Labrador – Island Transmission Link

Regionally Uncommon Plant Potential Mapping

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EXECUTIVE SUMMARY

Nalcor Energy is proposing to develop the *Labrador – Island Transmission Link* (the Project), a High Voltage Direct Current (HVdc) transmission system extending from Gull Island in Central Labrador to Soldiers Pond on the Island of Newfoundland's Avalon Peninsula. Project planning and design are (as of the time at which this study was completed) at a stage of having identified a 2 km wide corridor for the on-land portions of the proposed HVdc transmission line, as well as various alternative corridor segments in particular areas.

As part of the environmental assessment (EA) for the Project, Nalcor Energy carried out a regional Ecological Land Classification (ELC). The purpose of the ELC was to identify, categorize and evaluate vegetation types and associated habitats on a regional scale along and adjacent to the transmission corridor, for use in the EA. As a subcomponent of the ELC, a regionally uncommon plant potential modelling and mapping exercise was conducted to estimate the extent and general location of potential regionally uncommon plant habitats within the 15 km wide ELC Study Area and transmission corridor.

For the purposes of this study, "Regionally Uncommon Plants" refers to those species which occur in a limited number of locations in Newfoundland and Labrador and/or are represented by relatively few individuals in the province. In this context, the term "regionally uncommon" is not synonymous with "listed" or "protected" species, in that most of the plants which have been considered in this study are not designated as such under provincial and/or federal legislation. This study provides a general, regional understanding of the known or potential presence and distribution of all regionally uncommon plants in relation to the transmission corridor and adjacent area. Individual plant species which have been formally listed as protected under provincial and/or federal legislation are briefly described herein; however, their specific locations, habitat requirements and further information are provided separately and specifically in other studies prepared for the Project's EA.

Information on the known distribution of regionally uncommon plants within the 15 km wide ELC Study Area and associated 2 km wide transmission corridor were acquired from the Atlantic Canada Conservation Data Centre (ACCDC). A dual approach was taken that included the development of a habitat model to determine the potential for regionally uncommon plants to occur in the ELC Habitat Types and the identification of specific areas known to have regionally uncommon plants.

An atlas was produced for the entire ELC Study Area that indicates the areas estimated to have Low, Moderate, High and Very High potential for occurrence of regionally uncommon plants. Areas comprising approximately 6 percent of the Southeastern Labrador section of the Study Area and approximately 7 percent of that portion of the transmission corridor were classed as having High and Very High potential to harbour regionally uncommon plants. In Newfoundland, High and Very High potential were assigned to polygons comprising a total of 13 and 13 percent of the Study Area and proposed transmission corridor, respectively. Potential regionally uncommon plant "hot spots" are associated with calcareous habitats found on both sides of the Strait of Belle Isle, several habitat polygons along the Island's Northern Peninsula, and scattered polygons in the general vicinity of Grand Falls-Windsor in Central Newfoundland.

The objective of this study was to gather and present regional-scale information on regionally uncommon plants and their potential presence and distribution within the Study Area and proposed transmission corridor for use in the EA and ongoing planning and design, including for consideration in the eventual (post-EA) selection of a specific route for the proposed transmission line. The information provided through this study is considered appropriate and adequate for these purposes.

Further study and analysis may be undertaken in relation to particular portions of the eventual transmission line route once identified and prior to construction, as determined in consultation with the appropriate regulators following completion of the EA process.

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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 Gull Island in Central Labrador to Soldiers Pond on the Island of Newfoundland's Avalon Peninsula. The Project's environmental assessment (EA) is ongoing, with an Environmental Impact Statement (EIS) being prepared by Nalcor Energy.

In preparation for and in support of the Project's EA, a regional Ecological Land Classification (ELC) was completed in order to identify, compile, summarize and present information on vegetation communities and habitats in the area of, and which may interact with, the proposed Project, as environmental baseline information for use in the EIS.

This report presents the results of an associated *Regionally Uncommon Plant Potential Mapping* exercise, which uses the ELC and other relevant data and analyses to identify and delineate the potential for the various habitat types along and adjacent to the transmission corridor to contain regionally uncommon vascular plant species. The objective was to gather and present regional-scale information on regionally uncommon plants and their potential presence and distribution within the Study Area and proposed transmission corridor for use in the EA and ongoing planning and design.

1.1 Project Overview

The Project involves the construction and operation of transmission infrastructure within and between Labrador and the Island of Newfoundland.

The proposed HVdc transmission system, as currently planned, will include the following key components:

- an ac-dc converter station at Gull Island in Central Labrador, on the north side of the Churchill River adjacent to the switchyard for the Lower Churchill Hydroelectric Generation Project;
- an HVdc transmission line extending from Gull Island across Southeastern Labrador to the Strait of Belle Isle. This overhead transmission line will be approximately 400 km in length, with a cleared right-of-way averaging 60 m wide, and will consist of single galvanized steel lattice towers;
- cable crossings of the Strait of Belle Isle with associated infrastructure, including cables placed under the seafloor across the Strait through various means to provide the required cable protection;
- an HVdc transmission line (similar to that described above) extending from the Strait of Belle Isle across the Island of Newfoundland to the Avalon Peninsula, for a distance of approximately 700 km;
- a dc-ac converter station at Soldiers Pond on the Island of Newfoundland's Avalon Peninsula; and
- electrodes in Labrador and on the Island, with overhead lines connecting them to their respective converter stations.

Project planning and design are currently at a stage of having identified a 2 km wide corridor for the on-land portions of the proposed transmission line, and 500 m wide corridors for the proposed Strait of Belle Isle cable crossings, as well as various alternative corridor segments in particular areas.

It is these proposed transmission corridors and components that were the subject of Nalcor Energy's environmental baseline study program. Project planning is in progress, and it is anticipated that the Project description will continue to evolve as engineering and design work continue. The EA of the Project will also identify and evaluate alternative means of carrying out the Project that are technically and economically feasible.

In conjunction and concurrent with the EA process, Nalcor Energy will be continuing with its technical and environmental analyses of the corridors, in order to identify and select a specific routing for the Project. The eventual transmission line routing will be selected with consideration of technical, environmental and socioeconomic factors.

1.2 Regionally Uncommon Plants

An understanding of regionally uncommon plants, including their habitats, is important for various reasons, including:

- the preservation of rare and/or unique genetic information, and biological compounds that may provide potentially important social and economic benefits;
- regionally uncommon plants offer unique insight into biological adaptation and evolution;
- the preservation of unique habitats in which other regionally uncommon plants or plant communities exist, interact with and function within the larger ecosystem; and
- the preservation of overall biological diversity necessary for a sustainable and resilient ecosystem.

The concept of rarity is seemingly simple: a species is rare because it has relatively few individuals, it is very uncommon or scarce, or occurs in limited geographical range. The rarity of a plant species is a matter of scale, meaning that a species may not be rare in Canada but may be regionally uncommon in Labrador or Newfoundland. Plant species in the province are considered rare based on the land area in which they occur (i.e., Labrador or insular Newfoundland).

Regionally uncommon plant species are those species which occur in only a few localities in the province and/or are represented by relatively few individuals. Rarity is a relative concept and is related to the physical size of the individuals as well as their pattern of distribution. The rarest species are those with small geographic ranges, few occurrences and few individuals in each occurrence.

Although an understanding of regionally uncommon plant species and their protection is important for the reasons outlined above, the protection of the rarest such species within the province is required under the *Newfoundland and Labrador Endangered Species Act* (*NLESA*) and the federal *Species at Risk Act* (*SARA*), and a number of plant species in the province are currently designated / listed under the provincial and/or federal legislation. For the purposes of this study, however, the term "regionally uncommon" is not synonymous with

"listed" or "protected" species, in that most of the plants which have been considered herein are not designated as such under provincial and/or federal legislation.

Considering the nature of the Project, its relatively extensive geographic scale, and the inability to model and map at this scale at the individual species level, the study has taken a broader and more regional approach, and provides an overall understanding of the known or potential presence and distribution of all regionally uncommon plants in relation to the transmission corridor and adjacent area. Individual plant species which have been formally listed as protected under provincial and/or federal legislation and their specific locations and habitat requirements, are, however, addressed separately and specifically in other studies prepared for the Project's EA.

1.3 Regionally Uncommon Plant Potential Mapping

As a subcomponent of the ELC, a Regionally Uncommon Plant Potential Atlas was developed to identify the relative potential of areas for the presence of regionally uncommon plant species.

The Regionally Uncommon Plant Potential Atlas (Appendix A) covers a 15 km wide ELC Study Area (Appendix A-Index), from Gull Island at the north side of the Churchill River in Central Labrador to Soldiers Pond on the Avalon Peninsula in Newfoundland (Figure 1.1).

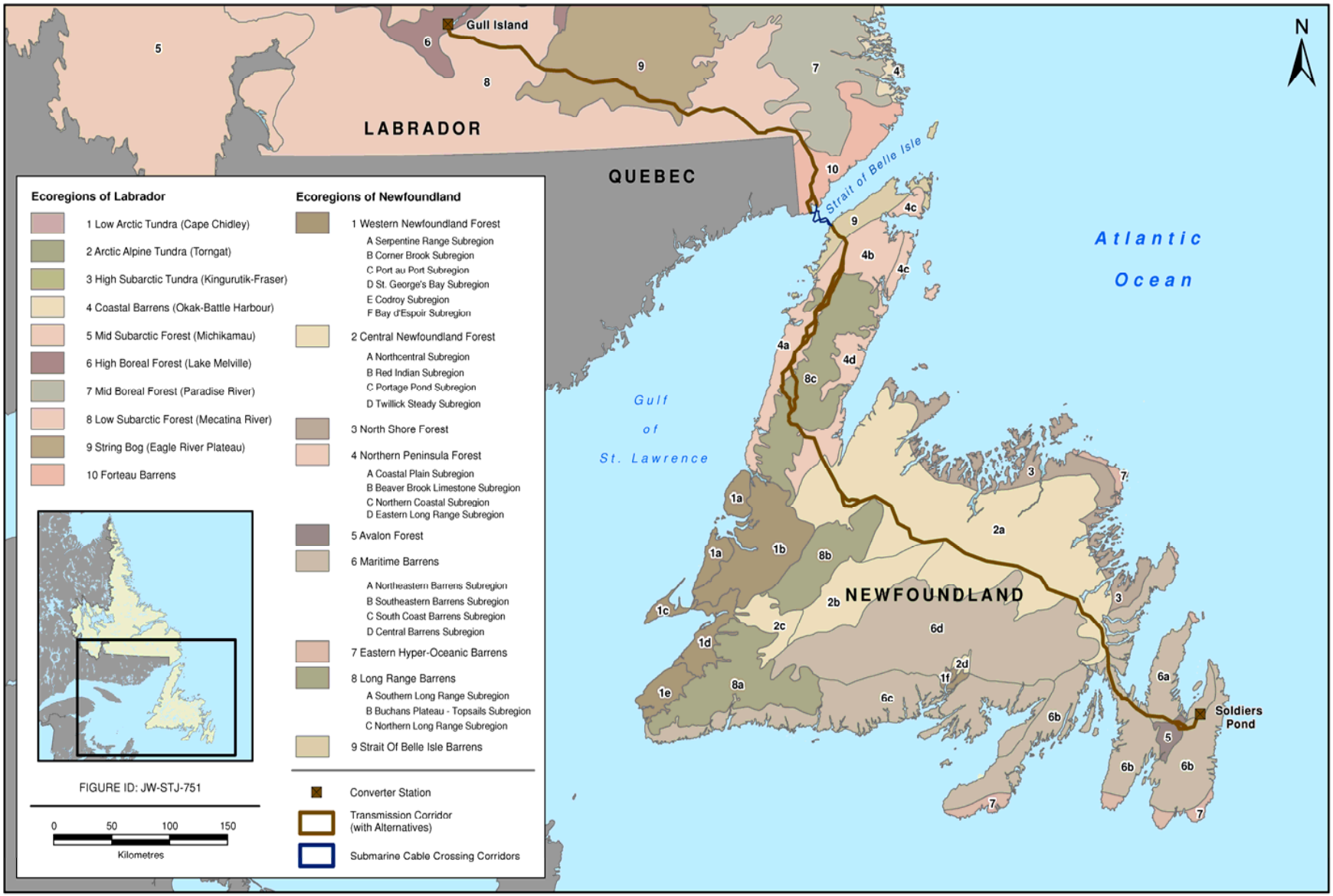
The Regionally Uncommon Plant Potential Atlas covers the same area as, and relies on, the mapped Habitat Types described in the ELC. The ELC identified, delineated and described 15 Habitat Types and several non-habitat areas within the Study Area. The ELC was developed using information derived from a dedicated field sampling program (vegetation and wildlife), high-resolution spatial imagery and remote sensing technology. The ELC was developed at a scale of 1:50,000 and, consequently, the Regionally Uncommon Plant Potential Atlas derived from it is also regional in scope.

Given the nature and geographic scale of this Project (which includes an approximately 1,100 km long transmission corridor from Central Labrador to Eastern Newfoundland), the current stage of Project planning, and the Project's likely interactions with the environment, it was not considered possible, practical or appropriate to undertake detailed and specific field surveys for regionally uncommon plants for the current study and EA.

The objective of this Study was therefore to gather and present regional-scale information on regionally uncommon plants and their potential presence and distribution in the Study Area for use in the EA and ongoing planning and design, including for consideration in the eventual selection of a specific route for the proposed transmission line. The information provided through this and other studies prepared for the EA is considered appropriate and adequate for these purposes.

Further study and analysis may be undertaken in relation to particular portions of the eventual transmission line route once identified and prior to construction, as determined necessary in consultation with the appropriate regulators following completion of the EA process.

Figure 1.1 The Labrador–Island Transmission Link and Associated Ecoregions of Newfoundland and Labrador



2.0 APPROACH AND METHODS

A dual approach was taken to identify and map regionally uncommon plant potential for the Study Area:

- a modelling approach, whereby habitat requirements for select regionally uncommon plants were compared with features of mapped Habitat Types in order to rank these units for their regionally uncommon plant potential; and
- an empirical approach, whereby sources (based on records acquired from the Atlantic Canada Conservation Data Centre (ACCDC), a non-profit organization that manages the species occurrence and distribution databases for the Newfoundland and Labrador Department of Environment and Conservation (Wildlife Division)) were used to identify Habitat Types and corridor sections known to be associated with one or more regionally uncommon plant species.

This dual approach was necessary since the area covered was extensive and actual regionally uncommon plant surveys in these regions have been somewhat limited in extent and focus. Together, results from these analyses indicate currently known regionally uncommon plant areas and possible regionally uncommon plant "hotspots" based on habitat attributes.

A similar approach was approved and used to identify areas of regionally uncommon plant potential in, for example, the EA of the Trans Labrador Highway Phase 3 project (JW/IELP 2004) and other recent linear developments.

2.1 Methods

The NatureServe Conservation Status Rank (Table 2.1) is used to rank regionally uncommon plant species across North America. The system is consistent with all conservation data centres across North America to facilitate tracking of regionally uncommon plant occurrences, and where known, threats on global, national (federal) and subnational (provincial) levels. Conservation status ranks range from "critically imperiled" (1) to "demonstrably secure" (5). Status is assessed and documented at three distinct geographic scales: global (G), national (N) and subnational (S) (i.e., state/province/municipal). These status assessments are based on the best available information and consider a variety of factors, such as species abundance, distribution, population trends and threats (NatureServe 2009). All provinces and territories participate in the process to align the ranking of species at risk with the national system and hence that of *SARA*. At the federal level, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) is responsible for assessing the biological status of rare species, or those determined to be at risk (Endangered, Threatened or of Special Concern) in Canada, with each species undergoing a regulatory review process administered by COSEWIC under *SARA* (Government of Canada 2003; Canadian Wildlife Service (CWS) 2005). In Newfoundland and Labrador, the ranking system is used at the national and subnational levels.

Table 2.1 NatureServe National (N) and Subnational (S) Conservation Status Ranks

Status	Rank	Definition
NX SX	Extinct or Presumed Extirpated	Not located despite intensive searches and no expectation of rediscovery
NH SH	Possibly Extirpated	Possibly extinct or extirpated; known only from historical occurrences but still hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the jurisdiction, but not enough to state this with certainty
N1 S1	Critically Imperiled	At very high risk of extinction due to extreme rarity (often 5 or fewer populations), steep declines or other factors, making the species especially susceptible to extirpation or extinction
N2 S2	Imperiled	At high risk of extinction due to very restricted range, few populations (often 20 or fewer), steep declines, or other factors
N3 S3	Vulnerable	At moderate risk of extinction due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors
N4 S4	Apparently Secure	Uncommon but not rare, and usually widespread in the range. Some cause for long-term concern
N5 S5	Secure	Common or very common, and widespread and abundant. Not susceptible to extirpation or extinction under current conditions
NNR SNR	Unranked	National or subnational conservation status not yet assessed
NU SU	Unrankable	Currently unrankable due to lack of information or due to substantially conflicting information about status or trends

ACCDC manages species occurrence and distribution databases for the province (Newfoundland and Labrador Department of Environment and Conservation). The ACCDC identifies and ranks all vascular plants known to occur in the province on consideration of the following factors: population size; number of occurrences; geographic distribution; trends in population; trends in distribution; threats to population; and threats to habitat. Each taxon is assigned a status and S-rank (ACCDC 2010). The ACCDC ranks are specific to the geographic area (Labrador and/or the Island of Newfoundland) in which they occur. As such, the rarity of a plant species is a matter of scale, meaning that a species may not be rare in Canada but may indeed be regionally uncommon in Labrador or Newfoundland. As a result, a species that occurs in both Labrador and in Newfoundland may have a different S-rank for each area. To be considered "listed" (i.e., protected under legislation), a taxon would have to have an S-rank containing SH, S1 or S2, and fall within the "May be at risk" or "Sensitive" status categories. The S-rank definitions used by the ACCDC are presented in Table 2.2.

Table 2.2 Definitions of the Atlantic Canada Conservation Data Centre S Ratings

S1	Extremely rare throughout its range in the province (typically five or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation
S2	Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors
S3	Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in some locations (21 to 100 occurrences)
S4	Usually widespread, fairly common throughout its range in the province, and apparently secure with many occurrences, but the species is of long-term concern (e.g., watch list) (100+ occurrences)
S5	Demonstrably widespread, abundant, and secure throughout its range in the province, and essentially ineradicable under present conditions
S#S#	Numeric range rank: A range between two consecutive numeric ranks. Denotes uncertainty about the exact rarity of the species (e.g., S1S2)
SH	Historical. Previously occurred in the province but may have been overlooked during the past 20-70 years. Presence is suspected and will likely be rediscovered; depending on species/community
S?	Unranked. Not yet ranked. (The ? qualifies the character immediately preceding it in the S-rank)
SU	Unrankable: Possibly in peril, but status is uncertain - more information is needed
SR	Reported but without persuasive documentation (e.g., misidentified specimen)
SE	Exotic/introduced species
Hybrid	Hybrid of two similar species

Records of known regionally uncommon plant locations within the Study Area were acquired from the ACCDC. Focus was limited to those plant species rated S1 (extremely rare) and S2 (rare) for the respective areas in which they occur. The focus was placed on S1 and S2 ranked species for several reasons. Species listed as S1 and S2 by the ACCDC include species that are listed under the *NLESA* and *SARA*. Thus S1 and S2 species, as a result of their designation, would require some form of mitigation. Species listed as S3 (uncommon in the province or in restricted range) and higher are not subject to the requirement for mitigation.

The inclusion of S3 species would have substantially increased the number of species that would have had to be modelled. This was not possible, as Labrador has limited plant distribution data and as such, commonly occurring species are listed as S3. Using S3 species for Labrador would have greatly reduced the efficacy of the model, since it would be flooded with a large number of common species found in a wide variety of habitats.

Fifteen species were identified along the Southeastern Labrador portion of the Study Area, with 122 species along the Newfoundland portion based on records provided by the ACCDC databases. Habitat requirements for 112 of these species were determined using regionally-specific sources (Bouchard et al. 1991; Meades et al. 2000). Habitat requirements for the remaining 25 species were determined using non-specific sources, including Crum and Anderson (1981), Zinck (1998), unpublished literature and professional judgment.

Plant species habitat requirements were compared to defined Habitat Types described and mapped during the ELC. The ELC identified 15 broad Habitat Types (Table 2.3) using information gathered during a dedicated vegetation and wildlife habitat field program and high-resolution air photo and satellite images. The reader is referred to the ELC, which has been submitted separately under the EA process, for detailed information on the Habitat Types referenced here. In instances where appropriate habitat for regionally uncommon plants was present, the associated ELC Habitat Type was rated as having potential for regionally uncommon plant presence.

Table 2.3 Habitat Types and Non-Habitat Areas for the Study Area Indicating Exclusiveness to the Region

Habitat Type	Notes
ELC Habitat Type	
Alpine Vegetated	Exclusive to Newfoundland Study Area
Black Spruce Lichen Forest	Exclusive to Labrador Study Area
Burn	Found in Labrador and Newfoundland portions of Study Area
Conifer Forest	Found in Labrador and Newfoundland portions of Study Area
Conifer Scrub	Found in Labrador and Newfoundland portions of Study Area
Cutover	Exclusive to Newfoundland Study Area
Exposed Bedrock	Exclusive to Labrador Study Area
Hardwood Forest	Exclusive to Labrador Study Area
Kalmia Lichen/Heathland	Exclusive to Newfoundland Study Area
Lichen Heathland	Exclusive to Labrador Study Area
Mixedwood Forest	Found in Labrador and Newfoundland portions of Study Area
Open Conifer Forest	Found in Labrador and Newfoundland portions of Study Area
Rocky Barrens	Exclusive to Newfoundland Study Area
Wetland	Found in Labrador and Newfoundland portions of Study Area
Scrub/Heathland/Wetland	Mosaic of Conifer Scrub, Kalmia Heathland and Wetland. Individual Habitat Types were sampled. Mosaic exclusive to Newfoundland Study Area
Non-Habitat Areas	
Cloud/Shadow	Found in Labrador and Island of Newfoundland portions of Study Area
Exposed Earth/Anthropogenic/Cutblock	Found in Labrador and Island of Newfoundland portions of Study Area
Exposed Earth/Anthropogenic	Exclusive to Island of Newfoundland Study Area
Open Water	Found in Labrador and Island of Newfoundland portions of Study Area

To enhance the accuracy of the model, habitat sub-units were also identified using landscape features that may affect regionally uncommon plant potential habitat. Three features in particular were identified as being important for the Study Area:

- the presence of calcareous substrates;
- riparian (rivers or streams) or lacustrine habitat (lakes and ponds); and
- habitats such as salt marshes and tidal flats associated with sea shores. These features were derived from existing computer-based Geographic Information System (GIS) geology (Davenport et al. 1999) and hydrology data sources.

Habitat Types and sub-units were then rated as having Low, Moderate, or High potential to support regionally uncommon plant species, based on the total number of regionally uncommon plant species that the model indicated could potentially be present in each Habitat Type (Table 2.4). In Southeastern Labrador, the fewer number of known regionally uncommon plant species identified (based on records in the ACCDC) is likely at least partially reflective of fewer plant surveys conducted in Labrador as compared to Newfoundland. For example, a multi-year survey program has been completed by the Newfoundland and Labrador Department of Environment and Conservation (Wildlife Division) for Newfoundland, but no such comparable program has yet been completed for Labrador. Therefore, fewer regionally uncommon plant occurrences were required to "satisfy" the habitat ratings for Labrador as compared to Newfoundland.

Table 2.4 Regionally Uncommon Plant Potential Ratings for ELC Habitat Types

Location	Number of Regionally Uncommon Plant Species Required for Habitat Potential Ratings			Total Number of Regionally Uncommon Plants
	Low	Moderate	High	
Labrador	0 to 1	2 to 3	4+	15
Newfoundland	0 to 10	11 to 25	26+	122

In addition to the application of ratings for the Habitat Types, the known locations of regionally uncommon plants within the Study Area (based on records in the ACCDC databases) were also used to rate the minimum potential of these specific areas to support regionally uncommon plant species. Specific mapped Habitat Type and/or Non-Habitat Area polygons associated with:

- one regionally uncommon plant record rated as having Moderate potential;
- polygons with 2 to 10 regionally uncommon plant records rated as having High potential; and
- polygons with more than 10 records rated as having Very High potential.

These individual polygons were rated independently of the Habitat Type and/or Non-Habitat Area ratings otherwise assigned to them. For example, although a Habitat Type may have initially had a Low rating, specific areas of that Habitat Type may have 10 or more regionally uncommon plants previously identified by the ACCDC. As such, that specific Habitat Type polygon would receive a rating as Very High. Alternatively, aspects of some Non-Habitat Areas (i.e., open water), as identified in the ELC, may represent a specific habitat affinity for a narrow range of regionally uncommon plants, that would otherwise not have been assigned a regionally uncommon plant potential rating. In these instances, habitat preferences of regionally uncommon aquatic and semi-aquatic plant species focuses on the littoral (close to the shore) zones of these seashores, lakes or rivers, however, for modelling purposes was super-imposed on the entire waterbody.

Using these methods, all Habitat Types, Non-Habitat Areas and/or their sub-units were assigned a regionally uncommon plant potential rating. In addition, specific areas with known regionally uncommon plant occurrences received a minimum potential rating based on the number of species found within that mapped polygon. The Regionally Uncommon Plant Potential Atlas was based on the highest overall rating for each polygon.

2.2 Study Team

All team members (Table 2.5) have in-depth knowledge and experience in their fields of expertise and a broad general knowledge of the work conducted by other experts in related fields. Brief biographical statements, highlighting roles and responsibilities and relevant education and employment experience of key personnel, are provided in Appendix B.

Table 2.5 Study Team Members and Roles

Role	Personnel
Component Lead	Brent Keeping (2008-2009)
	Sean Bennett (2010)
Report Authors	Michael Crowell (2008-2010)
	Brent Keeping (2008-2009)
	Sean Bennett (2010)
GIS and Remote Sensing	Stephen Rowe (2008-2010)
	Peter Miles (2008-2010)

3.0 RESULTS

Of the 21 ELC Habitat Types and sub-units for Labrador, four were rated as having High regionally uncommon plant potential. For Newfoundland, five Habitat Types and sub-units were rated as having High regionally uncommon plant potential. To obtain the "elevated" ratings for the distribution of "High" and "Very High" potential regionally uncommon plant habitat a combination of specific polygons known to have regionally uncommon plant species and Habitat Types and Sub-units were combined, which resulted in a number of areas determined to have a Very High potential for regionally uncommon plant species.

3.1 Habitat Type and Sub-Unit Ratings

Habitat Type, in this context, can be interpreted as the specific combination of environmental attributes, both abiotic and biotic, particularly structural elements (e.g., forest cover, wetlands, barrens), with which a species or community is commonly associated. While the relationship between regionally uncommon plants and their particular habitat affinities can be examined at a range of spatial resolutions, focus is typically on the fine-scale environmental variables that influence the presence of a particular species or community at a specific location.

While the association between a species and a set of environmental conditions is rarely conclusive, the habitat of a species can usually be defined to some degree. The key issue is whether the defined habitat of a species is spatially restricted or distributed over part or all of the landscape, and whether the spatial resolution used to identify those habitats is sufficient to ensure the identification of atypical landscape features or sub-units of Habitat Types delineated. A spatially restricted habitat may be naturally limited or result from extensive human-caused disturbance, such as the fragmentation of mature forest or calcareous limestone barrens embedded within previously undisturbed habitats. Spatially restricted habitats often host plant species that have specialized environmental requirements that limit or prevent movement into surrounding areas. This is particularly evident on the Northern Peninsula, where outcrops of calcareous bedrock are considered a "hotspot" for vascular plant diversity, and support some 114 of Newfoundland's 271 regionally uncommon plant species (Bouchard et al. 1991). Appendix C details all the regionally uncommon plant species known to occur within the ELC Study Area and associated transmission corridor, along with their typical habitats and the general suitability of ELC Habitat Types for those species.

Although the tables in Appendix C identify habitat units with and without calcareous substrate, not all of these combinations necessarily occur within the transmission corridor. Only information on Habitat Types (along with sub-units described above) determined from GIS analyses to actually occur within the Study Area are presented in Tables 3.1 and 3.2. Some Habitat Types were not found in areas that had calcareous substrates. Instances in which the combination of habitat and calcareous substrate did not occur within the Study Area were not listed.

Other landscape features, including: seashores, riparian habitat, lacustrine habitat, salt marshes and tidal flats were incorporated into the predictive model, however, these features were not identified in the ELC due to the fact that they are typically small in size or represent narrow linear features that could not be effectively mapped

at the a 1:50,000 scale. As such, these landscape features or Habitat Types sub-units were typically dealt with as inclusions within the larger ELC polygons. The difficulty in using these habitats is the ability to identify or appropriately map them at the spatial resolution of the available imagery. In most instances their presence was inferred based on the presence of features visible on the existing imagery. For instance, the presence of seashore and riparian habitat which are long narrow features was inferred from the presence of sea/land interfaces in the case of seashore and river/land interfaces for riparian habitat.

As such, a habitat-based predictive model as described herein is considered appropriate to predict locations of those species whose habitat affinities are considered spatially restricted.

Table 3.1 Regionally Uncommon Plant Species Potential within the ELC Study Area and Transmission Corridor as Modelled for Southeastern Labrador

Habitat Type	Number of Regionally Uncommon Plant Species Potentially Present	Regionally Uncommon Plant Species Potential	Percent of ELC Study Area	Percent of Transmission Corridor
ELC Habitat Types				
Exposed Bedrock	1	Low	0.0	0.0
Lichen Heathland	2	Moderate	4.2	4.0
Lichen Heathland (c)	5	High	1.0	1.2
Black Spruce Lichen	2	Moderate	3.6	3.4
Open Conifer Forest	2	Moderate	24.8	26.8
Conifer Scrub	0	Low	13.5	15.5
Conifer Scrub (c)	0	Low	2.4	3.2
Coniferous Forest	1	Low	19.4	20.1
Coniferous Forest (c)	4	High	0.1	0.1
Mixedwood Forest	0	Low	0.6	0.4
Hardwood Forest	3	Moderate	0.1	0.1
Wetland	1	Low	23.8	21.1
Wetland (c)	2	Moderate	0.2	0.1
Burn	0	Low	1.4	2.1
Total	23	n/a	95.1	98.1
Non-Habitat Areas and / or subunits[1]				
Open Water (rated)[2]				
Rivers and Streams	4	High	n/a	n/a
Rivers and Streams (c)	4	High	n/a	n/a
Lakes and Ponds	2	Moderate	n/a	n/a
Lakes and Ponds (c)	1	Low	n/a	n/a
Sea Shore	1	Low	n/a	n/a
Sea Shore (c)	1	Low	n/a	n/a
Clouds and Shadow (unrated)[3]	n/a	n/a	n/a	n/a
Exposed Earth/Anthropogenic (unrated)[3]	n/a	n/a	n/a	n/a
Exposed Earth/Anthropogenic/Cutblock (unrated)[3]	n/a	n/a	n/a	n/a
Total	13	n/a	4.9	1.9

n/a = not applicable; (c) = with calcareous substrate; 1 = extracted from 1:50,000 NRCan Data (unmapped); 2 = rated using ACCDC species element occurrence data; 3 = presence / absence of tracking list species is not supported by ACCDC element occurrence data

Table 3.2 Regionally Uncommon Plant Species Potential within the ELC Study Area and Transmission Corridor as Modelled for Newfoundland

Habitat Type	Number of Regionally Uncommon Plant Species Potentially Present	Regionally Uncommon Plant Species Potential	Percent of ELC Study Area	Percent of Transmission Corridor
ELC Habitat Types				
Alpine Vegetated	16	Moderate	0.2	0.1
Rocky Barrens	9	Low	0.8	1.3
Kalmia/Lichen Heathlands	10	Low	1.5	1.8
Kalmia/Lichen Heathlands (c)	30	High	0.0	0.0
Open Conifer Forest	7	Low	10.1	8.8
Open Conifer Forest (c)	4	Low	2.9	3.6
Conifer Scrub	4	Low	2.1	1.9
Conifer Scrub (c)	3	Low	0.1	0.1
Coniferous Forest	8	Low	10.7	12.1
Coniferous Forest (c)	11	Moderate	1.4	1.7
Mixedwood Forest	3	Low	17.9	19.7
Mixedwood Forest (c)	3	Low	2.1	2.1
Wetland	16	Moderate	8.9	7.8
Wetland (c)	22	Moderate	1.1	1.3
Mosaic of Conifer Scrub, Kalmia/Lichen Heathland, and Wetland	24	Moderate	18.2	17.7
Mosaic of Conifer Scrub, Kalmia/Lichen Heathland, and Wetland (c)	49	High	2.4	2.7
Burn	0	Low	0.1	0.0
Cutover	0	Low	9.0	10.5
Cutover (c)	0	Low	0.5	0.6
Total	219	n/a	90.0	93.8
Non-Habitat Areas and / or subunits[1]				
Open Water (rated)[2]				
Rivers and Streams	23	Moderate	n/a	n/a
Rivers and Streams (c)	28	High	n/a	n/a
Lakes and Ponds	18	Moderate	n/a	n/a
Lakes and Ponds (c)	26	High	n/a	n/a
Sea Shore	15	Moderate	n/a	n/a
Sea Shore (c)	15	Moderate	n/a	n/a
Clouds and Shadow (unrated)[3]	n/a	n/a	n/a	n/a
Exposed Earth/Anthropogenic (unrated)[3]	n/a	n/a	n/a	n/a
Exposed Earth/Anthropogenic/Cutblock (unrated)[3]	n/a	n/a	n/a	n/a
Total	125	n/a	10.0	6.2

n/a = not applicable; (c) = with calcareous substrate; 1 = extracted from 1:50,000 NRCan Data (unmapped); 2 = rated using ACCDC species element occurrence data; 3 = presence / absence of tracking list species is not supported by ACCDC element occurrence data

3.2 Distribution of "High" and "Very High" Potential Regionally Uncommon Plant Habitat

When specific areas known to contain occurrences of regionally uncommon plant species are combined with that of the modelled potential, a number of areas were predicted to have a High or Very High potential for regionally uncommon plant species. A regional summary of the relative area of the regionally uncommon plant potential (expressed as percent) for the entire ELC Study Area and transmission corridor, by geographic region (i.e., Southeastern Labrador, Northern Peninsula, Central and Eastern Newfoundland and Avalon Peninsula), is presented in Table 3.3. Graphical representations of those Habitat Types predicted as having a Very High, High, Moderate, and Low potential for the regionally uncommon plant species within the 15 km wide ELC Study Area, and High and Very High potential for the 2 km wide proposed transmission corridor are presented in Figures 3.2 to 3.9.

Approximately 11 percent of the entire ELC Study Area is comprised of habitat predicted to have a High and Very High potential for regionally uncommon plant species. Similarly, High or Very High habitat potential within the proposed transmission corridor is predicted to be 11 percent. When considered from a regional perspective (Figure 3.1), High and Very High plant potential areas cover approximately 6 percent of the ELC Study Area for Southeastern Labrador (Figure 3.2) and approximately 13 percent of the Island of Newfoundland. Approximately 7 percent of the proposed transmission corridor for Southeastern Labrador (Figure 3.3) and 13 percent of the Island of Newfoundland contain areas rated High and Very High for regionally uncommon plant potential. The Northern Peninsula has the highest proportion of area rated as High and Very High plant potential, with 32 percent of the ELC Study Area (Figure 3.4) and 36 percent of the proposed transmission corridor (Figure 3.5) classified as such. Habitats with High and Very High plant potential cover approximately 2 percent of the Central and Eastern Newfoundland ELC Study Area (Figure 3.6) and less than 2 percent of the transmission corridor (Figure 3.7). Habitats rated as High and Very High for regionally uncommon plant potential are considered somewhat negligible on the Avalon Peninsula, with both the ELC Study Area (Figure 3.8) and proposed transmission corridors (Figure 3.9) containing less than 1 percent of these habitats.

Table 3.3 Regionally Uncommon Plant Potential Habitat Percent Area by Geographic Region – ELC Study Area and Transmission Corridor

Regionally Uncommon Plant Potential Habitat	Southeastern Labrador	Northern Peninsula (Newfoundland)	Central and Eastern Newfoundland	Avalon Peninsula (Newfoundland)	Island of Newfoundland (All Regions)	Newfoundland and Labrador
ELC Study Area						
Low	63%	43%	69%	54%	59%	58%
Moderate	31%	25%	29%	46%	28%	31%
High	3%	22%	2%	0%	8%	7%
Very High	3%	10%	0%	0%	5%	4%
Total	100%	100%	100%	100%	100%	100%
Transmission Corridor						
Low	61%	43%	71%	56%	59%	59%
Moderate	32%	21%	28%	44%	28%	30%
High	3%	22%	<1%	0%	8%	6%
Very High	4%	14%	<1%	0%	5%	5%
Total	100	100	100	100	100	100

Figure 3.1 Overview of Geographic Regions that Comprise the ELC Study Area

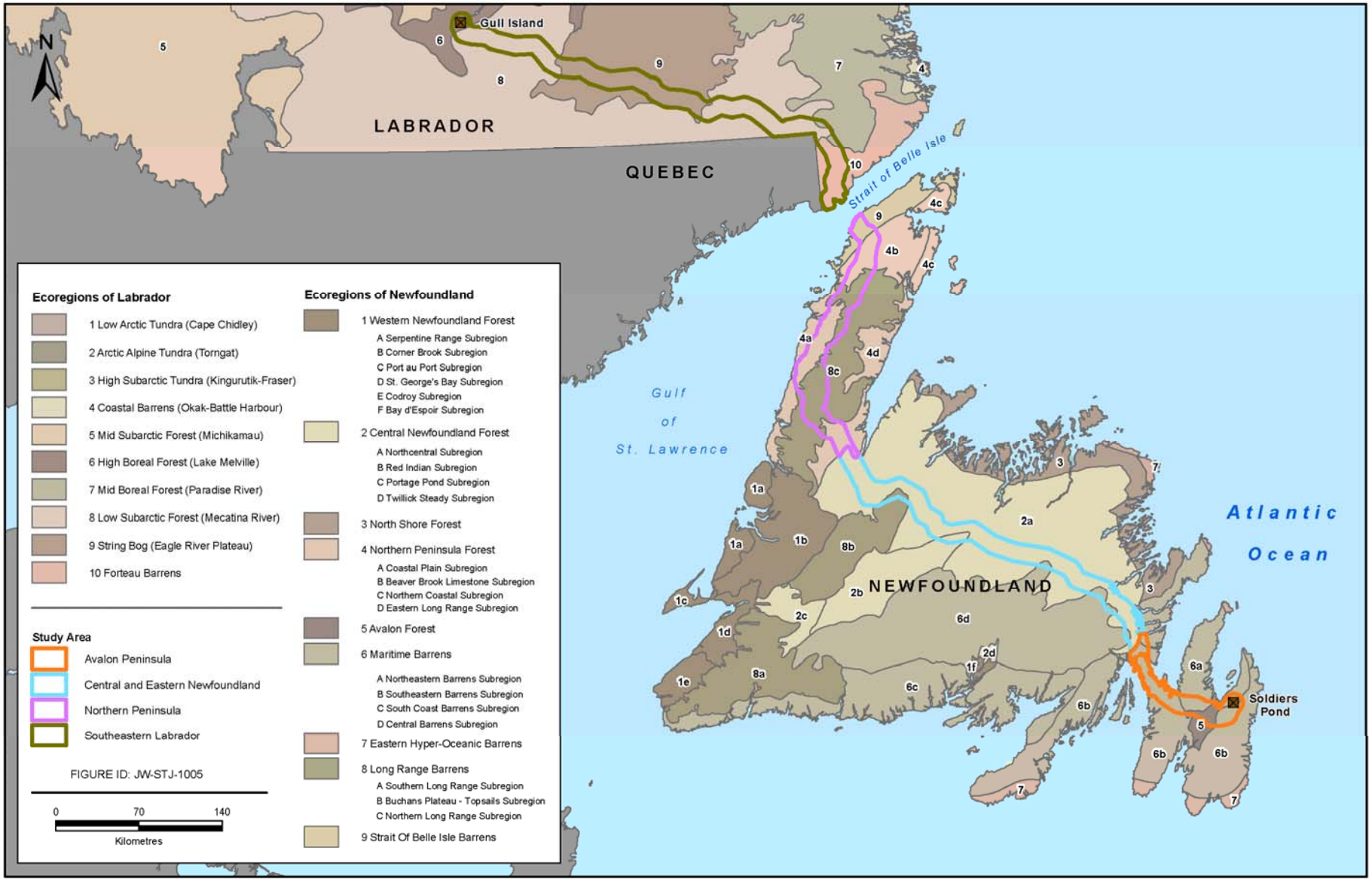


Figure 3.2 Regionally Uncommon Plant Habitat Potential Summary (ELC Study Area) – Southeastern Labrador

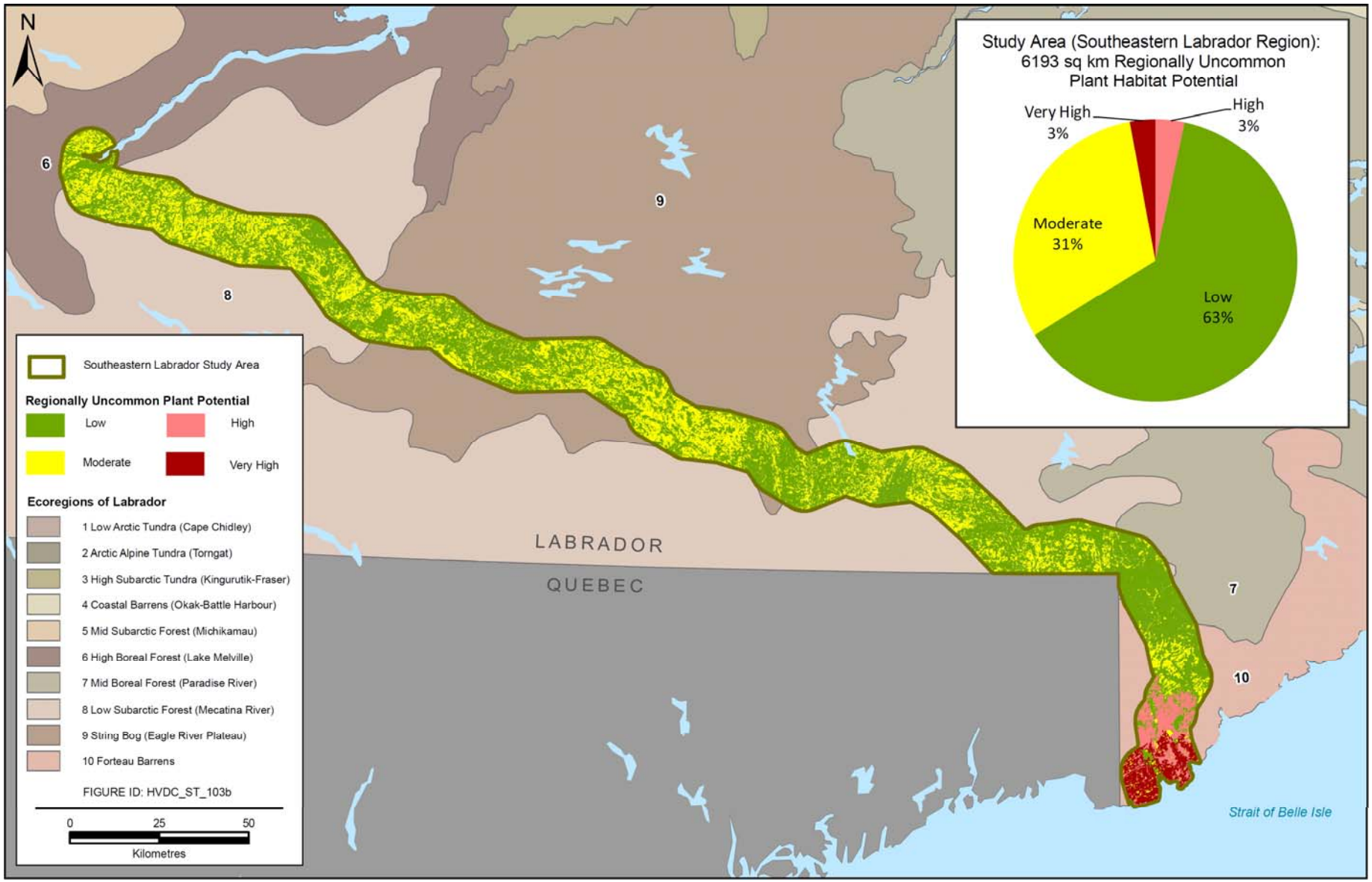


Figure 3.3 Regionally Uncommon Plant Habitat Potential Summary (Transmission Corridor) – Southeastern Labrador

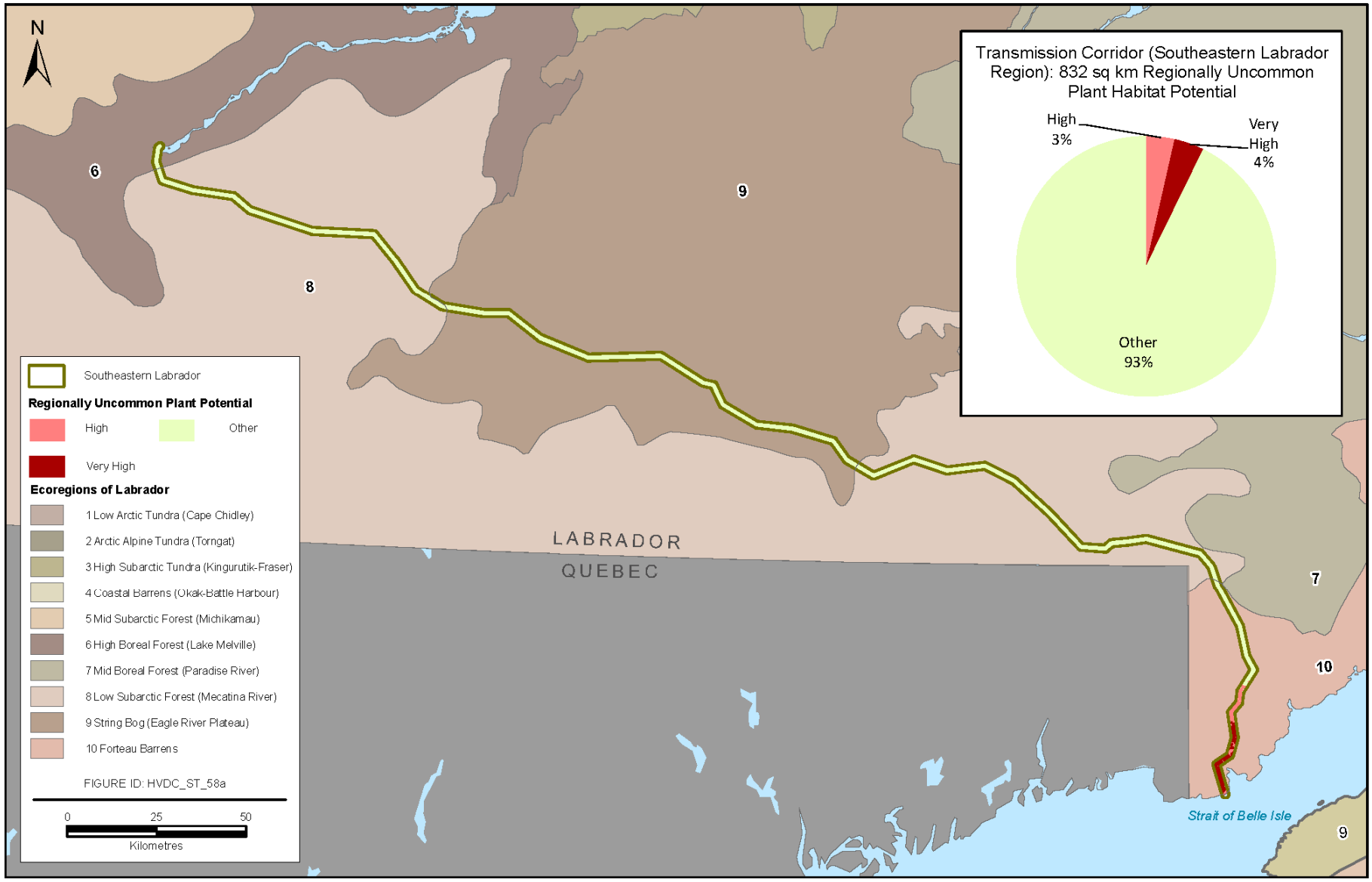


Figure 3.4 Regionally Uncommon Plant Habitat Potential (ELC Study Area) – Northern Peninsula

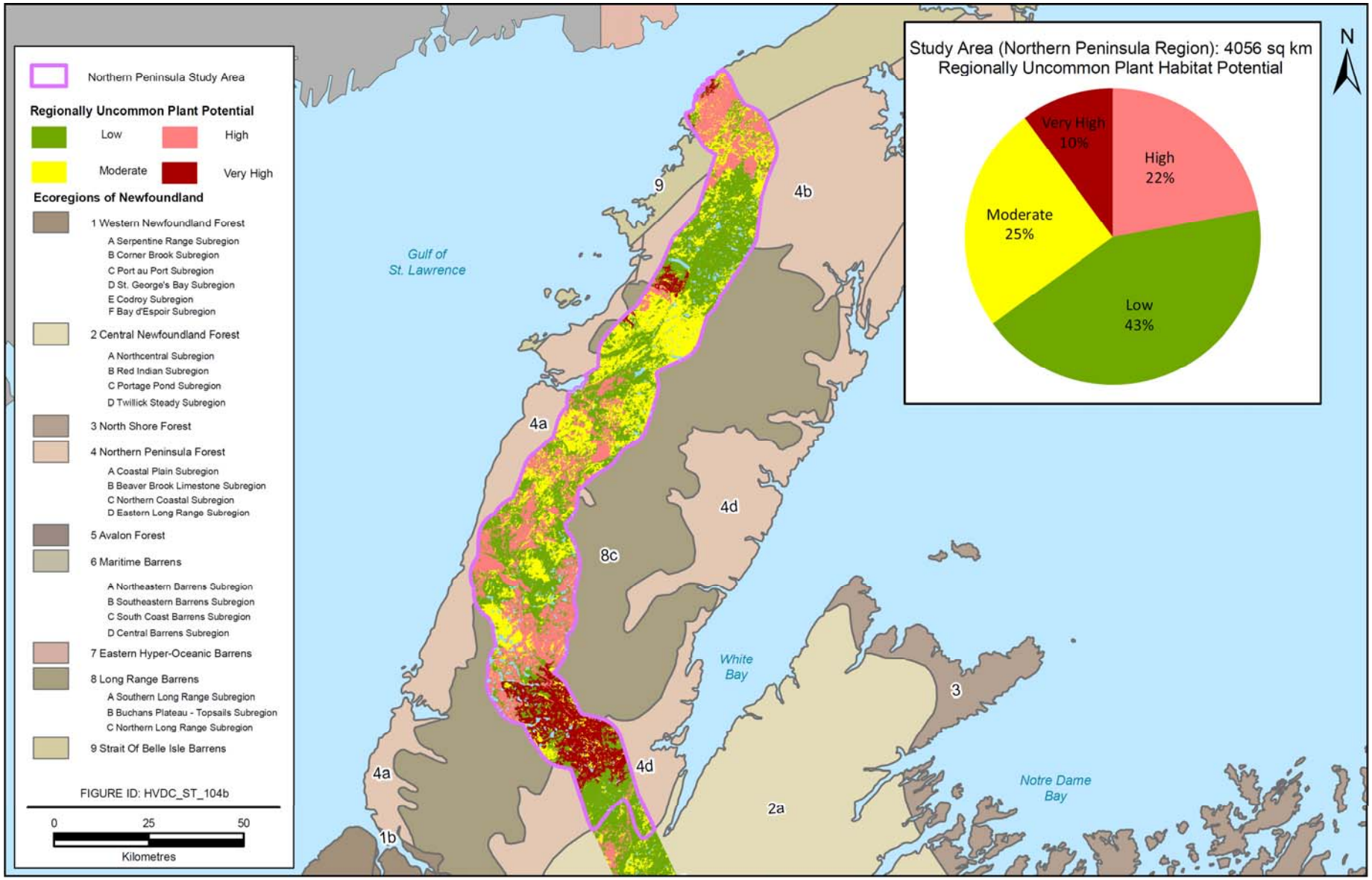


Figure 3.5 Regionally Uncommon Plant Habitat Potential (Transmission Corridor) – Northern Peninsula

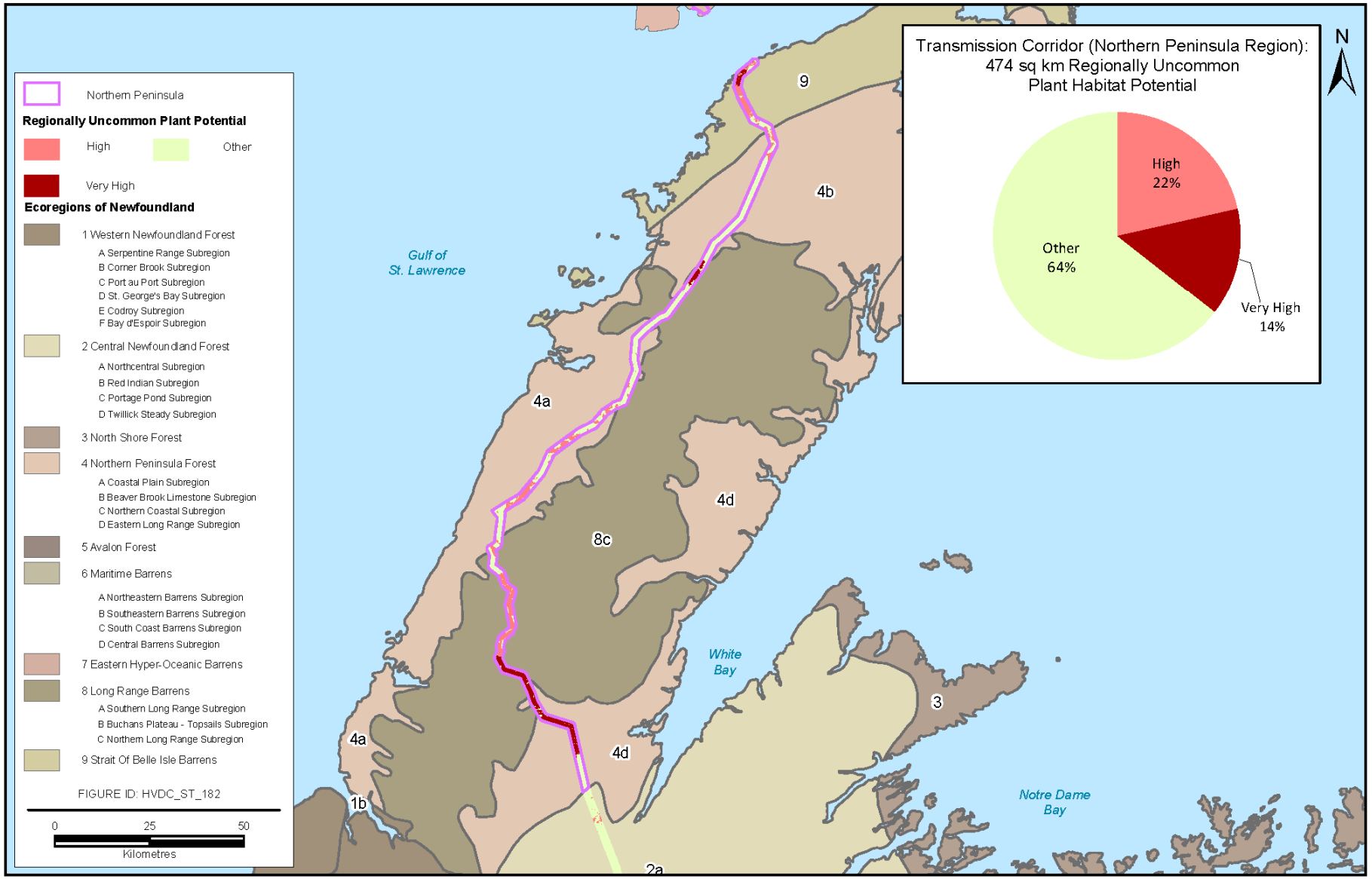


Figure 3.6 Regionally Uncommon Plant Habitat Potential (ELC Study Area) – Central and Eastern Newfoundland

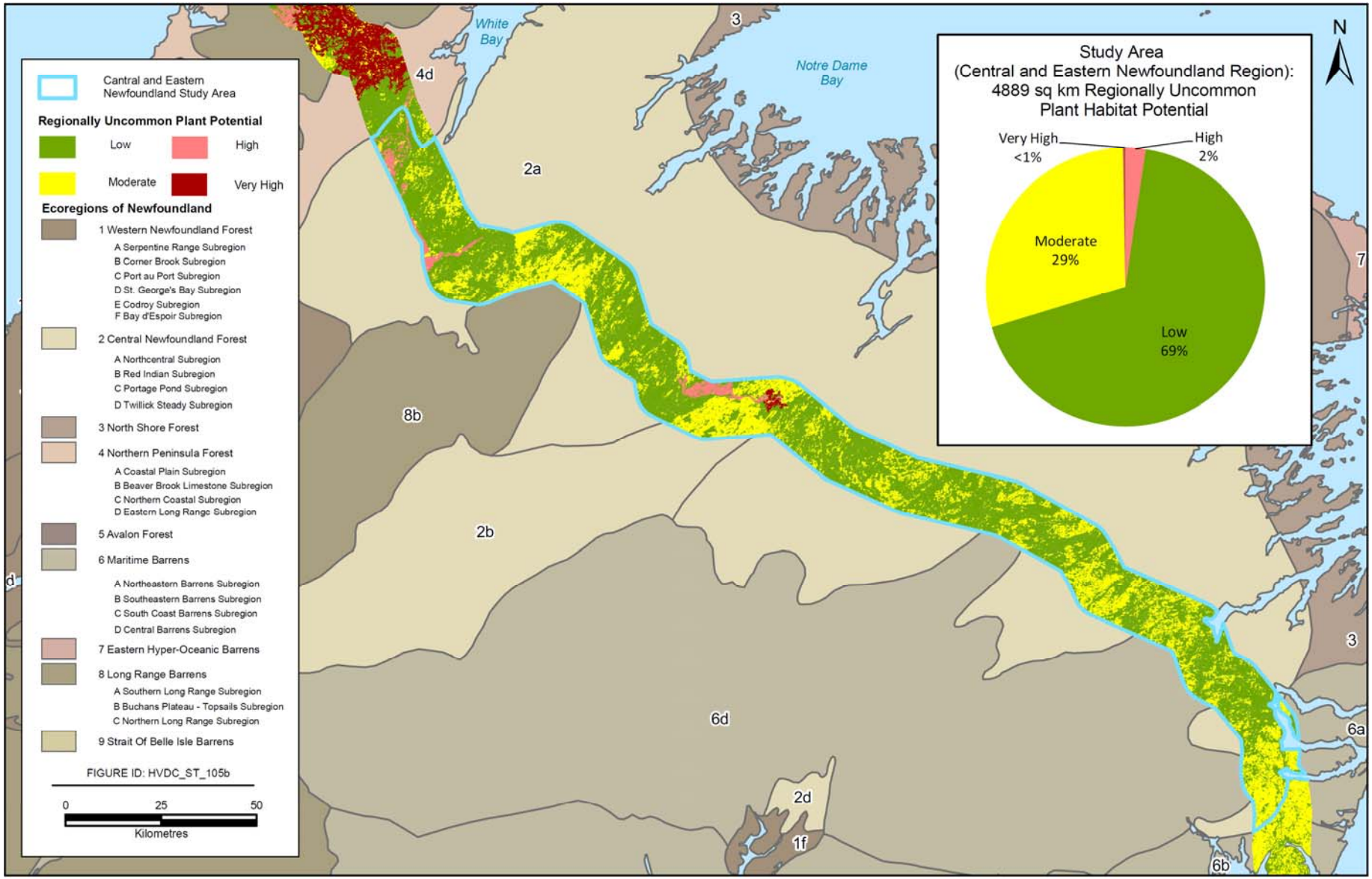


Figure 3.7 Regionally Uncommon Plant Habitat Potential (Transmission Corridor) – Central and Eastern Newfoundland

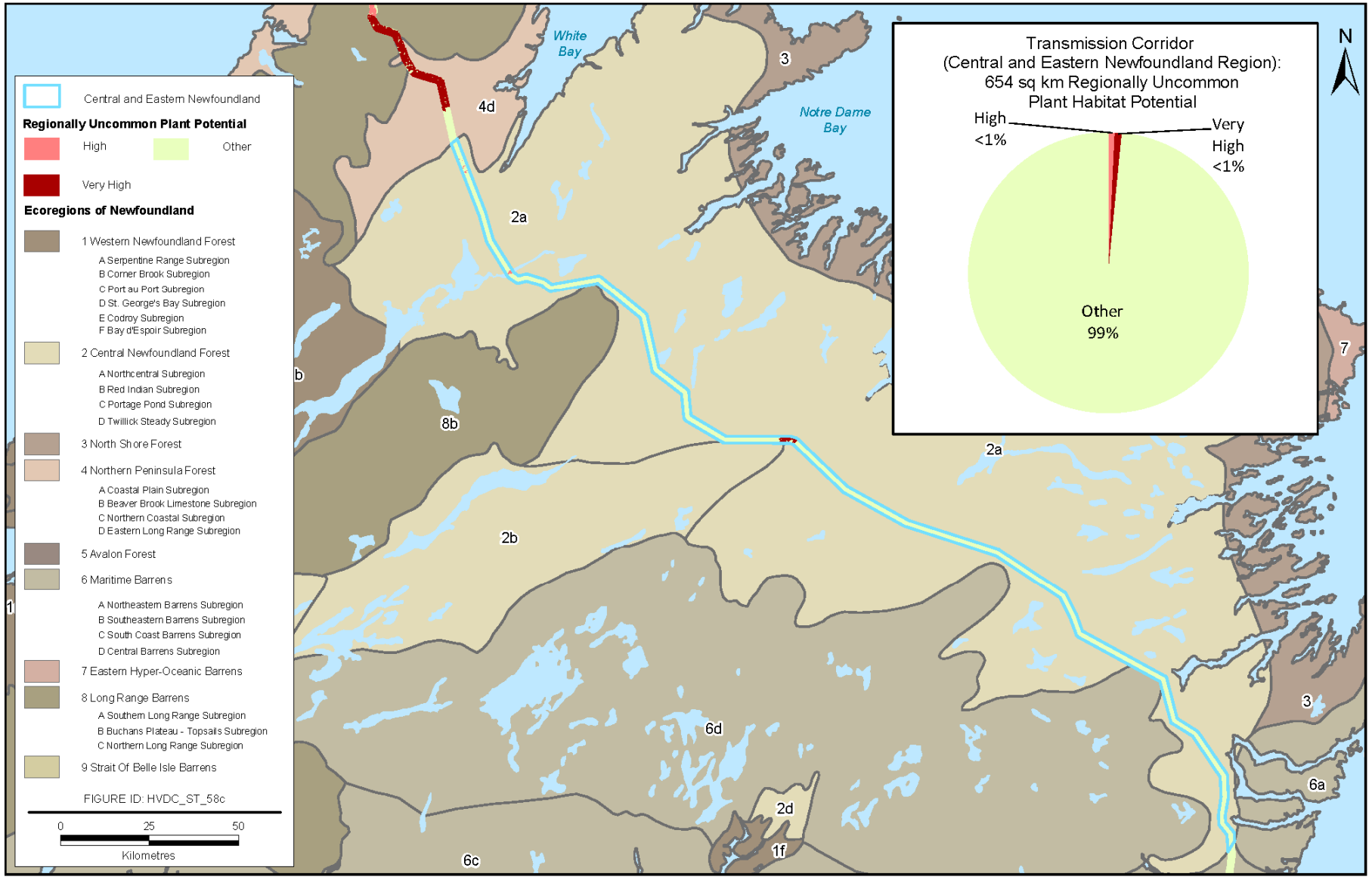


Figure 3.8 Regionally Uncommon Plant Habitat Potential (ELC Study Area) – Avalon Peninsula

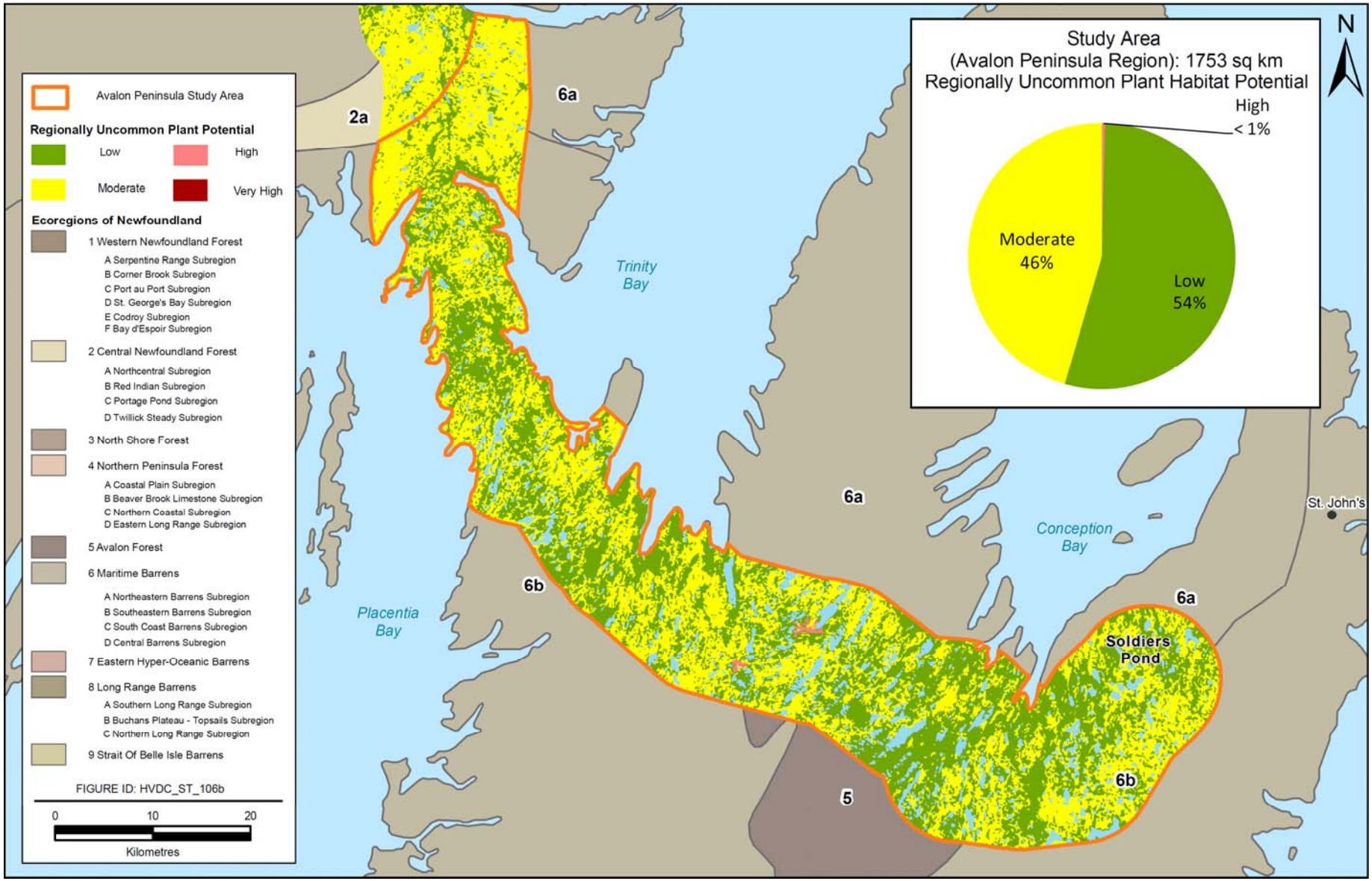
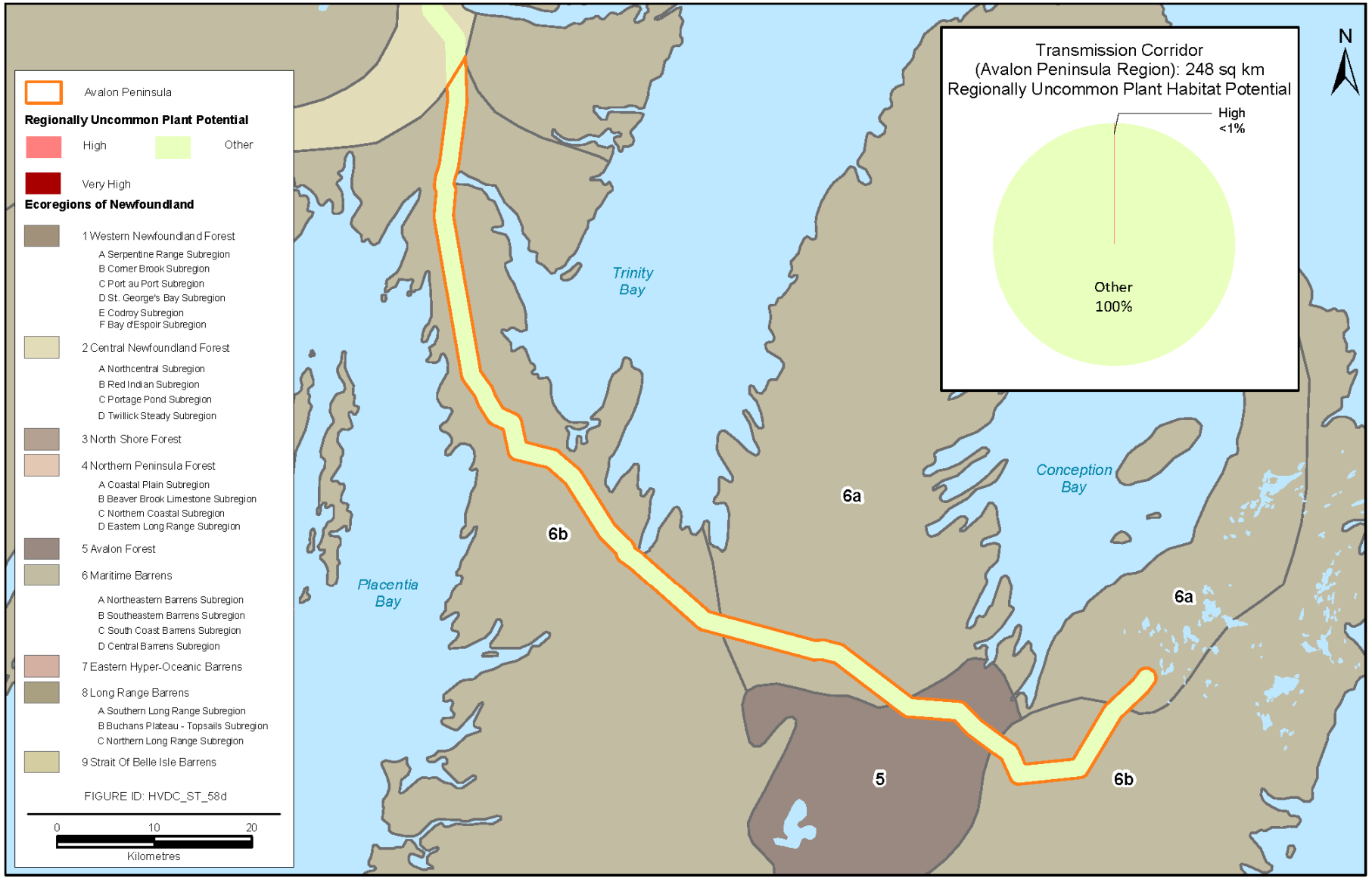


Figure 3.9 Regionally Uncommon Plant Habitat Potential (Transmission Corridor) – Avalon Peninsula



4.0 DISCUSSION AND CONCLUSION

Using the known locations of regionally uncommon plants within the regional ELC Study Area, a dual approach was taken to estimate the extent and general location of potential regionally uncommon plant habitat within the ELC Study Area and proposed transmission corridor in Labrador and Newfoundland. This included habitat modelling using information on preferred species habitat and transmission corridor ELC units, along with empirical data on regionally uncommon species occurrences.

4.1 Regionally Uncommon Plant Potential

For Labrador, the only High potential Habitat Types identified through modelling were calcareous Lichen Heathland and calcareous Coniferous Forest units (along with riparian sub-units found within other Habitat Types) (Table 3.1). These calcareous areas found on the southeast coast of Labrador make up only a small portion of the Study Area (1.1 percent). When combined with the areas known to have regionally uncommon plants, the area rated as having High and Very High potential increases to approximately 6 and 7 percent for the ELC Study Area and proposed transmission corridor, respectively.

For Newfoundland, the highest potential ranks are also associated with select habitats on calcareous substrate (Table 3.2). In particular, calcareous Kalmia Lichen/Heathlands, calcareous Conifer Scrub/Lichen Heathland/Wetland complexes Forests and riparian areas are the most likely to harbour regionally uncommon plants. When combined with areas of known regionally uncommon plant occurrence, these units (High and Very High) comprise 13 and 13 percent of the ELC Study Area and proposed transmission corridor, respectively (Table 3.3). A further 28 percent of the ELC Study Area is classed as Moderate potential regionally uncommon plant habitat (mainly non-calcareous Alpine Vegetated, Conifer Scrub, Kalmia/Lichen Heathland and Wetland), and 28 percent of the proposed transmission corridor. The remaining Habitat Types in Newfoundland have been classed as Low potential for regionally uncommon plant habitat.

Combining the information in Tables 3.1 and 3.2 with regionally uncommon plant occurrence records produces the final potential ratings for ELC Habitat Type polygons for the Study Area (Appendix A and Table 3.3). For Newfoundland, areas of higher potential follow the intuitive trend of being associated with less area (common plants are widespread and regionally uncommon plants are restricted). However, Labrador has two broad classes: Low and Moderate potential, which dominate the proposed transmission corridor and High and Very High potential, which is of minor occurrence. The lack of distinction between Low and Moderate classes in Labrador is likely due in part to the low number of regionally uncommon plants recorded in this area, which necessitated a narrow range between classes.

Potential regionally uncommon plant “hot spots” are associated with calcareous habitats found on both sides of the Strait of Belle Isle, several habitat polygons along the Northern Peninsula, and scattered polygons in the general vicinity of Grand Falls-Windsor (Appendix A).

4.2 Protected "Listed" Species

A listed plant, in this context, refers to those species designated as protected under the federal *Species at Risk Act* (*SARA*) and/or by the provincial *Endangered Species Act* (*NLESA*). Consistent with the goal of preserving biodiversity, conservation efforts focus primarily on the protection of known locations of listed plant species and/or their habitats.

Three plant species protected under *SARA* and *NLESA* and known to exist within Study Area for the Project include Long's braya (*Braya longii*) (designated as Endangered under *SARA* and *NLESA*), Fernald's braya (*Braya fernaldii*) (designated as Threatened under *SARA* and *NLESA*), and boreal felt lichen (*Erioderma pedicellatum*) (designated as Special Concern (*SARA*) and Vulnerable (*NLESA*)). A fourth, Fernald's Milk-vetch (*Astragalus robbinsii var. fernaldii*) (listed as Special Concern (*SARA*) and Vulnerable (*NLESA*)), though not within the Study Area, has been identified within adjacent landscapes. The status of individual species potentially present within the Study Area is listed in Table 4.1.

Table 4.1 Status of Listed Plant Species Potentially Present in the Study Area

Species	Scientific Name	Species Status	
		NLESA	SARA
Long's Braya	Braya longii	Endangered	Endangered
Fernald's Braya	Braya fernaldii	Threatened	Threatened
Fernald's Milk-vetch	Astragalus robbinsii var. fernaldii	Vulnerable	Special Concern
Boreal Felt Lichen	Erioderma pedicellatum	Vulnerable	Special Concern

The distribution of Long's braya, Fernald's braya and, to a lesser extent, Fernald's Milk-vetch is well documented by the Newfoundland and Labrador Department of Environment and Conservation (Wildlife Division). The known range of both braya species within the Study Area is primarily restricted to the limestone barrens along a few small areas around Sandy Cove and Anchor Point on the Northern Peninsula. Occurrences of Fernald's Milk-vetch meanwhile are known only from the Strait of Belle Isle region, in the area of Blanc Sablon, Quebec and on an adjacent site to the Study Area in the Highlands of St. John on the Northern Peninsula of Newfoundland.

The range of boreal felt lichen, although documented, is not as well defined in relation to the Study Area (Keeping and Hanel 2006). Current knowledge suggests that there are two disjunct centres of concentrations of boreal felt lichen in Newfoundland that appear to be relatively isolated. Distributional maps of this species in Newfoundland (Maass and Yetman 2002) depict one of these areas as having been centered on the Avalon Forest Ecoregion, notably in an area known as Hall's Gullies and Lockyer's Waters within the 15 km wide Study Area.

Further information on listed plant species which may potentially interact with the Project are addressed in other relevant baseline studies prepared for this Project's EA.

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