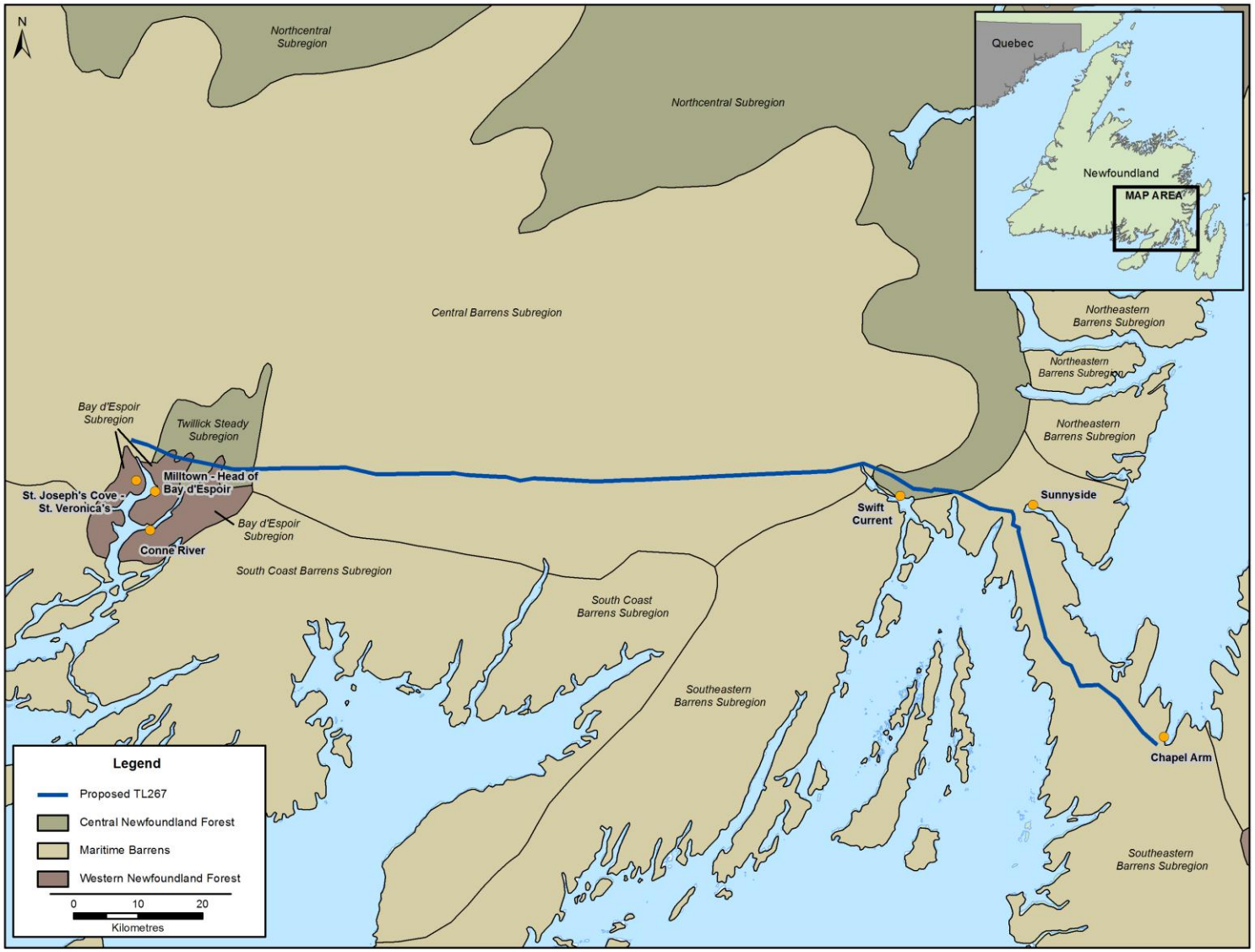
The Maritime Barrens Ecoregion is characterized by cool summers with frequent fog and strong winds. Winters are relatively mild with intermittent snow cover. Consequently, this ecoregion is dominated by open heathland and peat bog interspersed with patches of stunted balsam fir (*Abies balsamea*), black spruce (*Picea mariana*) and eastern larch (*Larix laricina*). Heath plants are primarily *Kalmia angustifolia* on protected slopes and *Empetrum nigrum* or *E. easmesii* on windswept ridges and headlands (Meades 1990).

The Central Newfoundland Forest Ecoregion has a more continental climate than the Maritime Barrens area, with cooler winter and higher summer temperatures. Forest fires have historically been more frequent in this ecoregion and have led to a replacement of balsam fir-*hyloconium* forest with black spruce types over many areas. However, upland areas within the Twillick Steady Subregion remain dominated by balsam fir forest. Ground cover in the Northcentral Subregion near portion of the near Goobies is primarily dwarf shrub heath (*K. angustifolia*) with interspersed stands of balsam fir and black spruce. Topography in both subregions is less than 300 m above sea level and the topography is rugged and undulating (Meades 1990).

The Western Newfoundland Forest Ecoregion (Bay d'Espoir Subregion) is characterized by a humid climate with a relatively longer frost-free period. Higher humidity reduces the prevalence of fire as a disturbance mechanism and favours the growth of *dryopteris*-balsam fir forest rather than black spruce as the dominant tree. Rich soils also support the growth of yellow birch (*Betula alleghaniensis*) in sheltered valleys of this subregion.

The proposed Project will also cross through a portion of the existing boundaries of the Bay du Nord Wilderness Reserve (2,895 km^2), which encompasses a vast landscape of ponds, rivers, barrens, bogs and fens, forests, and thickets in south-central Newfoundland (Parks and Natural Areas Division 2015).

Figure 2 - Ecoregions and Subregions in Newfoundland Crossed by the Proposed Project



2.2 Information Sources and Availability

This study involved identifying, compiling and reviewing existing and available information on avifauna and mammals in the region from the general literature and from relevant government agencies and non-governmental organizations. Various experts were also consulted to provide the Study Team with additional information and data relevant to the area, and to supplement information available through the published literature and elsewhere. An overview of key data sources that have been identified and used in this study is provided below.

2.2.1 Avifauna

The Atlantic Canada Conservation Data Centre (ACCDC) is a not-for-profit organization and an affiliate of NatureServe Canada. The ACCDC compiles and provides objective data on the biological diversity of Atlantic Canada and functions to further the collective understanding of the distribution and status of species of conservation concern. The ACCDC maintains a valuable database for assessing the occurrence and location of species and is extensively used for land use planning, environmental assessment reviews and other purposes. For this study, the ACCDC (Corner Brook, NL office) was contacted to provide relevant observational data on the occurrence and distribution of wildlife (including avian) species at risk within a five km wide area around the proposed transmission line ROW from Bay d'Espoir to the Western Avalon. The results from this query are summarized in the text that follows and presented in detail in Appendix A.

The North American Breeding Bird Survey (BBS) is coordinated by the US Geological Survey's Patuxent Wildlife Research Center, in partnership with the Canadian Wildlife Service. The purpose of the BBS is to collect data to monitor the status and trends of North American bird populations. BBS routes are surveyed by thousands of volunteers following a standardized protocol. Routes follow maintained road networks and consist of 50 stops spaced at 800 m intervals. Participants count all birds heard and seen during a 3-minute point count within a 400 m radius of the stop. In Newfoundland, these early morning surveys are conducted in June during the height of the breeding season. Although there are no established BBS routes that overlap with the Study Area itself, a BBS route along the access road to Bay L'Argent on the Burin Peninsula occurs within the same ecoregion (Maritime Barrens) and can be used to generally reflect the composition of bird communities for that region and its associated habitat types. This BBS route was sampled for three years (2007, 2011 and 2012), and is shown later (see Appendix B).

Information on the occurrence and location of birds in Newfoundland and Labrador and elsewhere is also available through an online program (eBird) which is administered by the Cornell Lab of Ornithology and the National Audubon Society in partnership with Bird Studies Canada. This online checklist provides a portal for recreational birders to record their observations and is a powerful tool for providing basic information on bird abundance and distribution. Similarly, a local online news group (nf.birds) also provides an opportunity for local enthusiasts to submit observations. For both of these data sources, sightings must be treated with some degree of caution as there is potential for observer error in species identifications. For this study, all species records obtained from nf.birds were from the immediate areas adjacent to the communities of St. Alban's, Terrenceville, Swift Current, Goobies and Come by Chance. The data obtained from eBird and nf.birds are summarized later.

The only known systematic surveys for birds in the region include aerial counts of breeding waterfowl by the Canadian Wildlife Service, ground-based surveys along a portion of the Bay du Nord River (Parks and Natural Areas Division 2009), and point counts for passerine species along the northern periphery of the Central Barrens Subregion (near Terra Nova National Park) and South Coast Barrens Subregion (near Goobies, Stantec Consulting Ltd 2012)These sources provided valuable site-specific information on the occurrence of avifauna in the Study Area.

As a result of the overall remoteness and relative inaccessibility of much of the Study Area, there have been very few systematic surveys conducted for birds in this region. As a result of this lack of direct data on avifauna in the Study Area, inferences on species occurrence in this report are based largely on their known presence and distribution within similar habitats at the ecoregion scale or beyond, as reflected in the general literature.

2.2.2 Mammals

As described above, the ACCDC is a not-for-profit organization and an affiliate of NatureServe Canada that compiles and provides data on the presence and status of species that are considered to be at risk or otherwise of conservation concern. For this study, the ACCDC's Corner Brook, NL office was contacted to provide relevant data on the occurrence and distribution of any such mammalian species that have been observed to occur in the region.

The Newfoundland and Labrador Small Mammal Monitoring Network is a partnership between various government departments, private companies and other organizations that has been established to assess small mammal populations across the province. Sampling stations maintained by partner organizations have provided valuable insight into the diversity, distribution, and population trends of this diverse species group. This study includes information on the status of local populations derived from trapping data from the Bay d'Espoir and Come by Chance regions using the latest available report of the NL Small Mammal Monitoring Network (Rodrigues 2011).

Although there have again been relatively limited ecological studies or population assessments undertaken for mammals in the area itself, recent technical reports from the Department of Environment and Conservation (Sustainable Development and Strategic Science) provide valuable insights related to the occurrence and ecology of carnivores in the province, including black bear, eastern coyote and Canada lynx (Fifield et al. 2013, Fifield and Lewis 2013). Previous research, not necessarily specific to the Bay du Nord region, include past studies on American mink (Northcott 1974), river otter (Cote et al. 2008), Arctic hare (Hearn et al. 1987), snowshoe hare (Joyce 2002) and other species and sources.

Many of the mammal species that are considered in this review are widely distributed and typically occur at low densities, with specific locational data for many areas generally being unavailable. Furthermore, the nature and extent of habitat use within the Study Area are undoubtedly variable between seasons and years as mammal populations fluctuate due to food availability, climatic conditions, predator density, the occurrence of disease and other biotic and abiotic factors. Inferences on species occurrence in this report are again based largely on their known presence and distribution within similar habitats at the ecoregion scale or beyond, as reflected in the general literature.

2.3 Applicable Legislation and Regulations

The Newfoundland and Labrador *Endangered Species Act* (*NL ESA*) provides protection for indigenous species, sub-species and populations considered to be endangered, threatened, or vulnerable within the province. These potential designations under the legislation are defined as follows:

1) *Endangered*: A wildlife species that is facing imminent extirpation or extinction;

2) *Threatened*: A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction; and

3) *Vulnerable*: A wildlife species that has characteristics which make it particularly sensitive to human activities or natural events.

There are currently 35 species, subspecies, and populations designated under the *NL ESA*. Thirteen of these species are listed as endangered, nine are listed as threatened and 13 are listed as vulnerable. Designations are based on recommendations from the national Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and/or the provincial Species Status Advisory Committee (SSAC). Both COSEWIC and SSAC are independent committees that consist of government and non-government scientists who determine the status of species, subspecies and significant populations considered to be at risk of extinction or extirpation. The evaluation processes of both are independent, open and transparent, and based on the best available information on the biological status of species including scientific, community and traditional knowledge. Habitat that is important to the recovery and survival of endangered or threatened species can also be designated as critical habitat or recovery habitat, and protected under the *NL ESA*.

The Canadian *Species at Risk Act* (*SARA*) provides protection to species at the national level to prevent extinction and extirpation, facilitate the recovery of endangered and threatened species, and to promote the management of other species to prevent them from becoming at risk in the future. Designations under the Act follow the recommendations and advice provided by COSEWIC.

There are currently various schedules associated with *SARA*. Species that have formal protection are listed on Schedule 1, which includes the following potential designations:

1) *Extirpated*: A species that no longer exists in the wild in Canada, but exists elsewhere;

2) *Endangered*: A species that is facing imminent extirpation or extinction;

3) *Threatened*: A species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction; and

4) *Special Concern*: A species that has characteristics which make it particularly sensitive to human activities or natural events.

Schedule 1 of *SARA* is the official federal list of species at risk in Canada. Once a species is listed, measures to protect and recover a listed wildlife species are established and implemented, including the development of a recovery strategy. Species designated as endangered must have a strategy developed within one year, and for threatened or extirpated species it must be developed within two years. These recovery strategies define conservation goals and objectives, identify critical habitat, and describe the research and management activities required. Critical habitat under *SARA* is defined as habitat that is required for the species' survival or recovery.

A number of species that are protected under the *NL ESA* are also listed under *SARA*. Differences in designations between these pieces of legislation are likely to be observed when a species is at risk in a province but is more common from an overall national perspective.

In addition to species that are listed under provincial and/or federal legislation, there is often a degree of interest around species that are considered to be regionally rare, even though these are not necessarily provided with formal, legal protection. Although the designation of a species by COSEWIC or other such organizations, for example, does not in itself constitute such legal protection, they do provide a general indication of species that may be considered rare, and thus, of some degree of potential conservation interest. As described previously, the ACCDC is a non-profit organization that manages the species occurrence and distribution databases for the NL Department of Environment and Conservation (Wildlife Division), and its databases are useful in understanding the distribution and status of species at risk and which are otherwise of conservation concern in the province.

Most migratory birds found in Canada are protected under the federal *Migratory Birds Convention Act*, which implements the terms of the *Migratory Birds Convention* of 1916 between Canada and the United States. In Canada, the *Migratory Birds Convention Act* and associated *Migratory Birds Regulations* are administered by Environment Canada's Canadian Wildlife Service (CWS). These strictly prohibit the harming of migratory birds and the disturbance or destruction of their nests and eggs.

Wildlife resources in Newfoundland and Labrador are also protected and managed under the provincial *Wild Life Act* and its associated *Wild Life Act Regulations.*

3.0 AVIFAUNA

As noted previously, the purpose of this study is to provide an overview of the occurrence, abundance, distribution, movements and habitat associations of wildlife species - including avifauna - that are known or likely to occur in vicinity of the proposed Project, with special emphasis being given to any species at risk that do or may occur in the area as well as any key and potentially sensitive habitats and time periods for birds.

The following sections present and discuss the results of this desk-top study with regard to avifauna. In addition to the text and tables that follow in this chapter, mapping of the various wildlife observations / locations, areas and other environmental features that are mentioned in this section is provided in Appendix B.

3.1 Avifauna in the Study Area

The proposed transmission line will pass through a variety of terrestrial and aquatic habitat types, including dense coniferous forest, open scrub forest, upland barrens, wetlands, lakes and rivers. As described earlier, it will also extend through the southern portion of the current boundaries of the Bay du Nord Wilderness Reserve, a vast and remote landscape of ponds, rivers, barrens, bogs and fens, forests and thickets, as well as crossing key landscape features in the region such as the Bay du Nord River watershed and others. It will also occur within three of the Ecoregions that have been identified on the Island of Newfoundland, including (primarily) the large Maritime Barrens Ecoregion, along with smaller portions of the Central Newfoundland Forest and Western Newfoundland Forest Ecoregion at its western ends and Central Newfoundland Forest at its eastern end.

This results in a diverse range of avifauna species and species groups being present in the region, which are supported by the inherent habitat variability that is characteristic of the Study Area and the larger, surrounding region. A number of taxonomic and functional groups are well represented in this region, including waterfowl, shorebirds, wood warblers, birds of prey, sparrows and finches. Common species that are known to breed in the area include American black duck, Canada goose, greater yellowlegs, spotted sandpiper, yellow-rumped warbler, blackpoll warbler, yellow-bellied flycatcher, osprey, white-throated sparrow and pine grosbeak.

Table 1 provides an overview of each avifauna species group that is known or considered likely (based on the existing and available information) to occur in the Study Area. This includes an identification of key and representative species within each group, as well as general information on relevant aspects of their life history, habitat associations and then specific information on their potential occurrence in the area and greater landscape.

Species groups are presented in Table 1 in taxonomic sequence (by Order and/or Family) following the American Ornithologists' Union Check-list of North American Birds (American Ornithologists' Union 1998).

Table 1 Major Avifauna Groups of the Island of Newfoundland

Description / Range	Overview of Species Group	Information Source(s)
Waterfowl (*Anseriformes*)		
Overview	• Waterfowl are relatively large, primarily aquatic birds that include swans, ducks, and geese. • Most waterfowl species utilize freshwater habitats during the breeding season and congregate in marine habitats during the non-breeding season. • Most species gather into large flocks during the summer moult, migration, and winter. • Many species eat aquatic invertebrates during the breeding season but may consume plant material at other times of the year. • All species and their active nests are protected under the *MBCA.* Many species in this group are game birds which are managed under this Act.	Godfrey (1986); Gauthier and Aubry (1996); ACCDC (2015); NF.Birds.
Occurrence within the Study Area	• Waterfowl species that are known to regularly occur within Study Area include Canada goose, American black duck, ring-necked duck, common goldeneye, red-breasted merganser, and common merganser. • Other species that occur in the general region and are likely to occur in the Study Area include wood duck, mallard, green-winged teal, American widgeon, and greater scaup. • The harlequin duck is protected by both provincial and federal species at risk legislation. The species is not expected to be widely distributed throughout the Study Area but has been observed on the Bay du Nord River during the breeding season. • Barrow's goldeneye is also protected but is not known to regularly occur in the Study Area or adjacent region. There is one historical record of a pair of Barrow's goldeneye in late fall from the Come by Chance estuary. • Canada geese are known to breed throughout the Bay du Nord Wilderness Area and the greater Maritime Barrens Ecoregion (see Appendix B).	
Loons (*Gaviiformes*)		
Overview	• Loons are medium-sized, fish-eating waterbirds. • Nests are located on inland lakes and rivers. • Overwintering primarily occurs along coastal areas of southern Newfoundland. • Birds and their active nests are protected under the *MBCA*.	McIntyre and Barr (1997); Parks and Natural Areas (2012); eBird Canada; NF.Birds.
Occurrence within the Study Area	• Only one species in this order, the common loon, occurs within the Study Area and adjacent landscape.	
Grouse and Ptarmigans (*Galliformes*)		
Overview	• Grouse and ptarmigans are resident, non-migratory birds that consume seeds, fruit, buds, and insects. • Four species from this group occur on insular Newfoundland: spruce grouse, ruffed grouse, willow ptarmigan and rock ptarmigan. • Both grouse species were introduced to the Island as a	Holder et al. (1999); Montevecchi and Tuck (1987); NF.Birds; Environment

Description / Range	Overview of Species Group	Information Source(s)
	source of food for local residents, while both willow and rock ptarmigan are native species. • All local species are game birds whose harvest is regulated by the provincial *Wild Life Act*. Their active nests are protected by the same legislation. • Grouse occur primarily in forested areas whereas ptarmigan inhabit open barrens during summer and more forested areas during the winter season.	Canada (2014)
Occurrence within the Study Area	• Both grouse species and willow ptarmigan are known to occur in the general region crossed by the proposed transmission line. • Rock ptarmigan are mainly restricted to high elevation areas of western Newfoundland and the Northern Peninsula.	
Herons (*Pelecaniformes*)		
Overview	• Herons are relatively large water-birds that are morphologically adapted for capturing fish and amphibians in aquatic habitats. • Only one species in this group, the American bittern, is a regular breeder across insular Newfoundland, although the great blue heron is now established in the Codroy Valley area of southwestern Newfoundland. • This species is protected under the *MBCA*.	Gibbs et al. (1992); NF.Birds
Occurrence within the Study Area	• American bittern is widespread across insular Newfoundland and is expected to occur in wetland habitat throughout the Study Area. • An American bittern was observed along the Bay d'Espoir Highway (outside of the Study Area) in 1998.	
Diurnal Raptors (*Accipitriformes* and *Falconiformes*)		
Overview	• This group consists of birds of prey that primarily hunt during daylight hours and includes hawks (*Accipite*r spp.), eagles (*Haliaeetus* spp.), harriers (*Circus* spp.), and falcons (*Falco* spp.). • Raptors occupy a range of habitat types including forest (e.g., sharp-shinned hawk) and barrens (e.g., Northern harrier) and may be either migratory (e.g., merlin) or resident (e.g., Northern goshawk). • Birds within this group, as well as their nests, are protected under the provincial *Wild Life Act*. • Peregrine falcons are protected by both provincial and federal endangered species legislation.	Gosse and Montevecchi (2000); Amec Foster Wheeler (2014); Environment Canada (2014); eBird Canada; NF.Birds
Occurrence within the Study Area	• Diurnal raptors that have been confirmed to occur in the Study Area include osprey, rough-legged hawk, merlin, bald eagle, and Northern harrier. A single gyrfalcon has also been observed near Arnold's Cove during fall, but is considered an irregular migrant. • Northern goshawk and sharp-shinned hawk are regular breeders at low density in Newfoundland and are expected to occur in the Study Area. • Peregrine falcons are expected to occur in low abundance during spring and fall migration. • Osprey have been observed on existing transmission line structures, including within the Study Area; see Appendix B.	

Description / Range	Overview of Species Group	Information Source(s)
Plovers and Sandpipers (*Chardriiformes*: *Charadriidae* and *Scolopacidae*)		
Overview	• Members of this taxonomic order are collectively referred to as 'shorebirds' as they primarily inhabit lake shorelines and coastal habitats during both the breeding season and migration. • All of the species in this group are migratory and are specially adapted for long-distance flight. • The red knot is a species at risk under both federal and provincial legislation. • All species and their active nests are protected under the *MBCA*.	Blancher (2003); Garland and Thomas (2009); Parks and Natural Areas (2012); NF.Birds; eBird Canada
Occurrence within the Study Area	• Local breeders identified within 5 km of the proposed transmission line included greater yellowlegs, spotted sandpiper, and Wilson's snipe. • Least sandpipers were not reported in the literature search for this study, but may breed on wet inland fens in or near the Study Area. • The estuary at the confluence of the Come by Chance River and inner Placentia Bay is a known staging area for shorebirds during migration in late summer and early fall (see Appendix B). • Additional species that are regularly recorded at this location include black-bellied plover, semi-palmated plover, semi-palmated sandpiper, white-rumped sandpiper, pectoral sandpiper, dunlin, American golden plover, and red knot. • Other shorebirds commonly seen across the Avalon Peninsula during migration also likely use this area.	
Gulls and Terns (*Chardriiformes*: *Laridae*)		
Overview	• Gulls and terns are medium-sized aquatic birds that are generally most abundant along coastal habitats but can also occur along inland water-bodies at lower density. • Their diet is somewhat general and consists of aquatic invertebrates and vertebrates, carrion and other available food items. • All species and their active nests are protected under the *MBCA*.	Godfrey (1986); Montevecchi and Tuck (1986); Parks and Natural Areas Division (2012)
Occurrence within the Study Area	• The only species that has been observed in the inland portion of the Study Area is herring gull. • Species listed as 'confirmed' along coastal areas of the Study Area (i.e. Come by Chance estuary, Arnold's Cove and Bellevue Beach) include ring-billed gull, glacous gull, great black-backed gull, black-legged kittiwake, and common tern. • Endangered ivory gulls are very unlikely to occur in the Study Area.	
Nocturnal Raptors (*Strigiformes*)		
Overview	• Owls are small to medium-sized birds of prey that are generally non-migratory. They may, however, exhibit nomadic behaviour in response to shifting and irruptive small mammal prey populations. • Nocturnal raptors are typically secretive, occur at low	Gosse and Montevecchi (2000); NF.Birds

Description / Range	Overview of Species Group	Information Source(s)
	density, and are usually detected by their vocalizations. • Members of this group and their active nests are protected by the provincial *Wild Life Act*.	
Occurrence within the Study Area	• Nocturnal owls that have been confirmed within a 5 km distance of the proposed transmission line include great horned owl and northern saw-whet owl • Northern hawk-owls have also been observed in recently burned forest along the Bay d'Espoir highway and are likely distributed throughout this landscape. • Boreal owls are relatively common throughout forested areas of Newfoundland and are also likely to occur in the Study Area. • All species (except short-eared owl) are associated with forested habitats throughout insular Newfoundland.	
Kingfishers (*Coraciiformes*)		
Overview	• Kingfishers are small to medium-sized birds that forage on small fish species and occur along riparian habitats. • Belted kingfishers are secondary cavity nesters and are further restricted to forested areas near water bodies. • Belted kingfishers and their active nests are protected by the provincial *Wild Life Act*.	Brooks and Davis (1987)
Occurrence within the Study Area	• Belted kingfishers are a common breeder across insular Newfoundland and are known to occur in the Study Area (beyond the immediate Project Area).	eBird Canada
Woodpeckers (*Piciformes*)		
Overview	• Woodpeckers are primary cavity nesters that actively forage for insects within dead and dying trees. • All species and their active nests are protected under the *MBCA*.	Setterington et al. (2000); Parks and Natural Areas Division (2012); Environment Canada (2014); NF.Birds
Occurrence within the Study Area	• Given their strong association with forest habitats they are unlikely to occur in large portions of the Maritime Barrens Ecoregion but are expected to be relatively common elsewhere. • Two species (downy woodpecker and northern flicker) are known to occur in the Study Area and two other species, black-backed woodpecker and hairy woodpecker, are resident species throughout the greater region. • The occurrence of the generally uncommon American three-toed woodpecker in the Study Area is unknown.	
Tyrant Flycatchers (*Tyrannidae*)		
Overview	• Tyrant flycatchers are small aerial insectivores that are associated with a range of forested habitats. • All four species from this group are migratory and occur in Newfoundland during the breeding season when insect prey is abundant. • Olive-sided flycatchers are listed as threatened under both federal and provincial species at risk legislation. • All species and their nests are protected under the *MBCA*.	Robertson and Hutto (1997); Stantec Consulting Ltd. (2012); Environment Canada (2014); NF.Birds
Occurrence within	• Two flycatcher species have been confirmed within the general region (olive-sided flycatcher and yellow-bellied	

Description / Range	Overview of Species Group	Information Source(s)
the Study Area	flycatcher) but neither of these within the immediate Project area. Yellow-bellied flycatchers were the most abundant passerine species detected across 51 point count stations in the Maritime Barrens Ecoregion. • Alder flycatchers are also expected to occur in this region but are not reported from the available literature. • The occurrence of the relatively uncommon least flycatcher is unknown.	
Jays, Crows, and Ravens (*Corvidae*)		
Overview	• Jays, crows, and ravens are medium-sized to large perching birds and are common non-migratory residents of insular Newfoundland. • Their diet is varied which enables this group to occupy a wide range of natural and anthropogenic habitats, though gray jays are typically associated with forested and semi-forested environments. • Members of this group and their active nests are protected by the provincial *Wild Life Act*.	Gauthier and Aubry (1996); Parks and Natural Areas Division (2012); Environment Canada 2014; eBird Canada
Occurrence within the Study Area	• Multiple sources have documented that all four corvid species occur within the immediate Study Area.	
Swallows (*Hirundinidae*)		
Overview	• Swallows are a cavity nesting, aerial insectivore that are generally associated with wetland habitats where prey is particularly abundant. • Three species are known to breed on insular Newfoundland, although only tree swallows are considered common. • All species within this group are migratory and only occur on the Island between May and September.	Robertson and Rendell (1990); Montevecchi and Tuck (1987); Parks and Natural Areas Division (2012)
Occurrence within the Study Area	• Tree swallows were recorded along the Bay du Nord River by the NL Parks and Natural Areas Division and are likely found throughout much of the Study Area. • Barn swallows have also been observed in the Study Area (Appendix A).	
Chickadees (*Paridae*)		
Overview	• Chickadees are small birds that forage by gleaning seeds and insects from vegetation. • These species and their active nests are protected under the *MBCA*.	Smith (2010); Parks and Natural Areas Division (2012); Environment Canada (2014); eBird Canada
Occurrence within the Study Area	• Both boreal and black-capped chickadees are common resident species on the Island and have been documented to occur in the Study Area. • Chickadees are strongly associated with forested habitats and are not likely to occur across open areas of the Maritime Barrens Ecoregion.	
Nuthatches (*Sittidae*)		
Overview	• Red-breasted nuthatches are a resident species found in forested areas throughout Newfoundland. • This species and their active nests are protected under the *MBCA*.	Ghalambor and Martin (1999); eBird Canada

Description / Range	Overview of Species Group	Information Source(s)
Occurrence within the Study Area	• This species has been recorded in the region and is known to occur at low density throughout forested portions of the Study Area.	
Kinglets (*Regulidae*)		
Overview	• Ruby-crowned and golden-crowned kinglets are common breeders across insular Newfoundland. • Ruby-crowned kinglets overwinter throughout the southern United States while golden-crowned kinglets are year-round residents. • Both species and their active nests are protected under the *MBCA*.	Blancher (2003); Sibley (2000); Parks and Natural Areas Division (2012); Environment Canada (2014)
Occurrence within the Study Area	• Ruby-crowned kinglets were recorded within the Study Area by the Parks and Natural Areas Division as well as along the BBS route on the Burin Peninsula (see Appendix B). • Golden-crowned kinglets generally occur at lower density and are more difficult to detect during the breeding season. • Although not reported in the identified literature, Golden-crowned kinglets likely inhabit forested portions of the Study Area.	
Wrens (*Troglodytidae*)		
Overview	• Winter wrens are the only species from this group that are known breeders on insular Newfoundland. • This migratory species is generally associated with forested slopes in western Newfoundland but irregularly occurs across the entire province. • All species and their active nests are protected under the *MBCA*.	Environment Canada (2014);
Occurrence within the Study Area	• Winter wrens have been detected along the BBS route near Bay L'Argent and near St. Alban's (see Appendix B), but outside of the immediate Study Area.	
Thrushes (*Turdidae*)		
Overview	• Thrushes are a common group of migrant songbirds that inhabit a range of forested and shrubby habitats on insular Newfoundland. • Their diet is largely comprised of invertebrates during the breeding season and berries during migration and winter. • All species and their active nests are protected under the *MBCA*. The Newfoundland subspecies of gray-cheeked thrush is listed as Threatened under the *NL ESA*.	Montevecchi and Tuck (1987); Lowther et al. (2001); Parks and Natural Areas Division (2012); Stantec Consulting Ltd. (2012); Environment Canada (2014)
Occurrence within the Study Area	• Three thrush species, American robin, gray-cheeked thrush, and hermit thrush have been documented to occur within the Study Area. American robins were recorded at a density of 0.7 birds/point count station within the Maritime Barrens Subregion. • Swainson's thrush have been observed along the BBS near Bay L'Argent. • Veerys are also an uncommon breeder on the Island but are apparently limited to southwestern Newfoundland.	

Description / Range	Overview of Species Group	Information Source(s)
Waxwings (*Bombycillidae*)		
Overview	• Two species of waxwings occur on insular Newfoundland although only cedar waxwings are known breeders. • Cedar waxwings are mainly associated with forested areas adjacent to water bodies where they catch flying insects during flight. • Bohemian waxwings regularly overwinter on the island though vary in abundance depending on fruit production of mountain ash (dogberry). • Waxwings and their active nests are protected under the *MBCA*.	Montevecchi and Tuck (1987); Murphy et al. (1997)
Occurrence within the Study Area	• Neither of the waxwing species were reported in the literature reviewed, although both are expected to occur in this region given their known distribution throughout Newfoundland.	
Wood Warblers (*Parulidae*)		
Overview	• Wood warblers are the largest taxonomic group found in the Study Area. • All are neo-tropical migrants that primarily inhabit forested regions, although some species such as palm warbler and common yellowthroat prefer heathland and open forest. • Most species are insectivorous although some species consume fruits outside of the breeding season. • All warbler species and their active nests are protected under the *MBCA*.	Blancher (2003)
Occurrence within the Study Area	• Warbler species confirmed in the greater Study Area include Tennessee warbler, yellow warbler, magnolia warbler, yellow-rumped warbler, black-throated green warbler, palm warbler, blackpoll warbler, black-and-white warbler, American redstart, ovenbird, Northern waterthrush, mourning warbler, common yellowthroat, and Wilson's warbler. • Both Northern waterthrush and blackpoll warbler were ranked within the five most abundant passerine species within point count stations conducted within the Maritime Barrens Subregion. • The status of several other warbler species in the Study Area (ie. blackburnian, bay-breasted, and Cape May warbler) is unknown.	Parks and Natural Areas Division (2012); Stantec Consulting Ltd. (2012); Environment Canada (2014); NF.Birds
Sparrows and Juncos (*Emberizidae*)		
Overview	• Sparrows and juncos are well represented in the Study Area as most of these species inhabit open barrens and semi-forested to forested habitats. • Birds in this group primarily feed upon insects during the breeding season but also consume seeds during non-breeding periods. • All species except dark-eyed juncos are migratory and over-winter in southern regions of North and Central America. • All species and their active nests are protected under the *MBCA*.	Gauthier and Aubry (1996); Parks and Natural Areas Division (2012); Stantec Consulting Ltd. (2012); Environment Canada (2014); NF.Birds

Description / Range	Overview of Species Group	Information Source(s)
Occurrence within the Study Area	• Species confirmed for the Study Area include savannah sparrow, fox sparrow, Lincon's sparrow, swamp sparrow, white-throated sparrow, song sparrow, and dark-eyed junco. • White-throated sparrows were recorded at a density of 0.7 birds / point count station within the Maritime Barrens Subregion • Other species including American tree sparrow, chipping sparrow, and white-crowned sparrow are unlikely to occur in the Study Area as they are mainly associated with grassland and high elevation habitats in western Newfoundland and the Northern Peninsula.	
Blackbirds (*Icteridae*)		
Overview	• The New World blackbirds are a group of migratory birds that inhabit a range of habitat types from wet woodlands (rusty blackbird), agricultural fields and wetlands (red-winged blackbird and bobolink) and areas of human habitation (common grackle). • The members of this group and their active nests are protected in Newfoundland and Labrador by the *Wild Life Act* as well as the *NL ESA* and *SARA* (rusty blackbird and bobolink).	Blancher (2003); Parks and Natural Areas Division (2012); Stantec Consulting Ltd. (2012); NF.Birds
Occurrence within the Study Area	• Rusty blackbirds were found along the Bay du Nord River during point counts conducted by the Parks and Natural Areas Division and also in the Goobies area at the eastern extent of the Study Area. The species was also detected along the northern periphery of the Maritime Barrens Ecoregion at a density of 0.02 birds/point count stop. • This species is likely to occur at a low density throughout forested and semi-forested areas of the Study Area. • Bobolinks (also a listed species) and red-winged blackbirds were not documented in the literature reviewed and are unlikely to occur in this region given their strong association with agricultural areas. • Both species are primarily limited to the Codroy Valley area of southwestern Newfoundland. • Common grackles are likely to occur in the Study Area given their affinity with communities.	
Finches (*Fringillidae*)		
Overview	• Finches are a group of seed-eating specialists that are common year-round residents of insular Newfoundland. • They associated with coniferous forests of cone-producing age but are also found in communities where they exploit artificial food sources at bird feeders. • Pplations often undergo irruptive phases in years when cone abundance is particularly high. • All finch species and their active nests are protected under the *MBCA*. Further discussion on the endangered red crossbill is provided in a later section.	Hynes and Miller (2014); Environment Canada (2014); eBird Canada
Occurrence within the Study Area	• All regularly occurring finch species that occur in Newfoundland have been confirmed within the Study Area (see Table 2).	

Table 2 provides a list of all bird species that are; 1) known or suspected to breed on the Island of Newfoundland, 2) are regularly recorded during the spring and/or fall migration periods, and 3) known to regularly or occasionally over-winter on the Island. This list was generated from the Checklist of Newfoundland Birds (Mactavish et al. 2003), supplemented with data obtained from the ACCDC and other sources as identified. Table 2 does not include vagrant species that are occasionally and intermittently present on the Island and where this region is well beyond their known ranges.

For each identified species, Table 2 also provides information on their expected occurrence in the Study Area, the information source on which this assessment is based, the species' relative abundance / breeding status, and the particular habitat types in which the species is typically found.

Bird species that are highlighted in **bold font** are those that have been confirmed to occur within five kilometers of the proposed transmission line ROW. Species listed as "confirmed" in regular font are known to occur in the general region but not within this five kilometer Study Area.

Table 2 Avifauna Species Known or Likely to Occur within the Study Area

Common Name*	Scientific Name	Occurrence	Information Source**	Relative Abundance (Breeding Status)	Habitat(s)
Canada Goose	*Branta canadensis*	Confirmed	PNAD, CWS	Common (breeder)	Wetlands
American Black Duck	*Anas rubripes*	Confirmed	NFB	Common (breeder)	Wetlands
Ring-necked Duck	*Aythya collaris*	Confirmed	PNAD, NFB	Common (breeder)	Wetlands
Harlequin Duck	*Histrionicus histrionicus*	Confirmed	ACCDC	Uncommon (breeder)	Wetlands
Common Merganser	*Mergus merganser*	Confirmed	PNAD, EBIRD, NFB	Uncommon (breeder)	Wetlands
Barrow's Goldeneye	*Bucephala islandica*	Confirmed	ACCDC	Uncommon	Wetlands
Common Goldeneye	*Bucephala clangula*	Confirmed	NFB	Common (breeder)	Wetlands
Red-Breasted Merganser	*Mergus serrator*	Confirmed	NFB	Common (breeder)	Wetlands
Common Loon	*Gavia immer*	Confirmed	PNAD, EBIRD, NFB	Common (breeder)	Wetlands
Willow Ptarmigan	*Lagopus lagopus*	Confirmed	NFB	Common (breeder)	Barrens
Osprey	*Pandion haliaetus*	Confirmed	BBS	Common (breeder)	Riparian forest
Bald Eagle	*Haliaeetus leucocephalus*	Confirmed	BBS, EBIRD	Common (breeder)	General
Merlin	*Falco columbarius*	Confirmed	NFB	Common (breeder)	Forest/barrens
Gyrfalcon	*Falco rusticolus*	Confirmed	ACCDC	Common (breeder)	Forest
Rough-Legged Hawk	*Buteo lagopus*	Confirmed	ACCDC	Uncommon (breeder)	Barrens
Northern Harrier	*Circus cyaneus*	Confirmed	BBS, ACCDC, NFB	Common (breeder)	Barrens
Semi-palmated Plover	*Charadrius semipalmatus*	Confirmed	EBIRD	Common in migration	Coastal shoreline
Black-Bellied Plover	*Pluvialis squatarola*	Confirmed	EBIRD	Common in migration	Coastal shoreline
Spotted Sandpiper	*Actitis macularius*	Confirmed	PNAD	Common (breeder)	Coastal/inland shoreline
Greater Yellowlegs	*Tringa melanoleuca*	Confirmed	EBIRD	Common (breeder)	Wetlands/coastal shoreline
Semi-palmated Sandpiper	*Calidris pusilla*	Confirmed	EBIRD	Common in migration	Coastal shoreline
White-Rumped Sandpiper	*Calidris fuscicollis*	Confirmed	NFB	Common in migration	Coastal shoreline
Red Knot	*Calidris canutus*	Confirmed	ACCDC, NFB	Uncommon	Coastal shoreline
American Golden Plover	*Pluvialis dominica*	Confirmed	NFB	Common in migration	Upland barrens/shoreline
Least Sandpiper	*Calidris minutilla*	Confirmed	NFB	Common (breeder)	Upland barrens/shoreline
Pectoral Sandpiper	*Calidris maritime*	Confirmed	NFB	Common in migration	Coastal shoreline

Common Name*	Scientific Name	Occurrence	Information Source**	Relative Abundance (Breeding Status)	Habitat(s)
Dunlin	*Calidris alpina*	Confirmed	NFB	Common in migration	Coastal shoreline
Wilson's Snipe	*Gallinago delicata*	Confirmed	PNAD, BBS	Common (breeder)	Wetlands
Herring Gull	*Larus argentatus*	Confirmed	PNAD, BBS, EBIRD	Common (breeder)	General
Ring-Billed Gull	*Larus delawarensis*	Confirmed	BBS, NFB	Common (breeder)	General
Great Black-Backed Gull	*Larus marinus*	Confirmed	BBS	Common (breeder)	General
Black-Legged Kittiwake	*Rissa tridactyla*	Confirmed	BBS	Common (breeder)	
Glacous Gull	*Larus hyperboreus*	Confirmed	EBIRD	Common (winter)	Coastal habitats
Common Tern	*Sterna hirundo*	Confirmed	PNAD	Common (breeder)	Coastal habitats
Great Horned Owl	*Bubo virginianus*	Confirmed	PNAD	Uncommon (breeder)	Forest
Northern Saw-Whet Owl	*Aegolius acadicus*	Confirmed	ACCDC	Uncommon (breeder)	Forest
Belted Kingfisher	*Megaceryle alcyon*	Confirmed	EBIRD, NFB	Common (breeder)	Wetlands
Downy Woodpecker	*Picoides pubescens*	Confirmed	PNAD	Common (breeder)	Deciduous forest
Northern Flicker	*Colaptes auratus*	Confirmed	PNAD, BBS, NFB	Common (breeder)	Forest
Olive-Sided Flycatcher	*Contopus cooperii*	Confirmed	NFB	Uncommon (breeder)	Open forest
Yellow-Bellied Flycatcher	*Empidonax flavivetris*	Confirmed	BBS, ST	Common (breeder)	Forest
Gray Jay	*Perisoreus canadensis*	Confirmed	PNAD, BBS	Common (breeder)	Coniferous forest
Blue Jay	*Cyanocitta cristata*	Confirmed	NFB	Common (breeder)	Forest/towns
American Crow	*Corvus brachyrhynchos*	Confirmed	BBS, EBIRD	Common (breeder)	General
Common Raven	*Corvus corax*	Confirmed	PNAD, BBS, EBIRD	Common (breeder)	General
Tree Swallow	*Tachycineta bicolor*	Confirmed	PNAD, ST	Common (breeder)	Wetlands
Barn Swallow	*Hirundo rustica*	Confirmed	ACCDC	Uncommon (breeder)	General
Black-Capped Chickadee	*Poecile atricapillus*	Confirmed	BBS, EBIRD, ST	Common (breeder)	Forest
Boreal Chickadee	*Poecile hudsonicus*	Confirmed	PNAD, BBS, EBIRD, ST	Common (breeder)	Forest
Red-Breasted Nuthatch	*Sitta canadensis*	Confirmed	EBIRD	Common (breeder)	Forest
Ruby-Crowned Kinglet	*Regulus calendula*	Confirmed	PNAD, BBS, ST	Common (breeder)	Forest
Hermit Thrush	*Catharus guttatus*	Confirmed	PNAD, BBS, ST	Common (breeder)	Forest
Gray-cheeked Thrush	*Catharus minimus*	Confirmed	ACCDC	Uncommon (breeder)	Forests
American Robin	*Turdus migratorius*	Confirmed	PNAD, BBS, ST	Common (breeder)	General
Magnolia Warbler	*Dendroica magnolia*	Confirmed	PNAD, BBS, NFB, ST	Common (breeder)	Forest

Common Name*	Scientific Name	Occurrence	Information Source**	Relative Abundance (Breeding Status)	Habitat(s)
Yellow-rumped Warbler	*Dendroica coronate*	Confirmed	PNAD, NFB, ST	Common (breeder)	Forest
Palm Warbler	*Dendroica palmarum*	Confirmed	PNAD, BBS, NFB	Common (breeder)	Forest
Blackpoll Warbler	*Dendroica striata*	Confirmed	PNAD, BBS, NFB, ST	Common (breeder)	Forest
Black-and-White Warbler	*Mniotilta varia*	Confirmed	PNAD, BBS, NFB, ST	Common (breeder)	Forest
Northern Waterthrush	*Seirus noveboracensis*	Confirmed	PNAD, BBS, NFB, ST	Common (breeder)	Forest
Common Yellowthroat	*Geothlypis trichas*	Confirmed	PNAD, BBS, NFB, ST	Uncommon (breeder)	Forest
Yellow Warbler	*Setophaga petechia*	Confirmed	BBS, NFB, ST, NFB	Common (breeder)	Forest
Wilson's Warbler	*Wilsonia pusilla*	Confirmed	PNAD, BBS, NFB, ST	Common (breeder)	Forest
Savannah Sparrow	*Passerculus sandwichensis*	Confirmed	PNAD, BBS, ST	Common (breeder)	Barrens
Fox Sparrow	*Passerella liliaca*	Confirmed	PNAD, BBS, ST	Common (breeder)	General
Lincoln's Sparrow	*Melospiza lincolnii*	Confirmed	PNAD, BBS, NFB	Common (breeder)	Barrens
Swamp Sparrow	*Melospiza georgina*	Confirmed	PNAD, BBS, NFB, ST	Common (breeder)	Forest
White-Throated Sparrow	*Zonotrichia albicollis*	Confirmed	PNAD, BBS, ST	Common (breeder)	Forest
Dark-Eyed Junco	*Junco hyemalis*	Confirmed	PNAD, BBS, EBIRD, ST	Common (breeder)	Forest
Rusty Blackbird	*Euphagus carolinus*	Confirmed	PNAD, NFB, ST	Uncommon (breeder)	Wetlands
Red Crossbill	*Loxia curvirostra*	Confirmed	NFB, ACCDC	Uncommon (breeder)	Coniferous forest
American Goldfinch	*Spinus tristis*	Confirmed	PNAD, BBS, ST	Common (breeder)	Forest
Pine Grosbeak	*Pinicola enucleator*	Confirmed	BBS, ST, NFB	Common (breeder)	Forest
Purple Finch	*Carpodacus purpureus*	Confirmed	BBS, ST, NFB	Common (breeder)	Coniferous forest
White-Winged Crossbill	*Loxia leucoptera*	Confirmed	NFB	Common (breeder)	Coniferous forest
Common Redpoll	*Acanthis flammea*	Confirmed	EBIRD, NFB	Common (breeder)	Barrens/forest
Pine Siskin	*Spinus pinus*	Confirmed	BBS, NFB	Common (breeder)	Barrens/forest
Evening Grosbeak	*Coccothraustes vespertinus*	Confirmed	NFB	Common (breeder)	Forest
Pine Grosbeak	*Pinicola enucleator*	Confirmed	BBS, ST, NFB	Common (breeder)	Forest
Wood Duck	*Aix sponsa*	Confirmed	EBIRD, NFB	Uncommon	Wetlands
American Wigeon	*Anas americana*	Unknown		Uncommon (breeder)	Wetlands
Mallard	*Anas platyrhynchos*	Unknown		Common (breeder)	Wetlands
Northern Pintail	*Anas acuta*	Unknown		Uncommon (breeder)	Wetlands

Common Name*	Scientific Name	Occurrence	Information Source**	Relative Abundance (Breeding Status)	Habitat(s)
Green-Winged Teal	*Anas crecca*	Confirmed	NFB	Common (breeder)	Wetlands
Greater Scaup	*Aythya marila*	Unknown		Uncommon (breeder)	Wetlands
Ruffed Grouse	*Bonas umbellus*	Confirmed	BBS	Common (breeder)	Forest
Spruce Grouse	*Falcipennis canadensis*	Confirmed	NFB	Uncommon (breeder)	Forest
Rock Ptarmigan	*Lagopus muta*	Unknown		Uncommon (breeder)	Barrens
American Bittern	*Botaurus lentiginosus*	Confirmed	NFB	Common (breeder)	Wetlands
Sharp-Shinned Hawk	*Accipiter striatus*	Probable		Common (breeder)	Forest
Northern Goshawk	*Accipiter gentilis*	Confirmed	NFB	Common (breeder)	Forest
Peregrine Falcon	*Falco peregrinus anatum*	Unknown		Uncommon	Forest/barrens
American Kestrel	*Falco sparverius*	Confirmed	NFB	Uncommon (breeder)	Barrens
Killdeer	*Charadrius vociferous*	Probable		Uncommon (breeder)	Coastal shoreline
Sanderling	*Calidris alba*	Probable		Common in migration	Coastal shoreline
Whimbrel	*Numenius phaeopus*	Probable		Common in migration	Upland barrens
Ivory Gull	*Pagophila eburnea*	Unknown		Uncommon	Coastal habitats
Short-Eared Owl	*Asio flammeus*	Probable		Uncommon (breeder)	Barrens
Northern Hawk Owl	*Surnia ulula*	Confirmed	EBIRD, NFB	Uncommon (breeder)	Barrens/forest
Boreal Owl	*Aegolius funereus*	Probable		Uncommon (breeder)	Forest
Common Nighthawk	*Chordeiles minor*	Unknown		Unusual	Open forest
Chimney Swift	*Chaetura pelagica*	Unknown		Very uncommon	Wetlands/towns
Hairy Woodpecker	*Picoides villosus*	Confirmed	NFB	Common (breeder)	Forest
American Three-Toed Woodpecker	*Picoides dorsalis*	Unknown		Uncommon (breeder)	Coniferous forest
Black-Backed Woodpecker	*Picoides arcticus*	Confirmed	NFB	Uncommon (breeder)	Coniferous forest
Alder Flycatcher	*Empidonax alnorum*	Probable		Common (breeder)	Forest
Least Flycatcher	*Empidonax minimus*	Unknown		Uncommon (breeder)	Forest
Blue-Headed Vireo	*Vireo solitaries*	Confirmed	BBS, NFB	Uncommon (breeder)	Mixed forest
Red-eyed Vireo	*Vireo olivaceus*	Unknown		Uncommon (breeder)	Mixed forest
Philadelphia Vireo	*Vireo philadelphicus*	Unknown		Uncommon (breeder)	Mixed forest
Horned Lark	*Eremophila alpestris*	Probable		Common (breeder)	Barrens
Bank Swallow	*Riparia riparia*	Unknown		Uncommon (breeder)	Wetlands
Brown Creeper	*Certhia americana*	Probable		Common (breeder)	Forest
Winter Wren	*Troglodytes troglodytes*	Confirmed	BBS, NFB	Uncommon (breeder)	Forest

Common Name*	Scientific Name	Occurrence	Information Source**	Relative Abundance (Breeding Status)	Habitat(s)
Golden-Crowned Kinglet	*Regulus satrapa*	Confirmed	ST	Common (breeder)	Forest
Veery	*Catharus fuscescens*	Unknown		Uncommon (breeder)	Forest
Swainson's Thrush	*Catharus ustulatus*	Confirmed	BBS, ST	Common (breeder)	Forest
European Starling	*Sturnus vulgaris*	Confirmed	NFB	Common (breeder)	Towns
American Pipit	*Anthus rubescens*	Probable		Common (breeder)	Barrens
Bohemian Waxwing	*Bombycilla garrulus*	Probable		Uncommon	Forest
Cedar Waxwing	*Bombycilla cedrorum*	Probable		Uncommon (breeder)	Forest
Tennessee Warbler	*Vermivora peregrine*	Confirmed	BBS, NFB, ST	Common (breeder)	Forest
Northern Parula	*Parula americana*	Unknown		Uncommon (may breed)	Forest
Cape May Warbler	*Dendroica tigrina*	Unknown		Uncommon (breeder)	Forest
Black-Throated Green Warbler	*Dendroica virens*	Confirmed	BBS, NFB, ST	Common (breeder)	Forest
Blackburnian Warbler	*Dendroica fusca*	Unknown		Uncommon (breeder)	Forest
Bay-Breasted Warbler	*Dendroica castanea*	Unknown		Uncommon (breeder)	Forest
American Redstart	*Setophaga ruticilla*	Confirmed	BBS, NFB	Common (breeder)	Forest
Ovenbird	*Seiurus aurocapilla*	Probable		Common (breeder)	Forest
Mourning Warbler	*Oporornis philadelphia*	Confirmed	BBS, NFB	Common (breeder)	Forest
American Tree Sparrow	*Spizella arborea*	Unknown		Uncommon (breeder)	Barrens/forest
Chipping Sparrow	*Spizella passerina*	Unknown		Uncommon (breeder)	Barrens/forest
Song Sparrow	*Melospiza melodia*	Confirmed	NFB	Common (breeder)	Forest
Snow Bunting	*Plectrophenax*	Probable		Common (winter)	Barrens
White-Crowned Sparrow	*Zonotrichia leucophrys*	Unknown		Uncommon (breeder)	Forest
Bobolink	*Dolichoyx oryzivorus*	Unknown		Uncommon (breeder)	Grassland / agricultural fields
Red-Winged Blackbird	*Agelaius phoeniceus*	Unknown		Uncommon (breeder)	Wetlands
Common Grackle	*Quiscalus quiscula*	Probable		Uncommon (breeder)	Towns

* **Bold** font indicates confirmed observations within 5 km of proposed TL 267 ROW.

** Information sources; ACCDC = Atlantic Canada Conservation Data Centre, PNAD = Parks and Natural Areas Division; BBS = Environment Canada Breeding Bird Survey; ST = Stantec Consulting Ltd; NFB = Observations submitted to nf.birds.com from recreational birders, EBIRD = Observations submitted to eBird from recreational birders.

3.2 Avifauna Species at Risk

There are 14 bird species at risk that are known to occur or that potentially occur within the Study Area and surrounding region. These include species that are listed on either Schedule 1 of the federal *SARA* and/or under the *NL ESA* (Table 3).

A general overview of each of these listed and protected species is provided below, including a description of their known breeding range, general biology and the potential for their occurrence in the Study Area. It should be noted that critical habitat has not been designated for any of these species in Newfoundland and/or elsewhere.

Table 3 Avifauna Species at Risk Potentially Occurring within the Study Area

Species*	Scientific Name	*SARA* Status	*NL ESA* Status
Harlequin Duck	*Histrionicus histrionicus*	Special Concern	Vulnerable
Barrow's Goldeneye	*Bucephala islandica*	Special Concern	Vulnerable
Red Knot	*Calidris canutus*	Threatened	Endangered
Olive-Sided Flycatcher	*Contopus cooperii*	Threatened	Threatened
Gray-Cheeked Thrush	*Catharus minimus minimus*	No status	Threatened
Rusty Blackbird	*Euphagus carolinus*	Special Concern	Vulnerable
Red Crossbill	*Loxia curvirostra*	Endangered	Endangered
Piping Plover	*Charadrius melodus melodus*	Endangered	Endangered
Ivory Gull	*Pagophila eburnea*	Endangered	Endangered
Peregrine Falcon	*Falco peregrinus anatum*	Special Concern	Vulnerable
Short-Eared Owl	*Asio flammeus*	Special Concern	Vulnerable
Common Nighthawk	*Chordeiles minor*	Threatened	Threatened
Bobolink	*Dolichonyx oryzivorus*	Threatened	Vulnerable
Chimney Swift	*Chaetura pelagica*	Threatened	Threatened
* Species that are identified in **bold** font are those that have been observed within 5 km of the proposed TL 267			

Harlequin Duck

The harlequin duck (eastern population) breeds on inland rivers and streams from northern New Brunswick to Nunavut, and winters in coastal areas from Newfoundland, south to Maryland, and parts of southwest Greenland (Environment Canada 2007). Breeding habitat generally includes fast flowing river systems (Rodway 1998) while wintering areas are typically comprised of rocky coastline, exposed headlands and subtidal ledges (Robertson and Goudie 1999). Harlequin ducks were originally designated as endangered under *SARA* in 1990, but an increase in their abundance at a number of key wintering areas and the discovery of an additional over-wintering population in southwest Greenland led to a downlisting to Special Concern in 2001 (Environment Canada 2007).

An incidental observation of an adult female harlequin duck and two recently fledged ducklings on the Bay du Nord River (within 5 km of the proposed transmission line) in June 1998 indicates that this

watershed is at least occasionally used by this species. There have been no known, dedicated surveys for this species on this river or others in the region.

Barrow's Goldeneye

The breeding range of Barrow's goldeneye is discontinuous in North America with more than 90 percent of birds occurring in the northwest portion of the continent. The eastern North American population is estimated at just 4,500 individuals. These birds are thought to nest in high elevation lakes north of the St. Lawrence Estuary and the Quebec North Shore (Schmelzer 2006). The overwintering area for 90 percent of this population includes two main regions in the Gulf of St. Lawrence, with the remaining 10 percent using a range of sites elsewhere in Atlantic Canada and in Maine (Savard 1990; Robert et al. 2000). There has been some indication that this species may breed on the Northern Peninsula of Newfoundland (Daury and Bateman 1996), although this has not been confirmed. Coastal locations around Newfoundland where overwintering birds have been observed include Traytown, Port Blandford, Spaniard's Bay, St. Mary's Bay, Stephenville Crossing, Rocky Harbour and at the mouth of the Humber River near Corner Brook (Schmelzer 2006). This species was only observed once (two individuals) within the estuary at Arnold's Cove over 20 years ago. It is possible that birds may overwinter in some of the sheltered bays south of the Study Area, but again these regions have not been formally surveyed.

Red Knot

The red knot is a medium-sized, migratory shorebird that winters in South America and breeds in the Canadian Arctic. There are six subspecies of red knot worldwide, three of which occur in Canada and one of which is found in Newfoundland and Labrador (*rufa* subspecies). Red knots are regularly seen during the fall migration at a number of key stop-over locations around the province. These include the Stephenville Crossing area, St. Paul's Inlet, the northeast coast (Cape Freels), the southern Avalon Peninsula and Bellevue Beach. Red knots have also been observed in small numbers (12 individuals recorded) at the Come by Chance estuary during fall shorebird surveys conducted by the Canadian Wildlife Service between 1978 and 2007 (Garland and Thomas 2009). The distance between this estuary and the closest point along the proposed transmission line is 1.7 km. A total of 167 individuals have been observed during 16 surveys (2003-2011) near Broad Cove at Bellevue Beach (see shorebird locations, Appendix B).

Olive-sided Flycatcher

The olive-sided flycatcher is a medium-sized aerial insectivore that is generally distributed across boreal regions of North America during the breeding season (May-August) and overwinters in Central and South America. Habitat types used during the breeding season include post-fire stands, partially open coniferous forest, and forest edges along riparian areas (Hutto and Young 1999, Altman and Sallabanks 2000; Lance and Phinney 2001). Olive-sided flycatchers are designated as threatened under both *SARA* and the *NL ESA*. The reasons for their observed continent-wide decline are unknown, although habitat degradation in both breeding and non-breeding areas has been implicated (Petit et al. 1993, Altman and Sallabanks 2000). Olive-sided flycatchers are known to breed in Newfoundland and Labrador, although the distribution and abundance of this species is not well understood. The only known source of trend data for Newfoundland and Labrador (i.e., Breeding Bird

Survey data) suggests a population decline over recent decades. Potential threats to local populations may include both temporary and permanent alteration of habitat, changes to prey abundance and availability and nest predation. Olive-sided flycatchers are expected to occur at low density within forested areas along the Study Area in the Western Newfoundland Forest and Central Newfoundland Forest Ecoregions. A single observation of an olive-sided flycatcher has been reported near Arnold's Cove. Critical habitat has not been identified for this species in Newfoundland and Labrador.

Gray-cheeked Thrush

The Newfoundland sub-species of gray-cheeked thrush was historically a common breeder on the Northern Peninsula, the Northeast Coast and along coastal habitats of the Avalon Peninsula and southern Newfoundland. A recent analysis of Breeding Bird Survey data, however, has indicated a precipitous decline in their abundance and distribution since the late 1970s. This quantitative data is further supported by anecdotal accounts of recreational birders who have also observed this declining trend. Newfoundland gray-cheeked thrushes are now absent or uncommon across much of their historical range, although they still appear to be locally abundant in high elevation forests in the Main River / Gros Morne region. The reasons for the decline of gray-cheeked thrushes are poorly understood, but may include long-term changes to habitat quality from forest harvesting practices and/or browsing by non-native moose, nest depredation by non-native red-squirrels and habitat loss on their overwintering range.

Habitat types used by gray-cheeked thrushes in Newfoundland include low, dense coniferous scrub, regenerating conifer forest, and willow and alder thickets. Ongoing research in western Newfoundland also suggests an affinity for structurally complex, old-growth balsam fir forest. Critical and recovery habitat have not yet been described or mapped for gray-cheeked thrushes in insular Newfoundland. A single observation of gray-cheeked thrush was reported over 20 years ago (ACCDC) near Bellevue Beach. This species may occur at low density in the Study Area from late May to September.

Rusty Blackbird

The breeding range of the rusty blackbird includes most boreal forest regions of Canada (including Newfoundland and Labrador) and the northern United States. Over-wintering areas include the eastern United States and southern portions of the eastern provinces of Canada (COSEWIC 2006). Habitats used by this species during the breeding season include riparian forest, sedge meadows, marshes, and the edges of swamps and cultivated fields. The population of this species in Canada has declined by over five percent per year since 1966 (COSEWIC 2006). The primary reason for this decline is thought to be the conversion of over-wintering forest habitat to agricultural and urban landscapes.

Rusty blackbirds are a common breeder at low density in Newfoundland and were recorded along the Bay du Nord River, west of Terra Nova National Park, as well as the Goobies area in recent years (Parks and Natural Areas Division 2012; NF.birds 2012, Stantec Consulting Ltd 2012). This species could occur in appropriate wet forest habitat within the Study Area from early May to mid-September. Densities are expected to be highest within the Western Newfoundland and Central Newfoundland Forest Ecoregions where forest cover is most extensive.

Red Crossbill

The *percna* subspecies of red crossbill is thought to be endemic to eastern Canada and is the primary phenotypic form on the Island of Newfoundland (Hynes and Miller 2014). Red crossbills are widespread at low density across the Island and have been found in a range of locations across eastern, central and western Newfoundland. Populations appear to be nomadic and irruptive in response to conifer cone crops to which they are uniquely adapted to exploit for food (COSEWIC 2004). Specific information on the occurrence of red crossbills in the Study Area is lacking, although the species has been observed foraging in white spruce forest along the edge of the estuary near Come by Chance (NF.Birds). Other observations over the past two decades include multiple sightings (19 individuals between 2003 and 2006) at Bellevue Beach Provincial Park and in Clarenville (eBird Canada).

Piping Plover

The piping plover is a small shorebird that is limited to a number of beach habitats throughout its geographic range. This species historically had a wider breeding distribution around the province but is now thought to be limited to western and southwestern Newfoundland (Calvert et al. 2006). The review of the literature for this study did not yield any records of this species in eastern Newfoundland. The inland route for the proposed transmission line does not cross potential habitat for this species, so the likelihood of their occurrence there is exceptionally low. However, the outflow of the Come by Chance river into Placentia Bay is a known staging area for multiple species of shorebirds during the fall migration, and could conceivably be used by this species on occasion (Appendix B). Again, the distance from this estuary to the closest point along the proposed transmission line ROW is appropriately 1.7 km.

Ivory Gull

The ivory gull has a circumpolar breeding distribution across the high Arctic, with small, scattered colonies in North America, Greenland, and the northern archipelagos of Russia. Its' breeding range in Canada is confined to Nunavut. Ivory gulls winter among the pack ice of the Davis Strait, Labrador Sea, Strait of Belle Isle, and northern Gulf of St. Lawrence. It is observed irregularly along the coastline of the Northern Peninsula and the northeast coast of Newfoundland, particularly during late winter and early spring (Stenhouse 2004). Given the strong association of this species with coastal pack ice during a limited time period, it is very unlikely that this species ever occurs in the Study Area. Its occurrence at a broader, regional scale is also unlikely since the South Coast of Newfoundland and Placentia Bay are typically ice-free.

Peregrine Falcon

The peregrine falcon primarily breeds in coastal and northern areas across Canada. The breeding range of peregrine falcon in Labrador encompasses coastal areas from Black Tickle to Cape Chidley and along larger river valleys in the north (COSEWIC 2007a). The species occurs regularly along coastal areas of Newfoundland during spring and fall migration, but is not known to nest on the Island. Peregrine falcons are not is not known to have been observed in the Study Area or surrounding region. The likelihood that this species utilizes the Study Area as breeding habitat is very low,

although it is likely that some birds may pass through this region (particularly coastal areas near Come by Chance) during spring and fall migration.

Short-eared Owl

Short-eared owls have a nearly global distribution, although only one subspecies (*Asio flammeus flammeus*) occurs in North America. Across their range, short-eared owls are mostly associated with grasslands and barrens of subarctic and temperate environments (Schmelzer 2005). Their populations are typically irruptive and nomadic as they track small mammals across the landscape. Nearly all records of this species in insular Newfoundland have been from coastal regions including the tip of the Burin Peninsula and west of the Connaigre Peninsula. The absence of observations of this species throughout the Study Area and entire Bay du Nord region is likely a result of low survey effort. Given the vast expanse of open, barren habitat in the Study Area, it is possible that short-eared owls occur in this region during both the breeding and migration periods (May to September).

Common Nighthawk

The breeding range of the common nighthawk includes all Canadian provinces and territories, except for Nunavut. Its wintering range includes southern Brazil and regions of eastern Peru and Ecuador (COSEWIC 2007b). The common nighthawk is an aerial insectivore and is associated with open habitats including recently burned forest, clear cuts, barrens and open fields. Like other insectivores, this species has experienced a significant long term decline (1968-2005) throughout its breeding range. The exact reasons for this decline are unclear, although a reduction of insect prey stemming from the wide-scale use of pesticides has been suggested (COSEWIC 2007b). While the species is irregularly recorded in insular Newfoundland during the migration period, it is not known to be a resident breeder on the Island. Common nighthawks were not reported in the literature that was identified and reviewed as part of this study. The probability that they breed within the Study Area is very low, although migrant birds could potentially pass through this region in low abundance.

Bobolink

The bobolink was recently listed as Vulnerable under the *NL ESA,* and is also listed as Threatened under *SARA*. This species breeds along the southern portion of all Canadian provinces including Newfoundland and Labrador. Its overwintering range is southern South America east of the Andes Mountains (COSEWIC 2010). Across its breeding range, bobolinks nest in a range of open habitat including native tall-grass prairie, hayfields, cultivated crop-fields and graminoid peatlands. Bobolinks are thought to be limited to agricultural areas in southwest Newfoundland (Codroy Valley) but historically were more widely distributed in appropriate habitat across the province (Montevecchi and Tuck 1987). There was no reference to this species occurring in the Study Area in the literature reviewed, and it is considered unlikely that bobolinks occur in this region given the absence of preferred habitat.

Chimney Swift

The breeding range of the chimney swift in Canada includes eastern Saskatchewan, southern Manitoba, Ontario, Quebec, New Brunswick and Nova Scotia (COSEWIC 2007c). Although birds are

occasionally recorded on the Avalon Peninsula and in southwestern Newfoundland, there are no confirmed breeding records for this species. Chimney swifts historically used tree cavities for roosting and nesting, but the species is now primarily associated with urban and rural communities where chimneys and other such structures are available for nesting. This species was not recorded in the literature identified and reviewed for this study, and the likelihood that they occur in the Study Area is considered to be extremely low.

3.3 Potentially Important Areas and Times for Avifauna

All habitats along the proposed transmission line right-of-way and within the larger surrounding Study Area do or may provide breeding and foraging opportunities for one or more bird species during at least some time period in the year. Some particular habitats do, however, support greater avian diversity and a disproportionate abundance of food resources. Riparian areas that support coniferous and deciduous forest, a structurally complex shrub layer and a rich understory typically support a wide range of species including many warblers, ground foraging sparrows, woodpecker species and birds of prey. Insect abundance is also generally higher in these sheltered areas and provides a food resource for aerial insectivores including flycatchers, swallows and waxwings. Riparian environments also provide important nesting environments for waterfowl such as Canada goose (such as in various sites within the Bay du Nord Wilderness Reserve), red-breasted mergansers, American black ducks and harlequin ducks (Appendix B).

Important sites for local and migrating birds include the inter-tidal estuary at Arnold's Cove, Bellevue Beach and the inflow of the Come by Chance River with Placentia Bay (Appendix B). Shallow mud-flats that support a variety of invertebrate prey such as insect larva, crustaceans and mollusks and are important for allowing shorebirds to store sufficient energy reserves for long distance flight. These sites support a wide range of shorebirds and other species for a short period of time (mid-August to late September) including the endangered barrow's goldeneye, red knot and red crossbill (*NL ESA* and *SARA*). There are also three identified raptor nests within 5 km of the proposed TL 267. These nests were observed in 2012 and it is unknown what type of raptors nested in these locations and whether or not these nests remain active. An aerial raptor survey along TL 203 on May 29, 2014, observed an active osprey nest on a utility structure near Bellevue and a pair near the transmission line at Come by Chance (Amec Foster Wheeler 2014). There are also a number of identified Canada goose nesting sites near the proposed transmission line (Parks and Natural Areas Division 2015) (Appendix B).

With respect to biologically important time periods, the breeding season is the most energetically demanding time for birds as most species are vulnerable to increased predation and nest disturbance during this life history stage. Disturbance of females from nests can expose eggs to precipitation and cool temperatures and cause clutch failure. Similarly, the disturbance of parents from nestlings can result in predation of the brood by predators. The specific dates for the breeding season vary by species, although the period between mid-May to mid-August generally encompasses the courtship, egg-laying and chick rearing phases of most migrant species in Newfoundland. Other species such as great horned owls and boreal owls initiate breeding in March or April, while cone dependent finches such as red crossbills can nest during most of the year if food is abundant.

4.0 MAMMALS

As noted previously, the purpose of this study is to provide an overview of the occurrence, abundance, distribution, movements and habitat associations of wildlife species - including mammals - that are known or likely to occur in vicinity of the proposed Project, with special emphasis being given to any species at risk that do or may occur in the area as well as any key and potentially sensitive habitats and time periods.

The following sections present and discuss the results of this desk-top study with regard to mammals (excluding caribou, which although referenced briefly for completeness are addressed in a separate study report). In addition to the text and tables that follow in this chapter, mapping for the various wildlife observations / locations, areas and other environmental features that are mentioned in this section is provided in Appendix B.

4.1 Mammals within the Study Area

The Study Area passes through the Maritime Barrens Ecoregion, along with smaller portions of the Central Newfoundland Forest and Western Newfoundland Forest Ecoregion, as well as a portion of the Bay du Nord Wilderness Reserve and other landscape features in the larger, surrounding region. Terrestrial and aquatic habitat types encompassed by this area include dense coniferous forest, open scrub forest, upland barrens, wetlands, and lakes and rivers.This again results in a diverse range of mammal species and species groups being present in the region. The area is also characterized by significant seasonal fluctuations in temperature, snow cover, and primary productivity, which in turn influences the nature and diversity of faunal communities. Mammal species that have evolved in this environment have adapted specialized morphologies and behavioral strategies including larger body size, dense insulative fur, the ability to access subnivean habitats and hibernation. Many of the mammal species that occur in this region of Newfoundland exist at the southern and eastern extreme of their North American distribution. It is also interesting to note that a large percentage of mammals that currently inhabit insular Newfoundland are non-native in origin, having been introduced unintentionally or for commercial or recreational / consumptive purposes.

Table 4 provides an overview of the various mammals species that are known or considered likely (based on the existing and available information) to occur in the Study Area, according to taxonomic order. For each identified species, Table 4 provides information on their expected occurrence in the Study Area, the information source on which this assessment is based, the species' relative abundance, and the particular habitat types in which the species is typically found.

Table 5 then provides general information on each species, including relevant aspects of their life history, habitat associations, and specific information on their potential occurrence within the Study Area and greater landscape.

Table 4 Mammal Species Known or Likely to Occur within the Study Area

Species*	Scientific Name	Occurrence	Relative Abundance	Habitat	Source(s)
Black Bear	*Ursus americanus*	Confirmed	Common	General	Fifield et al. (2013)
Red Fox	*Vulpes vulpes*	Confirmed	Common	General	Jeffery et al. (2004)
Eastern Coyote	*Canis latrans*	Confirmed	Common	General	Fifield et al. (2013)
Canada Lynx	*Lynx canadensis*	Confirmed	Low density	General	Fifield et al. (2013)
Short-Tailed Weasel	*Mustela erminea*	Expected	Common	General	Banfield (1974)
American Mink	*Mustela vison*	Confirmed	Common	Aquatic/riparian	Northcott (1974)
American Marten	*Martes americana*	Unknown	Rare	Forest	Fuller et al. (2007)
River Otter	*Lontra canadensis*	Expected	Common	Aquatic/riparian	Cote et al. (2008)
American Beaver	*Castor canadensis*	Confirmed	Common	Aquatic/riparian	Banfield (1974)
Muskrat	*Ondatra zibethicus*	Confirmed	Low density	Aquatic/riparian	Banfield (1974)
Meadow Vole	*Microtus pennsylvanicus*	Confirmed	Common	Barrens/meadows	Rodrigues (2011)
Red-Backed Vole	*Clethrionomys gapperi*	Confirmed	Unknown	Forest	Rodrigues (2011)
Masked Shrew	*Sorex cinerus*	Confirmed	Common	General	Rodrigues (2011)
Deer Mouse	*Peromyscus maniculatus*	Unlikely	Unknown	Forest	Rodrigues (2011
Red Squirrel	*Tamiasciurus hudsonicus*	Confirmed	Common	Forest	Payne (1976)
Snowshoe Hare	*Lepus americanus*	Confirmed	Common	Forest	Joyce (2002)
Arctic Hare	*Lepus arcticus*	Unlikely	Unknown	Barrens	Hearn et al. (1987)
Moose	*Alces alces*	Confirmed	Common	General	NL Wildlife Division website
Woodland Caribou	*Rangifer tarandus*	Confirmed	Locally common	General	Lewis and Mahoney (2014)
Little Brown Bat	*Myotis lucifugus*	Unknown	Unknown	General	NL Wildlife Division website
Hoary Bat	*Lasiurus cinereus*	Unknown	Unknown	Forest	NL Wildlife Division website
Northern Long-eared Bat	*Myotis septentrionalis*	Unknown	Unknown	Forest	NL Wildlife Division website

* Species indicated in **bold** text have been confirmed within 5 km of the proposed Project.

Table 5 Overview of Mammal Species Known or Likely to Occur in the Study Area

Description / Range	Species Summary	Sources(s)
Black Bear		
Overview	• Black bears are native to Newfoundland and are sufficiently morphologically and genetically distinct to have been considered a distinct subspecies (*Ursus americanus hamiltoni*). • Although mostly associated with forested habitats and areas of human habitation, black bears also inhabit areas of scrub forest and barrens. • Given their omnivorous diet and seasonal shifts in food availability among habitats, black bear foraging patterns are variable and bears can move considerable distances to find food as well as suitable denning sites and mates.	Hillman and Yow (1986); Paetkau and Strobeck (1996); Macdonald (2006); Fifield et al. (2013); Fifield and Lewis (2013)
Occurrence within the Study Area	• Black bears are known to occur in both forested and barren-ground habitats across most of insular Newfoundland including the Study Area (excluding the isthmus of the Avalon Peninsula). • From 2009-2011, biologists with the NL Department of Environment and Conservation used non-invasive genetic sampling to determine the occurrence and density of black bears within a portion of the area used by the Middle Ridge caribou herd for calving. They documented that the home ranges of multiple individuals overlap the Study Area but that the observed density is among the lowest recorded for the species in North America.	
Red Fox		
Overview	• Red fox have a circumpolar distribution and are a common resident of most ecozones across Canada. • They are considered a generalist species and can occupy a range of habitats including sub-arctic tundra, forests, grasslands, agricultural landscapes and areas of human habitation. Their diet is varied, though small mammals, snowshoe hares, and birds constitute their main source of food in remote, boreal landscapes. • A heavy reliance on cyclic small mammal prey is understood to explain the synchronous fluctuations in abundance observed for red fox populations across their range. • Red fox are extensively trapped for their fur throughout their range in Newfoundland and Labrador. • Populations are also occasionally managed to control outbreaks of rabies as red foxes are one of the transmission vectors of this virus.	Voigt (1987); Sklepkovych and Montevecchi (1996); Kurki et al. (1998); Forsey and Baggs (2001); Smith and Wilkinson (2003); Jeffery et al. (2004)
Occurrence within the Study Area	• Although no formal studies of red fox abundance and distribution in the Study Area are available, other studies have documented that red foxes occur throughout all areas of Newfoundland, including the ecoregions crossed by the proposed transmission line.	
Eastern Coyote		
Overview	• In the early 1900s coyotes began moving eastward from their historic range in western North America and now occur in all eastern states and Canadian provinces. • Coyotes are considered generalists with respect to patterns of habitat use and food choice and are highly adaptable when	Moore and Parker (1992); Parker (1995); Crête et al. (2001);

Description / Range	Species Summary	Sources(s)
	exposed to novel environments and opportunities for range expansion. • Coyotes now inhabit boreal and temperate forests, prairie habitats, agricultural landscapes and areas of human habitation. • Eastern coyotes were first discovered in insular Newfoundland in the late 1980s and now inhabit all regions of the province.	Gompper (2002); McGrath et al. (2009); Fifield et al. (2013); Fifield and Lewis (2013)
Occurrence within the Study Area	• A predator density study conducted by Fifield and Lewis (2013) showed that eastern coyotes maintained home ranges in the Middle Ridge / Bay du Nord Wilderness area and also exhibited transient behaviour in which they traversed large distances across the Island. • Furthermore, eastern coyotes in the Middle Ridge area maintained notably larger territories than their conspecifics elsewhere in North America. • Like black bears, eastern coyotes also function as a significant predator of caribou calves in the Middle Ridge / Bay du Nord Wilderness area.	
Canada Lynx		
Overview	• Lynx are distributed throughout forested regions of Canada and Alaska and into portions of the northern United States, closely paralleling the range of snowshoe hare, its primary prey. • Although lynx occupy sub-arctic forests similar in composition to those of this Study Area, they reach their highest densities in dense boreal and mixed-wood forests where hare numbers are greater and protective cover (a feature important to juvenile survival) is more extensive.	Legendre et al. (1978); Boutin et al. (1995); Mahoney et al. (1990); Poole (2003); Mowat and Slough (2003); McCarthy et al. (2011); Fifield et al. (2013)
Occurrence within the Study Area	• Lynx are native to insular Newfoundland and are known to be widely distributed throughout the Island. • Multiple studies of predator-specific mortality on woodland caribou confirm that lynx inhabit the Maritime Barrens Ecoregion and function as predators of caribou calves. • Lynx are known to occur at low density throughout both forested and barren-ground regions of the Study Area.	
Short-tailed Weasel		
Overview	• Short-tailed weasels are widely distributed across Canada and much of the northern United States. • Their diet primarily consists of small mammal prey and they occur in a wide range of habitats including early successional forest, bogs, meadows, forest edges and riparian areas. • Given their small body size, short-tailed weasels are often undetected during standard tracking surveys. • However, anecdotal reports from trappers in north-eastern Newfoundland suggest that the species is relatively common.	Banfield (1974); King (1983); Fagerstone (1987);
Occurrence within the Study Area	• Short-tailed weasels are considered common throughout the Study Area.	
American Mink		
Overview	• American mink are a common species across most of Canada south of the treeline.	Banfield (1974); Northcott (1974)

Description / Range	Species Summary	Sources(s)
	• Mink are not native to the Island of Newfoundland, having been intentionally introduced to establish commercial fur farming in 1934. The initial introductions occurred near St. John's and Springdale. Later introductions, including to the wild on offshore islands in Notre Dame and Bonavista Bays, occurred over the next two decades. • Wild bred mink, along with escapees from fur farms, enabled the species to establish across most of the island including the Bay d'Espoir region.	
Occurrence within the Study Area	• Mink are ubiquitous and abundant across the island and are a valued species to recreational trappers. • Mink are strongly associated with aquatic habitats throughout their geographic distribution and undoubtedly occur throughout the Bay du Nord/Western Avalon region.	
Newfoundland Marten		
Overview	• The genetically unique population of American marten on the Island of Newfoundland (*Martes americana atrata*) is designated as threatened under provincial and federal legislation. • Marten were historically distributed throughout most forested areas of insular Newfoundland. • Habitat alteration and incidental mortality associated with snaring and trapping resulted in a long-term range contraction and a decline in abundance.	Bergerud (1969); Gosse and Hearn (2005);, Fuller et al. (2007); Hearn et al. (2010); Newfoundland Marten Recovery Team (2010)
Occurrence within the Study Area	• Marten were known to occur in forested areas in the Bay d'Espoir region up to the early 1900s but were extirpated in the following decades. • A limited hair-sampling survey in the Conne River watershed was conducted by the Miawpukek First Nation and Parks Canada in 2011 but failed to yield any evidence of marten. • However, a road-killed marten collected along the Bay d'Espoir highway (near Twillick Brook) in the early 2000s raises the possibility that marten may be re-establishing in the area. • Furthermore, probability of occupancy modelling conducted by the Canadian Forest Service suggests that habitat conditions are adequate to support a small population of marten in heavily forested portions of the Central Newfoundland and Western Newfoundland Forest Ecoregion near Bay d'Espoir. • The probability of occurrence in the portion of the Study Area that passes through the Maritime Barrens Ecoregion and the western Avalon is considered to be exceptionally low. • Marten are strongly associated with forested habitats thus the virtual absence of significant cover would preclude marten from inhabiting this region.	
River Otter		
Overview	• River otters are a semi-aquatic, piscivourous species that are widely distributed across most of Canada and eastern North America. • In Newfoundland, river otters occupy both freshwater habitats and marine / coastal environments and are known to inhabit all regions of the province where these habitats occur. • Similar to American mink they are a valued fur resource and are	Northcott and Slade (1976); Raesly (2001); Cote et al. (2008)

Description / Range	Species Summary	Sources(s)
	targeted by licensed trappers.	
Occurrence within the Study Area	• The population of river otters inhabiting inner Placentia Bay (near the Come by Chance area) is particularly abundant and has been the subject of ecological research for decades (see Appendix B). • Although formal surveys for this species are lacking, river otters are expected to utilize all appropriate habitats throughout the Study Area.	
American Beaver		
Overview	• Beavers are a characteristic species of the boreal forest and historically were heavily exploited for their valuable fur and as a source of food for both aboriginal communities and European settlers. • Their commercial importance has declined over the last century, although smaller scale trapping still occurs throughout their range in Newfoundland. • Beavers are associated with a wide variety of forest types throughout their geographic range including mixed coniferous-deciduous forest, temperate hardwood forest, alder thickets, and barren habitat with marginal tree cover, although throughout their range, they are consistently and strongly associated with wetland habitat. • Beavers construct lodges within and adjacent to aquatic habitats as a strategy to reduce predation and as a means to more efficiently harvest aquatic plants and hardwood species adjacent to these water bodies. As a result, beavers exert a major influence in modifying landscape structure and composition.	Banfield (1974); Boyce (1981); Basey et al. (1988); Donker and Fryxell (1999)
Occurrence within the Study Area	• Beavers are widely distributed throughout forested and semi-forested regions of insular Newfoundland and are expected to occur throughout and adjacent to wetlands in the Study Area. • Density estimates for this region are unavailable, but are expected to be low given the vast proportion of un-forested habitat throughout the Study Area.	
Muskrat		
Overview	• Muskrat are another widely distributed, semi-aquatic mammal of the boreal forest and taiga regions that have also been heavily exploited as a furbearing species. • Muskrat are associated with a variety of wetland habitats including lakes, ponds, rivers, and marshes. • They are known to occur in appropriate habitat throughout insular Newfoundland though regional data on densities or population trends are unknown.	Banfield (1974); Perry (1982)
Occurrence within the Study Area	• Although there are no known systematic surveys for muskrat for this region, their occurrence in suitable habitat throughout the Study Area is likely. • Observations of muskrat near the eastern (Goobies), western (Twillick Brook), and interior portions of the Study Area (Kaegudeck Lake) suggest that they are distributed throughout the Bay du Nord region (see Appendix B).	

Description / Range	Species Summary	Sources(s)
Meadow Vole		
Overview	• The meadow vole is one of the most widely distributed rodents in Canada ranging from Newfoundland and Labrador to the Pacific coast. • Habitats utilized by this species include wet meadows, agricultural fields, burned forest, clear-cuts, and salt marshes that have adequate protective cover and an abundance of preferred forage species. • Meadow voles exhibit dramatic fluctuations in their populations and consequently influence the reproductive performance of small mammal predators including hawks, owls, American marten, red foxes and other carnivores.	Banfield (1974) Andersson and Erlinge (1977); Boonstra et al. (1998); Fryxell et al. (1999); Simon et al. (2002); Rodrigues (2011)
Occurrence within the Study Area	• Small mammal monitoring conducted by the NL Department of Environment and Conservation has confirmed that this species occurs around the Bay d'Espoir region. • Given that meadow voles are a native species with a long evolutionary history in insular Newfoundland, it is expected that they occur in all areas with appropriate habitat throughout the Study Area.	
Red-backed Vole		
Overview	• Southern red-backed voles are also widely distributed across Canada, although their expansion to insular Newfoundland only occurred since the late 1990s. • This species is most abundant in forested habitats but are also known to utilize openings following forest harvesting.	Hayward et al. (1999); Rodrigues (2011)
Occurrence within the Study Area	• Red backed voles were first captured along the Bay d'Espoir highway in 2008 and were later captured along the eastern portion of the Study Area near Come by Chance in 2010. • They now constitute the most abundant small mammal species captured during monitoring efforts. • This species is not yet known to occur on the Avalon or Burin Peninsulas but is likely to occur throughout all of south-central Newfoundland, including the Study Area.	
Masked Shrew		
Overview	• Masked shrews are widely distributed across Canada and occupy a diverse range of habitats including coniferous forest, meadows, and Arctic tundra. • Masked shrews are not native to Newfoundland, having been intentionally introduced to the island in 1958. • The species now occurs in all regions of the province though is apparently not used extensively as a prey species by carnivores.	Follinsbee (1971); Banfield (1974); Rodrigues (2011)
Occurrence within the Study Area	• Small mammal monitoring has detected this species at high density (relative to other small mammals) in all areas where trapping occurred, including the Bay d'Espoir region. • Therefore, masked shrews are expected to occur within the Study Area.	
Deer Mouse		
Overview	• The deer mouse is found throughout a range of terrestrial habitats in all regions of Canada south of the tree-line. • Their occurrence has been confirmed for insular Newfoundland,	Banfield (1974); Rodrigues (2011)

Description / Range	Species Summary	Sources(s)
	although their distribution appears to be restricted to western Newfoundland.	
Occurrence within the Study Area	• Small mammal monitoring by the NL Wildlife Division has not yielded a single capture along the Bay d'Espoir highway or the Milltown area • This species is therefore not expected to occur in the Study Area	
Red Squirrel		
Overview	• Red-squirrels are a common resident of boreal and temperate forests and occur across most of mainland Canada, including insular Newfoundland. • Red squirrels were intentionally introduced to insular Newfoundland in the early 1960s and are now ubiquitous across the Island. • The species relies almost exclusively on the reproductive buds and seeds of coniferous species as a food source, and so are limited to forested landscapes with adequate cone production. • Red squirrels are not targeted by trappers but are incidentally captured in traps set for other furbearers. • They are preyed upon by a range of avian and mammalian predators including great horned owls, northern goshawks, American marten, and red foxes, and in turn are known to exert significant predation pressure on juvenile snowshoe hare and songbird eggs.	Brink and Dean (1966); Banfield (1974); Payne (1976); O'Donoghue (1994); Sieving and Willson (1998); Wirsing et al. (2002); Gosse and Hearn (2005)
Occurrence within the Study Area	• Red squirrels likely occur in isolated patches of conifer or scrub forest in the Study Area and would likely be most abundant in the western portion of the region where coniferous forest cover is most extensive.	
Snowshoe Hare		
Overview	• Snowshoe hare were introduced to insular Newfoundland in the late 1800s to provide food and hunting opportunities for local residents. • Optimal habitat for this species is early successional forest with an abundance of deciduous trees and shrubs. • Snowshoe hares have an important functional role in the boreal forest ecosystem as they are a major food source for a variety of mammalian and avian predators. • Snowshoe hare abundance is known to cycle dramatically, with peak numbers occurring at approximately ten-year intervals. • Therefore, population densities of their predators that rely heavily on snowshoe hares also fluctuate in relation to their abundance.	Pietz et al. (1983); Krebs et al. (2001); Joyce (2002)
Occurrence within the Study Area	• Snowshoe hare are distributed across all areas of insular Newfoundland and are expected to occur in forested and semi-forested habitats throughout the Study Area.	

Description / Range	Species Summary	Sources(s)
Arctic Hare		
Overview	• Arctic hare reach the southern limit of their geographic distribution along the Long Range Mountains of western and south-western Newfoundland. • Although Arctic hare are currently thought to be limited to this portion of the province, their historical distribution remains unclear. • Earlier authors believed that Arctic hare were more abundant and widely distributed prior to the introduction of snowshoe hares in the late 1800s. They speculated that Arctic hares declined as a result of interspecific competition with snowshoe hares for food resources and/or experienced higher rates of predation as lynx density increased.	Howley (1913); Cameron (1958); Dodds (1960); Bergerud (1967); Hearn et al. (1987)
Occurrence within the Study Area	• Portions of the Study Area that cross the Maritimes Barrens Sub-region likely contains suitable habitat for Arctic hares, although there is no scientific or anecdotal evidence to suggest that this species occurs in the Study Area.	
Moose		
Overview	• Moose were intentionally introduced to insular Newfoundland in 1878 and 1904 and colonized the Island following the extirpation of their primary wild predator (wolves) in 1932. • The species is now widely distributed across the Island and is important from an economic and recreational perspective. • Moose have also affected forest composition and structure through long-term browsing and have indirectly modified habitat quality for a range of other species.	Pimlott (1953, 1959); McLaren et al. (2004); Gosse et al. (2011); NL Wildlife Division website
Occurrence within the Study Area	• Moose are known to occur throughout the Study Area, although they likely reach higher densities within forested regions where preferred forage species (hardwoods and aquatic plants) are more prevalent.	
Order Chiroptera (Bats)		
Overview	• Three species of bats are known to occur in insular Newfoundland: little brown myotis, northern myotis, and hoary bat. • Little brown myotis are the most common bat species in Canada and are the most familiar to the public as they often roost in buildings and forage in areas where they are highly visible (such as over lakes, around streetlights). • Northern myotis and hoary bats are most common in forested habitats. • All three bat species are aerial insectivores and are associated with a variety of structures including trees, buildings, and caves which are used as sleeping and roosting sites. • The status of two of these species (little brown myotis and northern myotis) has received increased conservation attention in recent years as an emerging fungal disease (the white-nose syndrome) has decimated populations of these bats throughout eastern North America. • Consequently, both of these species were designated as	Frick et al. (2010); Park and Broders (2012); NL Wildlife Division website

Description / Range	Species Summary	Sources(s)
	Endangered under the *SARA* in 2013	
Occurrence within the Study Area	• Both little brown myotis and northern myotis are widespread at low density across insular Newfoundland and were recently detected in the Bay d'Espoir region during systematic surveys. • Their distribution and abundance across the interior portion of the Study Area is unknown.	

4.2 Mammal Species at Risk

Only one mammal species is listed and protected under the *NL ESA* for insular Newfoundland - the threatened Newfoundland marten, which is also listed under *SARA*. Additional mammal species listed under *SARA* include little brown bat and northern long-eared bat, both of which are considered endangered (Table 6).

Table 6 Summary of Mammal Species at Risk in Newfoundland

Species	Scientific Name	*SARA* Status	*NL ESA* Status
Newfoundland marten	*Martes americana*	Threatened	Threatened
Little brown bat	*Myotis lucifugus*	Endangered	-
Northern long-eared bat	*Myotis septentrionalis*	Endangered	-

There was a single report of Newfoundland marten near Twillick Brook along the Bay d'Espoir highway in the early 2000s (see Appendix B), but there have been no recorded reports since that time. There have been no known reports of little brown bats or Northern long-eared bats within the Study Area.

4.3 Potentially Important Areas and Time Periods for Mammals

Generally speaking, all terrestrial and aquatic habitats within the Study Area provide, or may provide some functional value to resident mammals for foraging, reproduction, and concealment from predators. Dense coniferous forests, for example, provide foraging habitat for Canada lynx and woodland caribou, aquatic habitats are used by beavers, muskrat and river otters, and wetlands can provide food and microhabitats for meadow voles and other small mammals. Except for known calving and over-wintering areas which have been delineated for woodland caribou (see Caribou Study, Amec Fw 2015), no particularly important or sensitive locations have been identified for mammal species within the Study Area.

With respect to particularly important time periods, the late winter and early spring are particularly important seasons as most mammal species give birth during this time and face the increased energetic demands associated with nursing and caring for their young. Furthermore, adults are often in a reduced physical condition as they may have experienced food shortages during the preceding winter months.

5.0 SUMMARY AND CONCLUSION

The purpose of this study has been to provide an overview of the occurrence, abundance, distribution, movements and habitat associations of wildlife species (including avifauna and mammals) that are known or are likely to occur in the vicinity of the proposed Project, with special emphasis given to any species at risk that do or may occur in the area. A key objective of this study has also been to identify and describe any key and potentially sensitive areas (habitats) and time periods with respect to avifauna and mammals. The study approach and methods involved the identification, review, analysis and summary of existing and available information and datasets on avifauna and mammal species in the region, including published and unpublished reports, journal articles, research theses, government documents and datasets and other information sources. In addition to any direct and focused field investigations and surveys for wildlife that have occurred previously in parts of the region, inferences on species occurrence have been made based on their known presence and distribution within similar habitats at the ecoregion scale or beyond.

The proposed transmission line will pass through a variety of terrestrial and aquatic habitat types, including dense coniferous forest, open scrub forest, upland barrens, wetlands, lakes and rivers. The Project will pass through the southern portion of the current boundaries of the Bay du Nord Wilderness Reserve, a vast and relatively remote landscape of ponds, rivers, barrens, bogs and fens, forests and thickets, as well as crossing key landscape features in the region such as the Bay du Nord River watershed and others. It will also occur within three of the Ecoregions that have been identified on the Island of Newfoundland, including (primarily) the large Maritime Barrens Ecoregion, along with smaller portions of the Central Newfoundland Forest and Western Newfoundland Forest Ecoregion at its western ends and Central Newfoundland Forest at its eastern end. This overall habitat diversity results in a diverse range of wildlife species and functional groups being present in the region.

5.1 Summary of Avifauna Presence within the Study Area

A number of taxonomic and functional groups of avifauna are relatively well represented in the Study Area including waterfowl, shorebirds, wood warblers, birds of prey, sparrows and finches. Collectively, these species inhabit all terrestrial and riparian habitats including dense coniferous and mixed-wood forest, open spruce woodland, barrens, bog, and both inland and coastal shorelines. Common species that are known to breed in the area include American black duck, Canada goose, greater yellowlegs, spotted sandpiper, yellow-rumped warbler, blackpoll warbler, osprey, great-horned owl, white-throated sparrow and pine grosbeak. Less common species that have been documented to occur in the Study Area, but for which demographic information is lacking, include gray-cheeked thrush, Northern hawk-owl, blackburnian warbler, and least sandpiper. Other species that may utilize the Study Area during migration include semi-palmated plover, white-rumped sandpiper, American golden plover and other shorebird species. Overall, the assemblage of bird species found in the Study Area is reflective of community composition that has been more extensively described for this region of Newfoundland.

There are 14 designated species at risk that either breed in insular Newfoundland or occur there occasionally during migration. Of this group, seven species have been documented to occur within 5 km of the proposed Project, including harlequin duck, barrow's goldeneye, red knot, gray-cheeked

thrush, olive-sided flycatcher, rusty blackbird and red crossbill. Other species at risk that may occur in this region include short-eared owl.

Particularly important areas for birds near the proposed Project and its surrounding Study Area have been identified based on existing observational data and other sources, and include the Bay du Nord River, several nesting sites for Canada geese within the Bay du Nord Wilderness Area, the Come by Chance River Estuary, Arnold's Cove and Bellevue Beach.

5.2 Summary of Mammal Presence within the Study Area

Again, a variety of terrestrial and aquatic habitats are crossed by the proposed transmission line, including dense coniferous forest, open scrub forest, upland barrens, marshes, lakes and rivers. This habitat diversity allows occupancy by a diverse range of functional groups including small mammals and other rodents (meadow voles and red-squirrels), mid-trophic level carnivores (short-tailed weasels and American mink), ungulate browsers (moose and woodland caribou), and upper-trophic level predators and scavengers (such as eastern coyotes and black bears). In total, 14 out of a possible 22 mammal species that occur in natural habitats on the Island of Newfoundland have been identified in the Study Area. Species that are expected to be most widely distributed include snowshoe hare, red squirrel, meadow vole, beaver, red fox, and eastern coyote. Species not expected or unknown to occur in the Study Area include those with a restricted distribution on the Island or species for which formal surveys are lacking. Listed species include Newfoundland marten (threatened; *SARA/NL ESA*), little brown bat (endangered; *SARA*), and northern long-eared bat (endangered; *SARA*). The occurrence of these species in the Study Area is largely unknown, although some are considered unlikely to occur in the area.

The presence and abundance of individual mammal species is ultimately influenced by intrinsic factors and their trophic level status. For example, small mammal species produce multiple large litters throughout the year and are likely distributed across the Study Area. Conversely, large-bodied, upper trophic level carnivores require extensive home ranges to secure adequate food resources so are inherently low in abundance. Species richness and density are therefore undoubtedly variable throughout the Study Area and reflect habitat complexity, food availability and abiotic factors such as weather and snow depth. Species diversity and abundance is expected to be greatest in forested riverine valleys (Conne River and the Bay du Nord River) and lower in non-forested portions of the Maritime Barrens Ecoregion.

Additional details on the various wildlife observations, locations, areas and other environmental features that are mentioned in this report are provided in Appendices A and B.

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Appendix A

Summary of ACCDC Observations Within 5 km of the Proposed TL 267

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Table A1: Summary of ACCDC Observations within 5 km of the Proposed TL 267

Scientific Name	Common Name	Obs #	Month	Day	Year	*NL ESA*	*SARA*	Source
Hirundo rustica	Barn Swallow	5	5	21	2011	-	-	Nf.Birds
Bucephala islandica	Barrow's Goldeneye	2	11	30	1993	Vulnerable	Special Concern	CWS
Chroicocephalus ridibundus	Black-headed Gull	34	2	14	2010	-	-	NF.Birds
Catharus minimus	Gray-cheeked Thrush	0	6	24	1990	Vulnerable	-	SSAC Report
Falco rusticolus	Gyrfalcon	1	4	26	2011	-	-	Nf.Birds
Histrionicus histrionicus	Harlequin Duck	1	6	0	1998	Vulnerable	Special Concern	Pers. Comm.
Histrionicus histrionicus	Harlequin Duck	1	6	0	1998	Vulnerable	Special Concern	Email
Circus cyaneus	Northern Harrier	2	8	24	2005	-	-	Nf.Birds
Aegolius acadicus	Northern Saw-whet Owl	0	5	18	2012	-	-	WD
Contopus cooperi	Olive-sided Flycatcher	1	6	20	2003	Threatened	Threatened	NF.Birds
Loxia curvirostra	Red Crossbill	1	9	2	2003	Endangered	Endangered	NF.Birds
Loxia curvirostra	Red Crossbill	1	7	20	2006	Endangered	Endangered	Incidental
Loxia curvirostra	Red Crossbill	1	9	6	2006	Endangered	Endangered	Email
Loxia curvirostra	Red Crossbill	1	9	3	2006	Endangered	Endangered	Email
Loxia curvirostra	Red Crossbill	1	9	4	2006	Endangered	Endangered	Email
Loxia curvirostra	Red Crossbill	2	9	2	2003	Endangered	Endangered	Nf.Birds
Loxia curvirostra	Red Crossbill	5	9	3	2006	Endangered	Endangered	Nf.Birds
Loxia curvirostra	Red Crossbill	2	9	4	2006	Endangered	Endangered	Nf.Birds
Loxia curvirostra	Red Crossbill	5	8	8	2006	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	1	9	20	2005	Endangered	Endangered	CWS
Calidris canutus	Red Knot	2	9	24	2005	Endangered	Endangered	CWS
Calidris canutus	Red Knot	1	9	29	2006	Endangered	Endangered	CWS

Scientific Name	Common Name	Obs #	Month	Day	Year	*NL ESA*	*SARA*	Source
Calidris canutus	Red Knot	1	9	30	2006	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	3	8	26	2009	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	1	1	27	2003	Endangered	Endangered	CWS
Calidris canutus	Red Knot	1	1	28	2003	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	4	9	23	2007	Endangered	Endangered	CWS
Calidris canutus	Red Knot	30	9	4	2000	Endangered	Endangered	CWS
Calidris canutus	Red Knot	30	9	4	2000	Endangered	Endangered	CWS
Calidris canutus	Red Knot	3	8	22	2000	Endangered	Endangered	CWS
Calidris canutus	Red Knot	3	8	23	2000	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	18	9	3	2002	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	1	8	9	2003	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	12	8	23	2003	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	11	9	18	2004	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	15	9	7	2005	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	1	8	14	2006	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	11	8	25	2008	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	2	8	21	2009	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	2	8	29	2010	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	16	9	18	2011	Endangered	Endangered	Nf.Birds
Calidris canutus	Red Knot	8	8	29	2010	Endangered	Endangered	Nf.Birds
Buteo lagopus	Rough-Legged Hawk	1	8	11	2002	-	-	Nf.Birds

Appendix B

Wildlife Observations and Identified Areas

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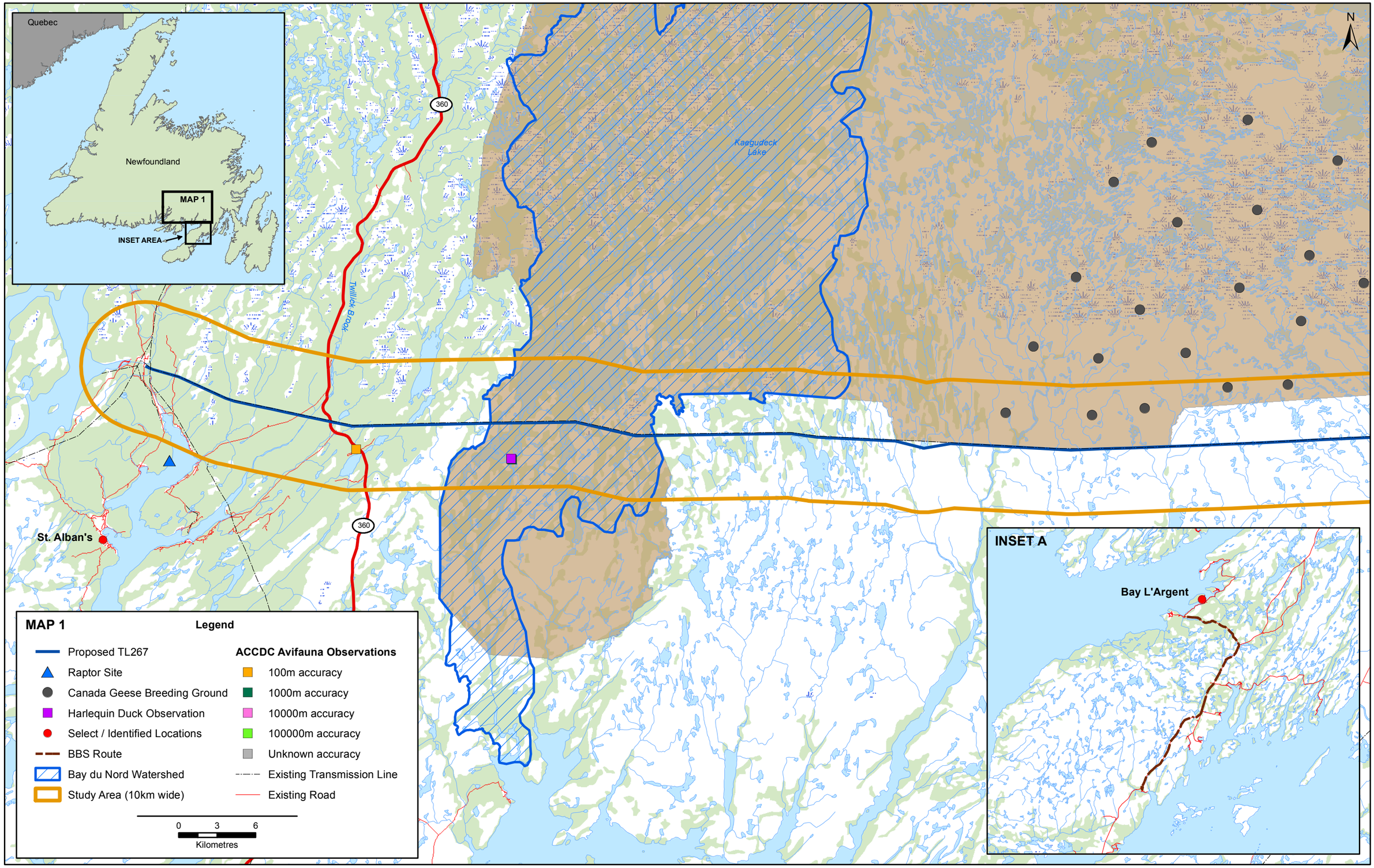

Quebec
Newfoundland
MAP 1
INSET AREA
N
360
Twillick Brook
Kaegudeck Lake
St. Alban's
INSET A
Bay L'Argent
MAP 1
Legend
Proposed TL267
Raptor Site
Canada Geese Breeding Ground
Harlequin Duck Observation
Select / Identified Locations
BBS Route
Bay du Nord Watershed
Study Area (10km wide)
ACCDC Avifauna Observations
100m accuracy
1000m accuracy
10000m accuracy
100000m accuracy
Unknown accuracy
Existing Transmission Line
Existing Road
0
3
6
Kilometres

N

Goobies

Swift Current

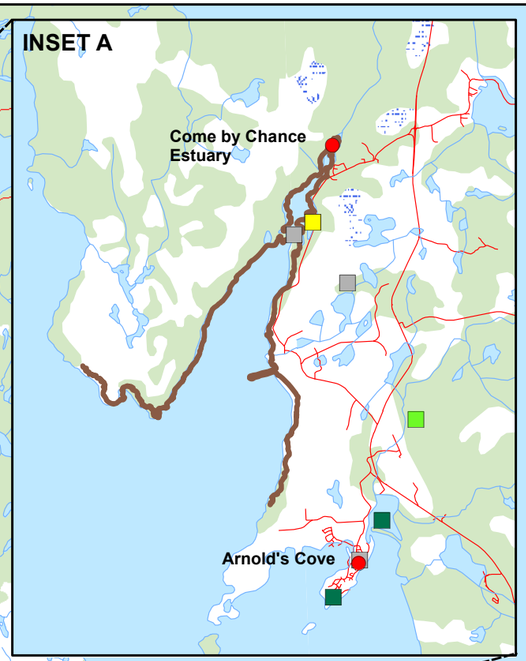
Come by Chance Estuary

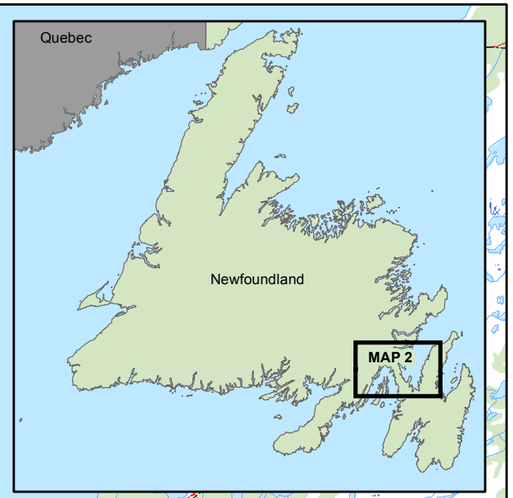
Arnold's Cove

Placentia Bay

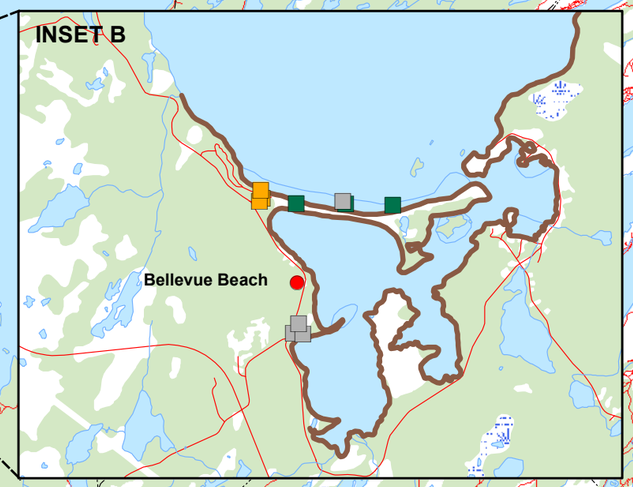
Bellevue Beach

INSET A





INSET B



MAP 2 **Legend**

- Proposed TL267
- Raptor Site
- Canada Geese Breeding Ground
- Barows Goldeneye Observation
- Select Identified Locations
- Shorebird Area
- Study Area (10km wide)

ACCDC Avifauna Observations

- 100m accuracy
- 1000m accuracy
- 10000m accuracy
- 100000m accuracy
- Unknown accuracy
- Existing Transmission Line
- Existing Road

0 3 6
Kilometres