
Labrador – Island Transmission Link

Furbearer and Small Mammal Supplementary Report

Labrador Transmission Corridor Option: Muskrat Falls to the Strait of Belle Isle

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1.0 INTRODUCTION

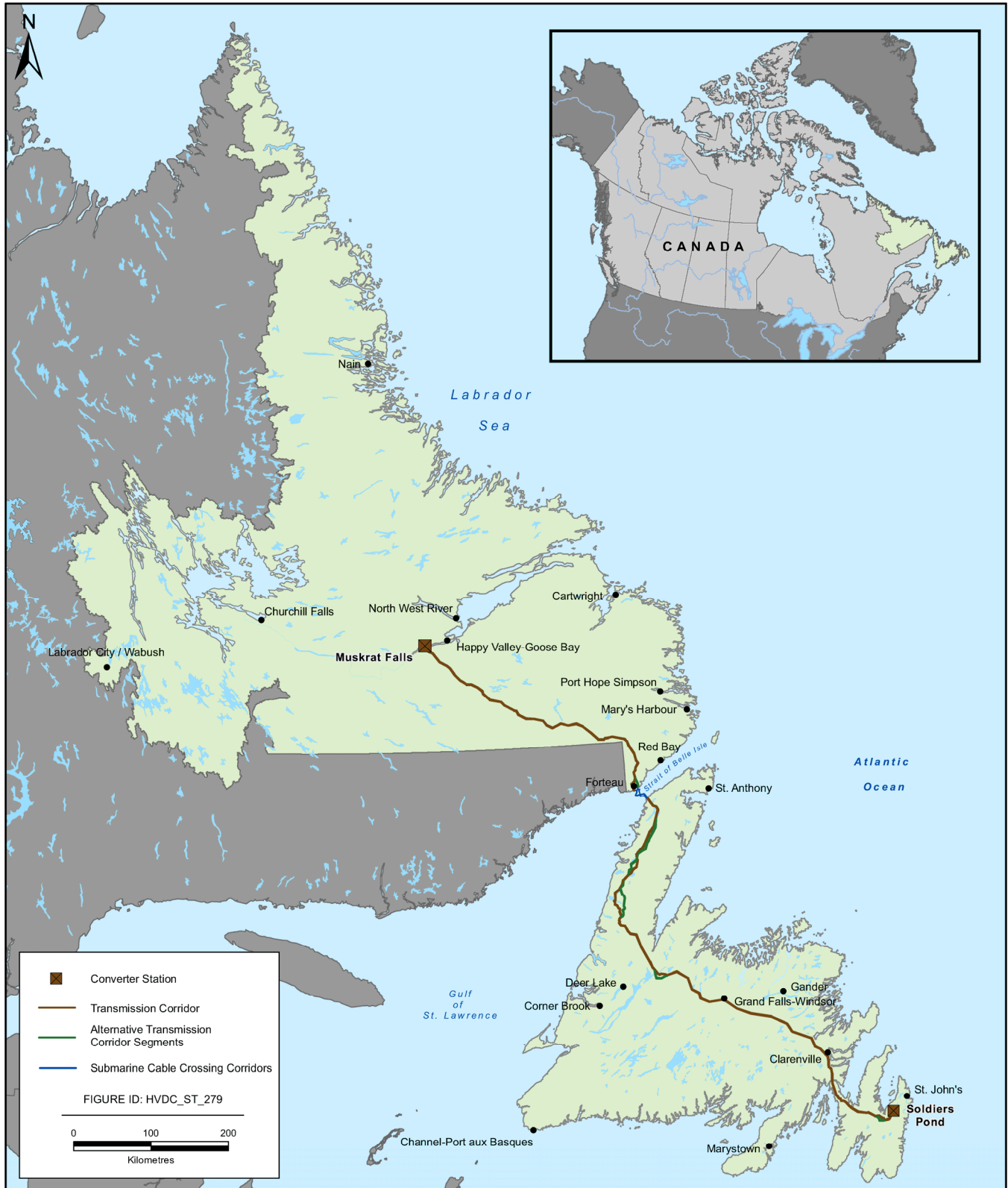
Nalcor Energy is proposing to develop the Labrador-Island Transmission Link (the Project), a High Voltage Direct Current (HVdc) transmission system extending from Central Labrador to the Island of Newfoundland's Avalon Peninsula.

The Environmental Assessment (EA) process for the Project was initiated in January 2009 and is in progress. An Environmental Impact Statement (EIS) is being prepared by Nalcor Energy, which will be submitted for review by governments, Aboriginal and stakeholder groups and the public. In preparation for and support of the Project's EA, a series of environmental studies have been completed to provide information on the existing biophysical and socioeconomic environments in and near the Project Area.

At the time of commencement of the EA and these associated environmental studies, the Labrador component of the Project included a converter station facility at Gull Island on the lower Churchill River, as well as a proposed transmission corridor extending from Gull Island to the Strait of Belle Isle. In mid-November 2010, Nalcor Energy advised the provincial and federal governments that it would also be assessing the potential option of locating the Project's Labrador converter station at or near the Muskrat Falls site on the lower Churchill River. If that were to be the case, the Labrador transmission corridor would potentially extend from Muskrat Falls to the Trans Labrador Highway (Phase 3) (TLH-3), and then follow generally along the south side of the highway to approximately its southernmost point before meeting and continuing along the previously identified corridor from that location to the Strait of Belle Isle (Figure 1.1).

The purpose of this supplementary report is to expand and update the scope of the *Labrador – Island Transmission Link Furbearer and Small Mammal Component Study* (Stantec 2010a), completed for the EA to provide similar environmental information for this additional transmission corridor option, for eventual use in Project planning and in the EIS.

Figure 1.1 Labrador - Island Transmission Link (Muskrat Falls Corridor Option)



2.0 APPROACH AND METHODS

The study included the compilation and review of existing and available information on furbearers and small mammals, and their known and potential habitats in the area of the proposed Project, including the identified 2 km wide transmission corridor, as well as a larger regional 15 km wide Study Area. The information and analysis provided herein focuses primarily upon the new 135 km long transmission corridor segment from Muskrat Falls, to and along a portion of the TLH-3, to the point where that corridor option joins the previously identified transmission corridor to the Strait of Belle Isle (see Figure 1.1). However, for completeness and consistency, the associated habitat quality mapping includes the entire transmission corridor and larger Study Area from Muskrat Falls to the Strait of Belle Isle.

2.1 Review of Relevant Studies

This supplementary report is based on research completed by the Study Team and others in support of this Project, as well as other relevant and available original research completed throughout Newfoundland and Labrador. Where relevant, information from elsewhere (e.g., incidental sightings) has been used to supplement the understanding of existing conditions for furbearers and small mammals in the Study Area.

Initial discussions with Nalcor Energy representatives and various provincial and federal government departments and stakeholders served to focus the scope of the study by identifying various key and representative species and compiling potential information sources including (but not limited to) relevant documents and data prepared for this Project and the Lower Churchill Hydroelectric Generation Project, as well as existing scientific literature.

Species included in this supplementary report represent groups of furbearers and small mammals, including any species listed under the *Species at Risk Act (SARA)* and/or *Newfoundland and Labrador Endangered Species Act (NLESA)*.

2.2 Ecological Land Classification Habitat Mapping

An Ecological Land Classification (ELC), previously prepared for the Project (Stantec 2010b), has been applied to the Study Area (Stantec 2011). Through this initiative, vegetation types and associated habitats were identified, classified and categorized on a regional scale, with nine habitat types identified and mapped for Southeastern Labrador (Figure 2.1). These ELC-based classifications formed the basis of the wildlife habitat mapping component of this supplementary report. Based on interpretation of the ELC units, as outlined by Stantec (2010a) and presented in Tables 2.1 to 2.4, habitat quality maps for representative furbearer and small mammal species were produced for the Study Area. Species chosen for this exercise included American marten (*Martes americana*) (Table 2.1), porcupine (*Erithizon dorsatum*) (Table 2.2), southern red-backed vole (*Clethrionomys gapperi*) (Table 2.3) and meadow vole (*Microtus pennsylvanicus*) (Table 2.4). Maps were colour-coded to reflect habitat quality and to indicate the percentage of identified primary, secondary and tertiary habitat available within the Study Area, including each of the Ecoregions in Southeastern Labrador. These are presented in Section 3.0, Results and Analysis.

Figure 2.1 Ecoregions of Southeastern Labrador

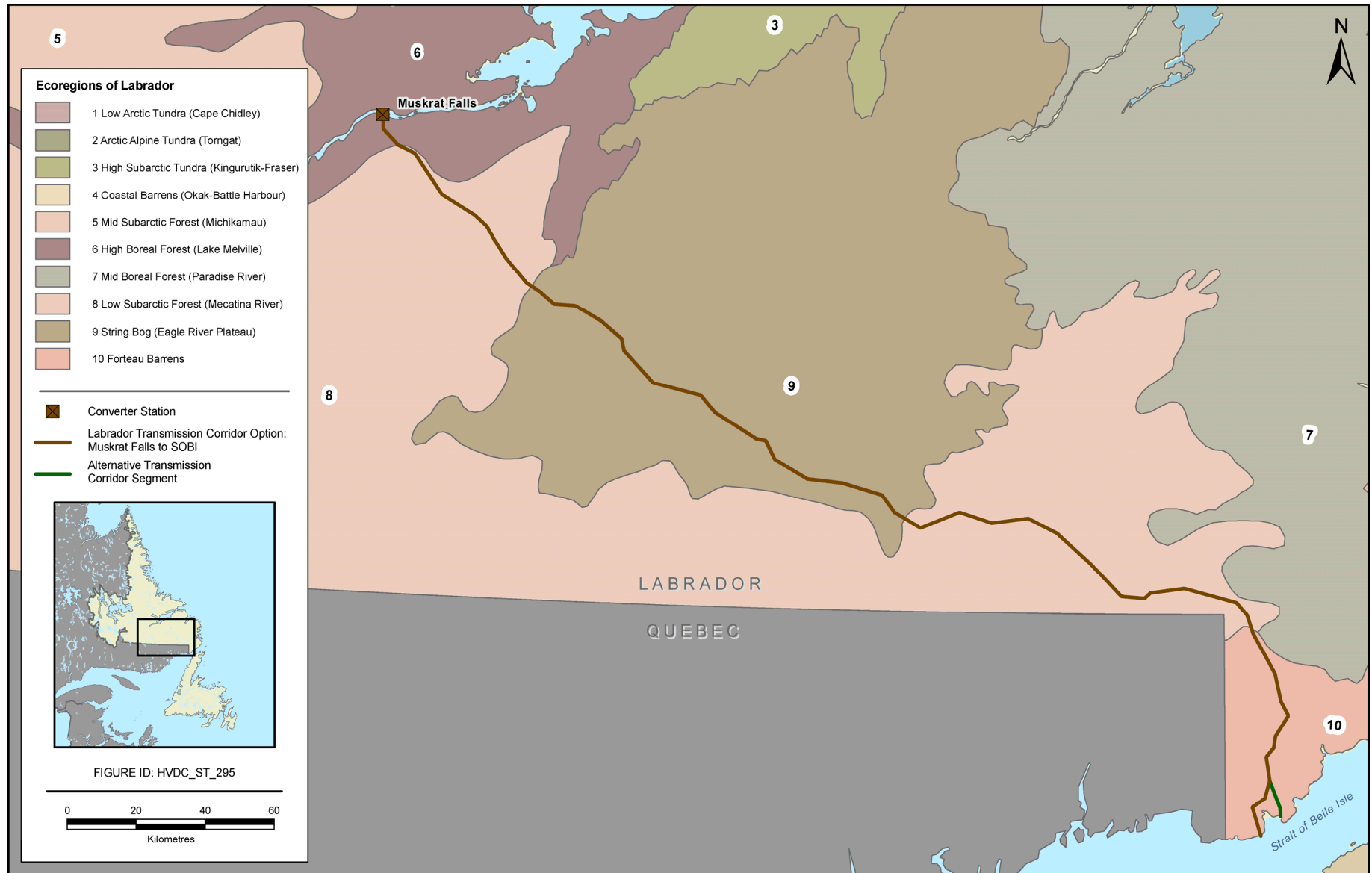


Table 2.1 ELC Habitat Types and Relative Quality for Marten

Habitat Type ¹	Habitat Quality ²	Notes
Black Spruce and Lichen Forest	Secondary	Vertical structure is marginal
Burn	Tertiary	Will use these areas for forage if adjacent to mature, coniferous forest
Conifer Forest	Primary	Cover and both vertical and horizontal structure are important (Bowman and Robitaille 1997; Smith and Schaefer 2002; Gosse et al. 2005)
Conifer Scrub	Secondary	Based on association with small mammals
Hardwood Forest	Secondary	Labrador only (Chapin et al. 1997)
Lichen Heathland	Tertiary	Lack of vertical and horizontal structure
Mixedwood Forest	Secondary	Where coniferous forest dominates, mixedwood would rate as primary
Open Conifer Forest	Secondary	Cover and both vertical and horizontal structure are important (Bowman and Robitaille 1997; Smith and Schaefer 2002; Gosse et al. 2005); also based on association with vole species
Wetland	Tertiary	Lack of vertical and horizontal structure
Notes: ¹ Habitat types are described in Stantec (2010b) ² Habitat quality is described in Stantec (2010a)		

Table 2.2 ELC Habitat Types and Relative Quality for Porcupine

Habitat Type ¹	Habitat Quality ²	Notes
Black Spruce and Lichen Forest	Secondary	Inner tree bark, needles and buds as winter forage
Burn	Tertiary	Habitat lacks trees that would be used as winter forage
Conifer Forest	Primary	Inner tree bark, needles and buds as forage
Conifer Scrub	Primary	Inner tree bark, needles and buds as forage
Hardwood Forest	Secondary	Deciduous leaves, grasses, forbs and berries as forage
Lichen Heathland	Tertiary	Habitat lacks both winter forage (tree bark, needles and buds) and summer forage (herbaceous vascular plants)
Mixedwood Forest	Primary	Deciduous leaves, grasses, forbs and berries as summer forage; coniferous as winter forage
Open Conifer Forest	Primary	Inner tree bark, needles and buds as forage
Wetland	Tertiary	Riparian is considered secondary habitat
Notes: ¹ Habitat types are described in Stantec (2010b) ² Habitat quality is described in Stantec (2010a)		

Table 2.3 ELC Habitat Types and Relative Quality for Southern Red-backed Vole

Habitat Type ¹	Habitat Quality ²	Notes
Black Spruce and Lichen Forest	Primary	Negative association for this species in areas with much lichen coverage was found in Labrador (Simon et al. 1998), although lichens are a known food source for western subspecies (Ure and Maser 1982); this habitat type would provide conifer seeds as food source; percent ground cover / debris and percent canopy closure would vary from stand to stand and therefore, some of these habitat types may provide suitable habitat. Minaskuat (2008) also identified relatively high abundance in this habitat
Burn	Tertiary	Coarse woody debris necessary for visual cover (Simon et al. 1998)
Conifer Forest	Primary	This species was most abundant on older successional sites in western Labrador; importance of fallen logs (Simon et al. 1998; Minaskuat 2008)
Conifer Scrub	Primary	These sites may be important if enough moisture and coarse woody debris is available to provide cover and nest sites (Simon et al. 1998)
Hardwood Forest	Tertiary	Necessary cover, forage and nesting material not found here
Lichen Heathland	Tertiary	Negative association for this species in areas with much lichen coverage (Simon et al. 1998)
Mixedwood Forest	Primary	Positive associations for this species found in this forest type in western Labrador with trees >2 m high and containing broad-leaved shrubs (Simon et al. 1998)
Open Conifer Forest	Secondary	These sites may be important if enough moisture and coarse woody debris is available to provide cover and nest sites (Simon et al. 1998)
Wetland	Tertiary	Fens not used by this species in western Labrador (Simon et al. 1998)
Notes: ¹ Habitat types are described in Stantec (2010b) ² Habitat quality is described in Stantec (2010a)		

Table 2.4 ELC Habitat Types and Relative Quality for Meadow Vole

Habitat Type ¹	Habitat Quality ²	Notes
Black Spruce and Lichen Forest	Tertiary	Very few grasses available for forage, cover and nesting material
Burn	Secondary	In Labrador, at least one of these sites was a ‘recent’ burn; early invasive species present; some <i>Microtus</i> found on recent burns in western Labrador (Simon et al. 1998)
Conifer Forest	Primary	Grass and sedge species available for forage, cover and nesting material
Conifer Scrub	Primary	Conifer areas preferred as very few grasses available for forage, cover and nesting in tuckamore
Hardwood Forest	Secondary	Few grass / sedge species present
Lichen Heathland	Primary	Lack of moisture / water and cover are limiting factors for this species (Birney et al. 1976; Reich 1981; Raphael 1987)
Mixedwood Forest	Primary	Primary for Labrador more so than the Island of Newfoundland. Several grass and sedge species to provide forage, cover and nesting material; moisture present
Open Conifer Forest	Primary	Primary for Labrador more so than the Island of Newfoundland. Few grass and sedge species present in this forest type in the Island of Newfoundland; however, grass and sedges found in Labrador
Wetland	Primary	Conifer, grass and sedge species available for forage, cover and nesting material
Notes: ¹ Habitat types are described in Stantec 2010b) ² Habitat quality is described in Stantec (2010a)		

3.0 RESULTS AND ANALYSIS

The Study Area encompasses five ecoregions in Southeastern Labrador (Figure 2.1). The Low Subarctic Forest (Mecatina River) and String Bog (Eagle River Plateau) Ecoregions are dominant, comprising approximately 41 percent and 35 percent of the Study Area, respectively. The Forteau Barrens Ecoregion comprises 16 percent of the Study Area, whereas the High Boreal Forest (Lake Melville) and Mid Boreal Forest (Paradise River) Ecoregions are relatively minor components, accounting for approximately 6 percent and 2 percent, respectively.

3.1 Furbearers and Small Mammals in Labrador

There are 18 confirmed furbearer species in Labrador. Furbearer species recorded along the lower Churchill River valley during baseline surveys in 2006 include porcupine, red fox (*Vulpes vulpes*), grey wolf (*Canis lupus*), muskrat (*Ondatra zibethicus*), mink (*Mustela vison*), northern river otter (*Lontra canadensis*), snowshoe hare (*Lepus americanus*) and American beaver (*Castor canadensis* subsp. *caecator*). In addition to these species, Canada lynx (*Lynx canadensis*), eastern coyote (*Canis latrans*), American marten, ermine (*Mustela erminea*), Arctic hare (*Lepus arcticus*), red squirrel (*Tamiasciurus hudsonicus*), northern flying squirrel (*Glaucomys sabrinus*), Arctic fox (*Alopex lagopus*) and woodchuck (*Marmota monax*) may also occur.

Wolverine (*Gulo gulo*) are listed as an *Endangered* species under SARA and NLESA; however, their presence in Labrador remains unconfirmed. While the Newfoundland population of marten are listed as *Threatened* by both SARA and NLESA, the population in Labrador is not considered to be at risk.

In general, most furbearer species are widely distributed throughout Labrador but occur in low densities. An aerial survey of a proposed transmission corridor route across Southern Labrador (Northland Associates 1980) revealed that red fox, river otter and lynx observations were scattered throughout the proposed corridor, and generally associated with water bodies.

Aerial wildlife surveys conducted along the TLH-3 revealed that river otter and red fox were scattered along most of the route but were most commonly encountered along the western portion of the route between the Churchill River and Crooks Lake. Porcupine and beaver were scattered fairly evenly along the entire route (Department of Works, Services and Transportation 2003).

Wildlife habitat use data collected along the transmission corridor in conjunction with the ELC studies (Minaskuat Inc. 2008a) revealed the presence of marten in 6 percent of the sampling sites, all of which were located in coniferous forest and open coniferous forest habitat. This species is widely distributed in Labrador but is often difficult to detect (Minaskuat Inc. 2008a). Similarly, only one marten was detected during an aerial survey of the TLH-3 route (Department of Works, Services and Transportation 2003).

Red fox were detected in 8 percent of the ELC plots, with foxes recorded in conifer forest, open conifer forest, lichen heathland and wetland habitat.

Beaver occur in relatively low densities in Labrador compared to elsewhere in North America (Minaskuat Inc. 2008b). Evidence of beaver activity was found in 3 percent of the ELC plots and always in wetland habitat. The low detection of beaver was attributable to the scale at which the ELC-based wildlife habitat mapping was

prepared. The narrow riparian habitats that are most frequently used by beaver could not be plotted on the ELC mapping and were therefore not selected for sampling.

Porcupine were recorded in 17 percent of the ELC plots. This species was found in conifer forest, hardwood forest, open conifer forest and wetland habitat.

Sixteen small mammal species are found in Labrador occupying a wide range of ecological niches. These include northern bog lemming (*Synaptomys borealis*), Labrador collared lemming (*Dicrostonyx hudsonicus*), southern red-backed vole, meadow vole, eastern heather vole (*Phenacomys ungava*), rock vole (*Microtus chrotorrhinis*), meadow jumping mouse (*Zapus hudsonicus*), woodland jumping mouse (*Napaeozapus insignis*), deer mouse (*Peromyscus maniculatus*), house mouse (*Mus musculus*), star-nosed mole (*Condylura cristata*), Norway rat (*Rattus norvegicus*), pigmy shrew (*Sorex hoyi*), water shrew (*Sorex palustris*), masked shrew (*Sorex cinereus*) and little brown bat (*Myotis lucifugus* subsp. *atrata*). The meadow vole and masked shrew are believed to have more restricted distributions relative to other small mammal species in Labrador, perhaps due to stricter habitat requirements (Simon et al. 1998). Results from small mammal trapping in 2006 suggest that southern red-backed vole is the most common small mammal in the lower Churchill River valley (accounting for 70 percent of all small mammal captures), consistent with Simon et al. (1998).

Evidence of small mammal presence in general (e.g., leads / runs, scat and holes) was detected in only four habitats during ELC surveys along the transmission corridor in 2008 (lichen heathland, coniferous forest, open conifer and wetland habitats). Combined, however, these species occupy a greater range of habitats than indicated by these data.

Small mammal species are an important prey item for several carnivorous species [e.g., marten, red fox (Hearn et al. 2006)]. Regular fluctuations of small mammal populations are a common occurrence in Labrador, as in other northern ecosystems, which may affect predators that rely heavily on them as prey.

3.2 Key and Representative Species and ELC Habitat Quality Mapping

Seven key and representative species have been identified as representative of a wide spectrum of mammals, varying in their habitat preferences and representing both common species and species of conservation concern.

For four of these species (marten, porcupine, southern red-backed vole and meadow vole), the distributions of primary, secondary and tertiary habitats have been mapped along the Study Area. Habitat type and quality could not be meaningfully mapped for wolverine, red fox and beaver at this scale.

The presence of wolverine in Labrador is currently unconfirmed. As an *Endangered* species under SARA and NLESA, the recovery plan for the eastern population of wolverine identifies the need for further research on this species in Labrador. The reintroduction of this species may be considered as a part of this plan in the future.

Red fox are common in Labrador. As a generalist species that can find prey in almost any habitat type, they are likely widely distributed throughout the Study Area.

Beaver are found throughout the province, although their abundance may have declined in the past 60 years. This species requires particular local site conditions for colony establishment (e.g., permanent source of surface water) and has habitat-specific preferences (e.g., alder beds at the mouths of tributaries or slow-flowing streams

in narrow valleys with bedrock foundation). Due to the specific nature of these habitat requirements, habitat quality was not assessed for beaver in the Study Area.

Marten are considered common throughout Labrador, where approximately 1,417 km² of primary habitat (25 percent) and 2,579 km² (45 percent) secondary habitat are found in the Study Area (Figure 3.1). Tertiary habitat occupies 1,553 km² (27 percent) of the Study Area. The High Boreal Forest Ecoregion, with its abundance of mature coniferous forest, provides the greatest proportion of primary habitat for marten in the Study Area; however, this Ecoregion occupies only a small proportion of the Study Area (6 percent). The Forteau Barrens Ecoregion provides lowest proportion of primary and secondary habitat for marten in comparison to the other four Ecoregions.

Porcupine are highly adaptable and can be found in a variety of habitat types. Primary habitat is abundant, and occupies 67 percent (3,839 km²) of the Study Area (Figure 3.2). Tertiary habitat was determined to occupy 27 percent (1,563 km²) of the Study Area. Secondary habitat occupies 3 percent (145 km²) of the Study Area, primarily due to the fact that secondary riparian habitat cannot be mapped at the scale of the ELC. The heavily forested High Boreal Forest Ecoregion provides the greatest amount of primary habitat for porcupine of the five Ecoregions, while the more open Forteau Barrens Ecoregion provide the lowest amount of primary porcupine habitat.

Southern red-backed voles are considered common in Labrador and are found throughout the Study Area in this region, with 1,589 km² (28 percent) of the Study Area rated as primary habitat (Figure 3.3). An additional 2,400 km² (42 percent) of the Study Area is considered secondary habitat. Tertiary habitat occupies 1,560 km² (27 percent) of the Study Area. Like porcupine, the largest proportion of primary habitat for southern red-backed vole is found in the heavily forested High Boreal Forest Ecoregion and the lowest proportion of primary habitat is found in the more open Forteau Barrens Ecoregion.

The meadow vole is common in suitable habitat throughout the Study Area. Primary meadow vole habitat occupies 93 percent (5,356 km²) of the Study Area (Figure 3.4). Secondary habitat occupies only 55 km² (1 percent) of the Study Area and tertiary habitat occupies only 138 km² (2 percent) of the Study Area. All of the Ecoregions within the Study Area are characterized by the presence of a high proportion (greater than 90 percent) of primary meadow vole habitat.

Figure 3.1 Marten Habitat Quality in the Study Area

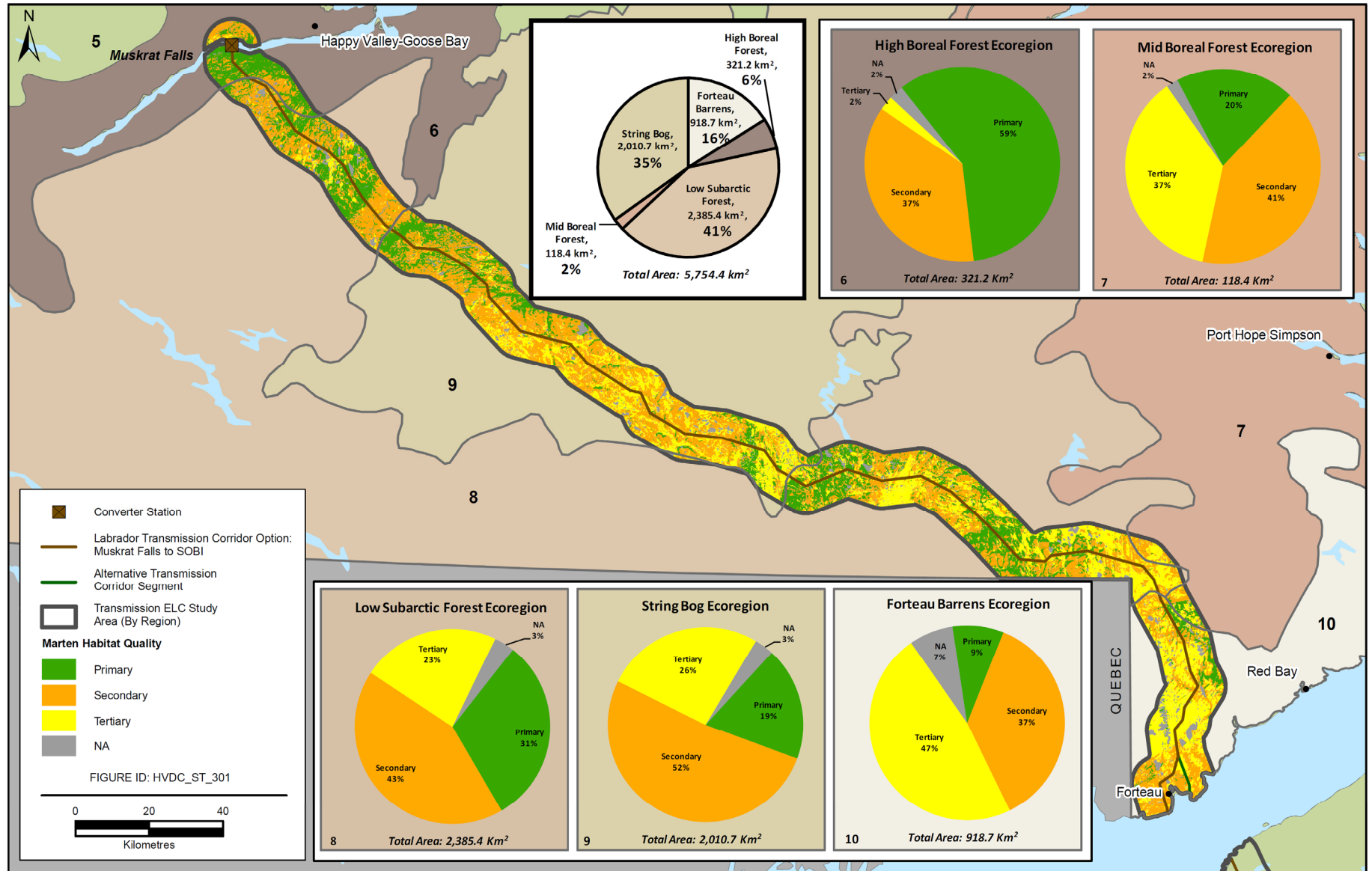


Figure 3.2 Porcupine Habitat Quality in the Study Area

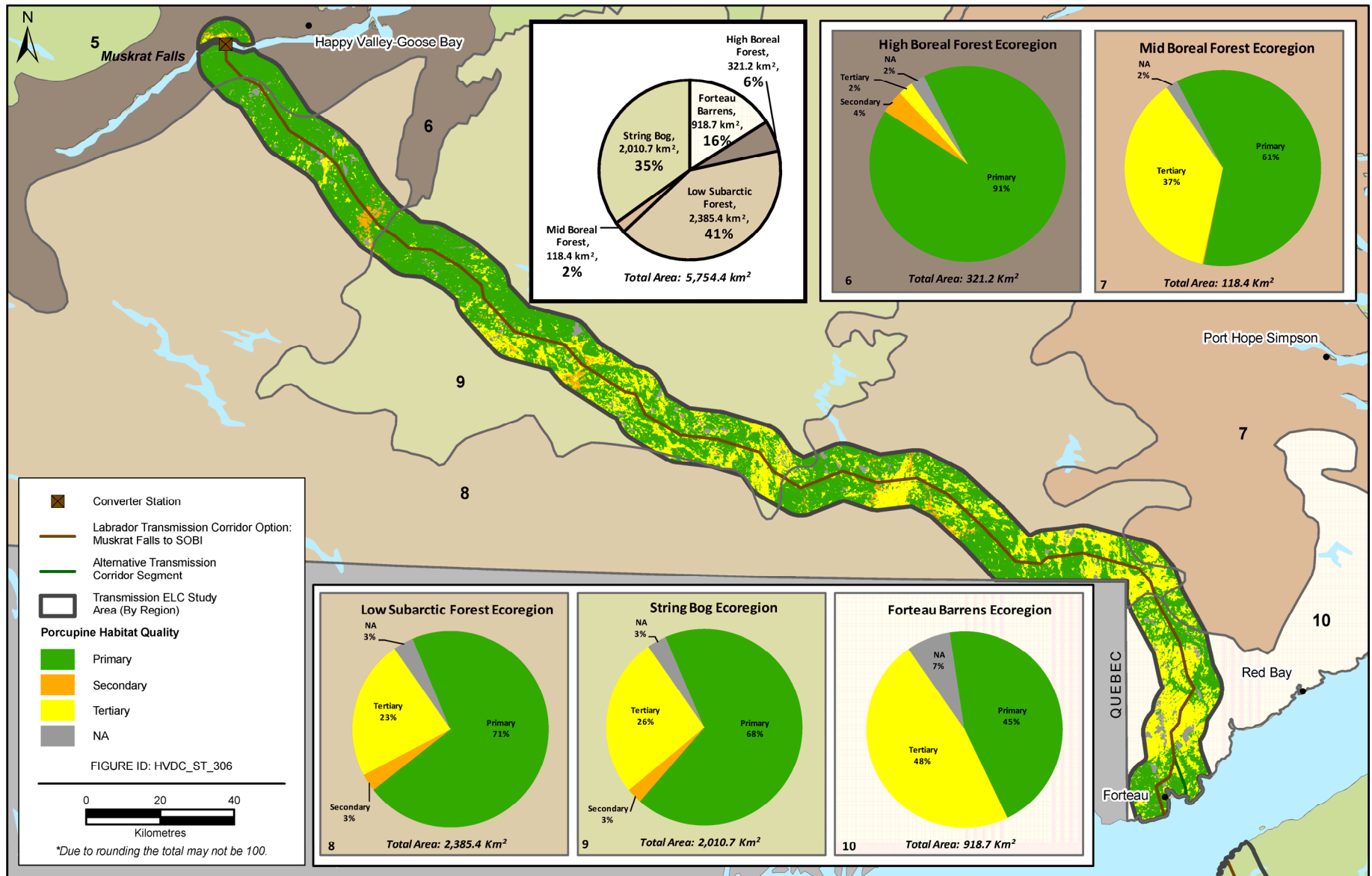


Figure 3.3 Southern Red-backed Vole Habitat Quality in the Study Area

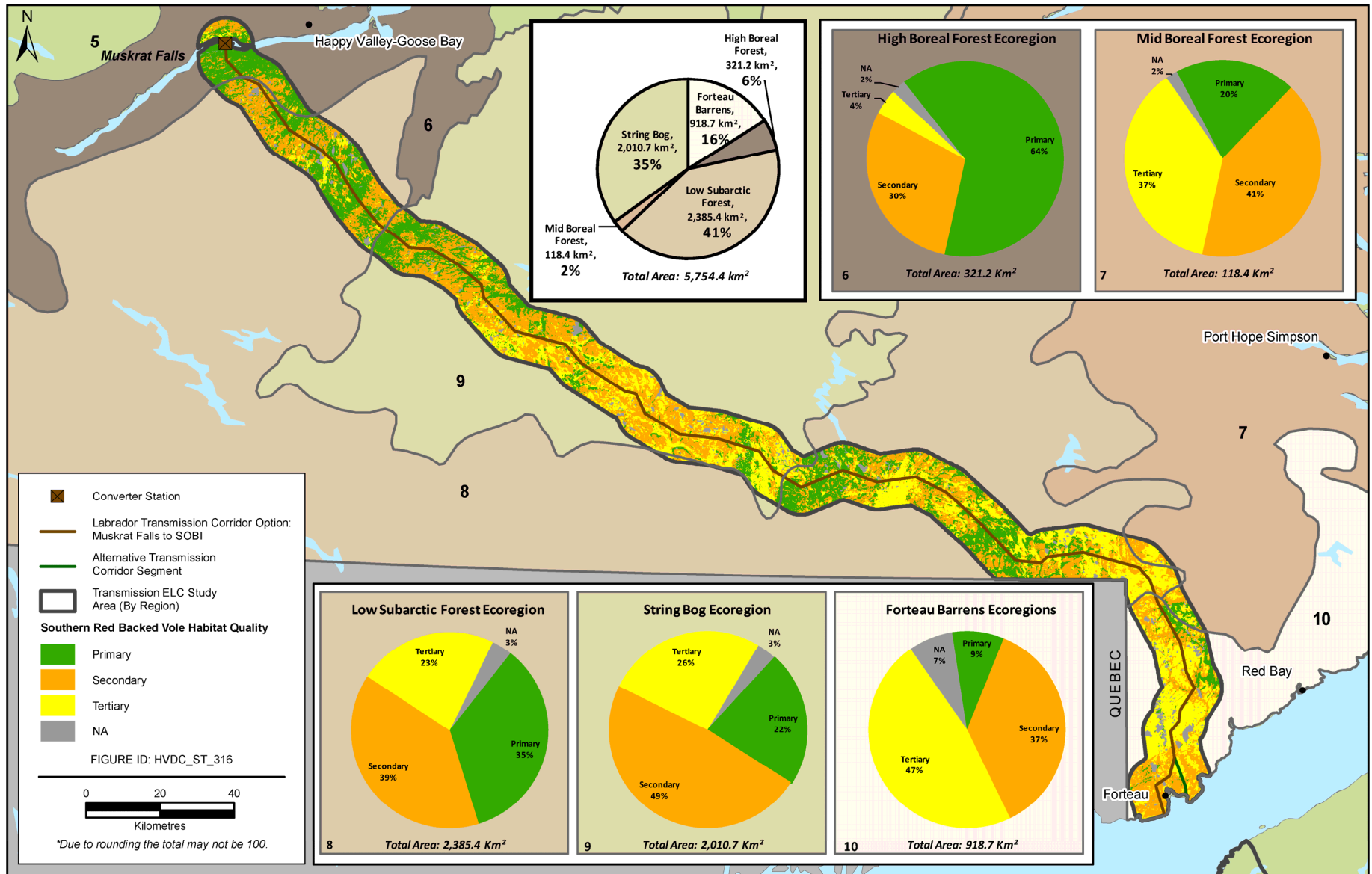
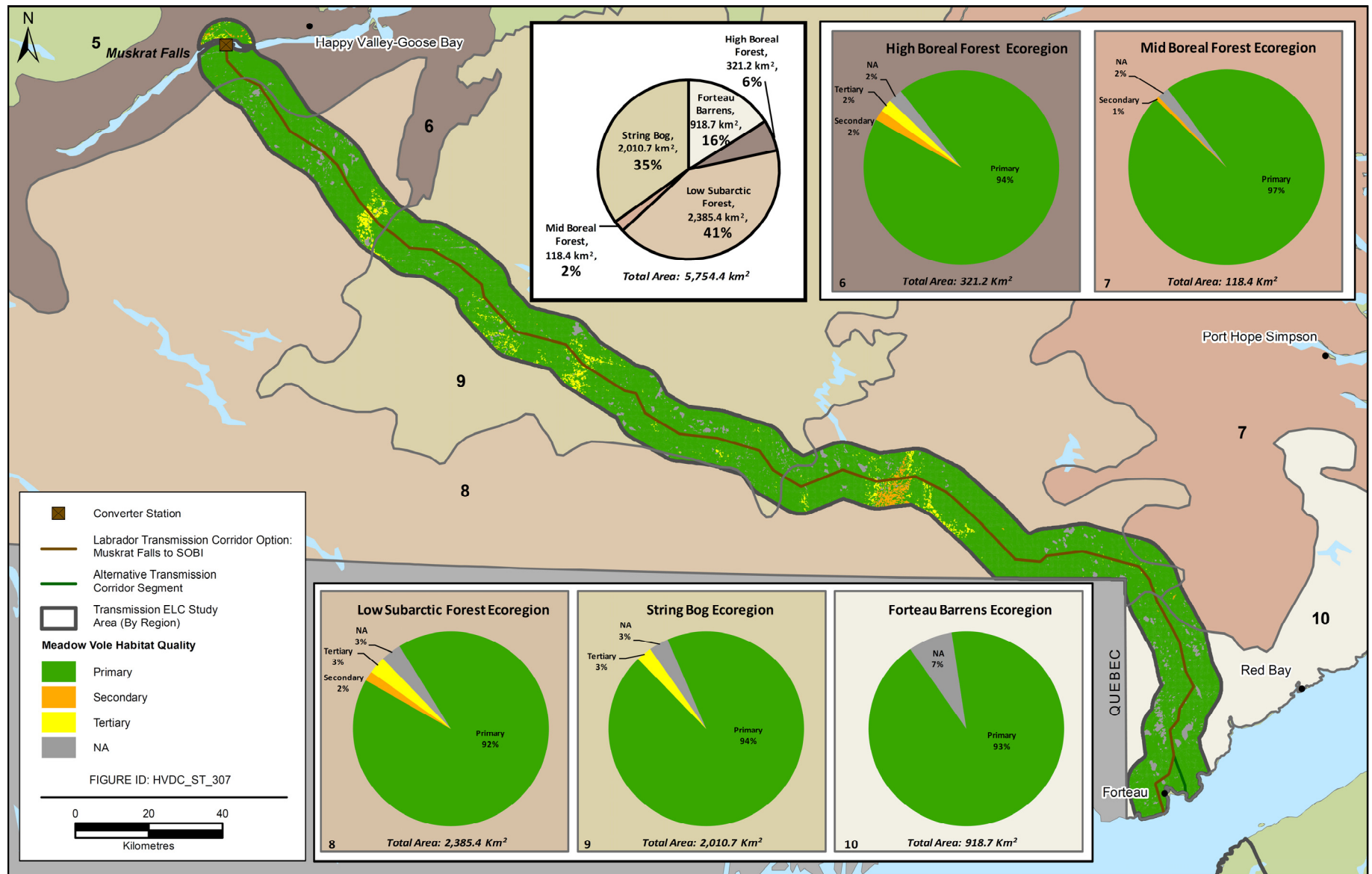


Figure 3.4 Meadow Vole Habitat Quality in the Study Area



4.0 SUMMARY

Nalcor Energy is proposing to develop an HVdc transmission system extending from Central Labrador to the Island of Newfoundland's Avalon Peninsula. As part of the EA for this Project, this report provides information on the known and potential use of habitat within a 15 km wide Study Area by furbearers and small mammals. This supplementary report is intended to expand and update the scope of the *Labrador – Island Transmission Link Furbearer and Small Mammal Component Study* (Stantec 2010a), for eventual use in Project planning and in the EIS.

Information on furbearers and small mammals within the Study Area was obtained through both a review of existing reports and an update of an ELC-based habitat model for the revised Study Area. The information derived from the existing literature is relevant for the Muskrat Falls to the Strait of Belle Isle transmission corridor option. However, based on the updated ELC model, new mapping and habitat distribution descriptions were performed for the Study Area for this corridor option. Maps were colour-coded to reflect habitat quality and indicate the percentage of primary, secondary and tertiary habitat available within specific Ecoregions. Results of the habitat models indicate that the Study Area:

- provides 25 percent (1,417 km²) primary habitat, 45 percent (2,579 km²) secondary habitat and 27 percent (1,553 km²) tertiary habitat for American marten;
- provides 67 percent (3,839 km²) primary habitat, 3 percent (145 km²) secondary habitat and 27 percent (1,563 km²) tertiary habitat for porcupine;
- provides 28 percent (1,589 km²) primary habitat, 42 percent (2,400 km²) secondary habitat and 27 percent (1,560 km²) tertiary habitat for southern red-backed vole; and
- provides 93 percent (5,356 km²) primary habitat, 1 percent (55 km²) secondary habitat and 2 percent (138 km²) tertiary habitat for meadow vole.

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