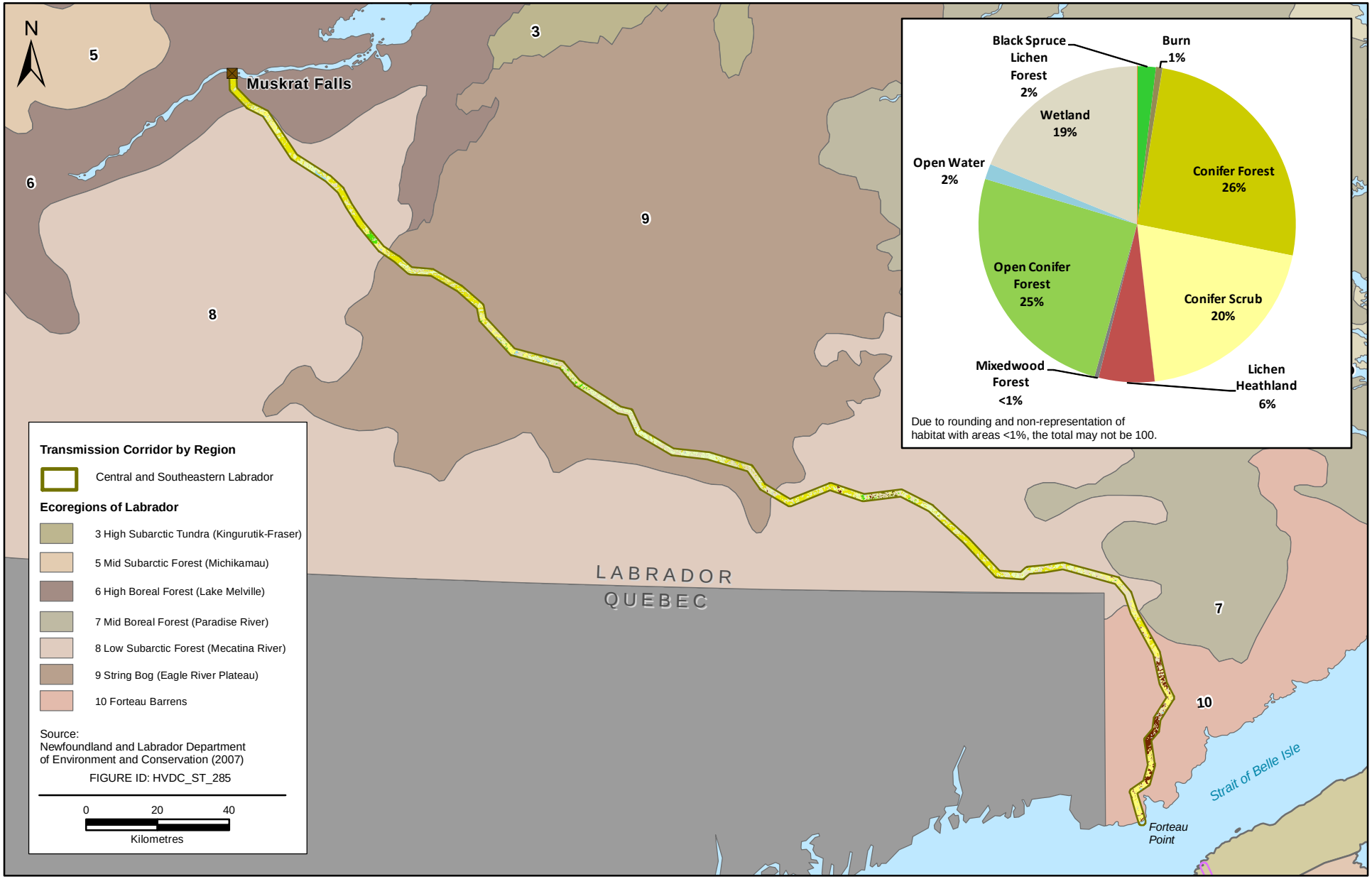


FIGURE 10.3.3-5

Habitat Types and Non-Habitat Areas within the Transmission Corridor for Central and Southeastern Labrador

Table 10.3.3-6 Habitat Types and Non-Habitat Areas Crossed by the Transmission Corridor by Ecoregion for the Northern Peninsula

Ecoregion	Habitat Types										Non-Habitat Areas				Total Area (km^2) (Percent of Total - %)
	Alpine Vegetated	Conifer Forest	Conifer Scrub	Cutover	Kalmia Lichen / Heathland	Mixedwood Forest	Open Conifer Forest	Rocky Barrens	Scrub / Heathland / Wetland Complex	Wetland	Cloud / Shadow	Exposed Earth / Anthropogenic / Cutblock	Exposed Earth / Anthropogenic	Open Water	
Within the Transmission Corridor															
Strait of Belle Isle Barrens (km^2)	0	6	<1	<1	0	0	14	0	6	8	<1	2	<1	7	44 (9)
Northern Peninsula Forest (km^2)	0	90	4	20	0	32	50	<1	44	20	7	<1	0	22	288 (59)
Long Range Barrens (km^2)	<1	39	3	3	<1	5	22	0	59	12	0	<1	<1	8	152 (32)
Total Area (km^2)	<1	135	7	23	<1	36	86	<1	108	40	7	2	1	37	484 (100)
Percent of Northern Peninsula Transmission Corridor	**<1**	**28**	**2**	**5**	**<1**	**8**	**18**	**<1**	**22**	**8**	**2**	**<1**	**<1**	**8**	**100**
Percent of Entire Transmission Corridor (Newfoundland and Labrador)	**0**	**6**	**<1**	**1**	**0**	**2**	**4**	**0**	**5**	**2**	**<1**	**<1**	**<1**	**8**	**22**

Note: Rounding errors <1% may occur.

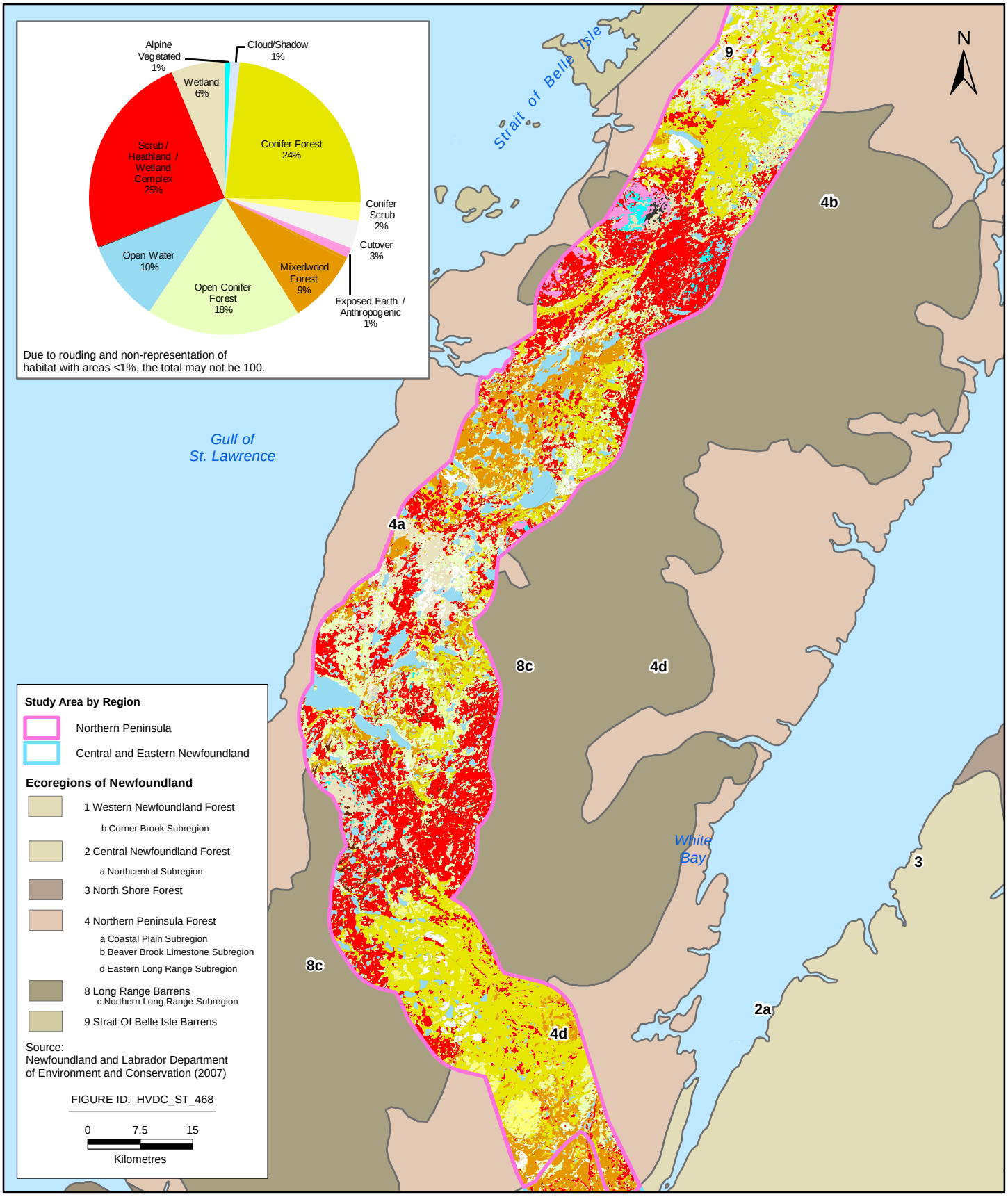


FIGURE 10.3.3-6

Habitat Types and Non-Habitat Areas within the Study Area for the Northern Peninsula

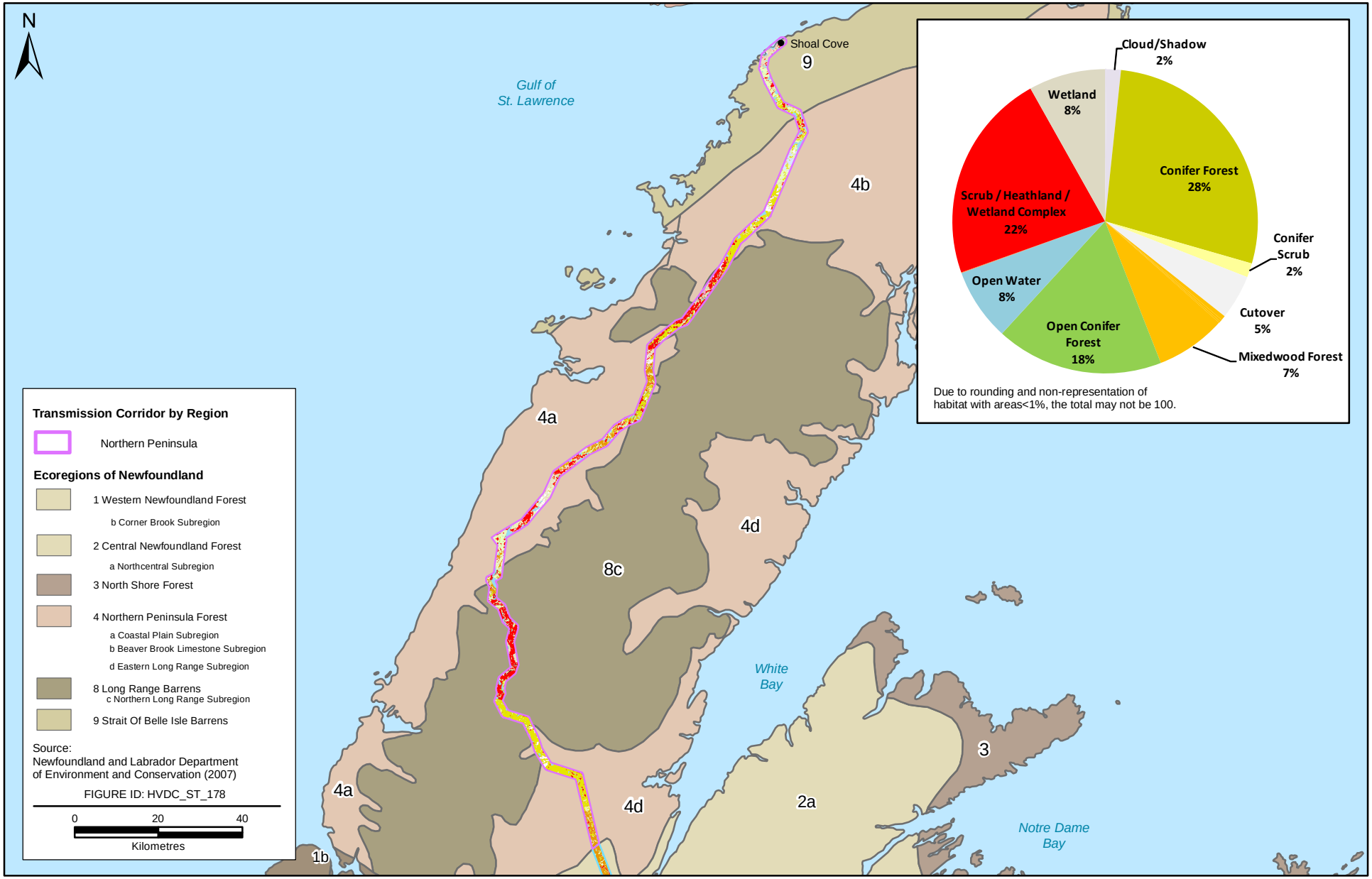


FIGURE 10.3.3-7

Habitat Types and Non-Habitat Areas within the Transmission Corridor for the Northern Peninsula

Table 10.3.3-7 Habitat Types and Non-Habitat Areas Crossed by the Transmission Corridor by Ecoregion for Central and Eastern Newfoundland

Ecoregion	Vegetation/Habitat Types									Non-Habitat Areas			Total Area (Percent of Total - %)
	Conifer Forest	Conifer Scrub	Cutover	Kalmia Lichen / Heathland	Mixedwood Forest	Open Conifer Forest	Rocky Barrens	Scrub / Heathland / Wetland Complex	Wetland	Exposed Earth / Anthropogenic / Cutblock	Exposed-Earth / Anthropogenic	Open Water	
Within Transmission Corridor													
Long Range Barrens (km^2)	0	<1	0	0	<1	0	0	0	<1	0	0	0	<1 (<1)
Central Newfoundland Forest (km^2)	40	19	106	8	213	86	1	71	80	3	<1	13	642 (98)
Maritime Barrens (km^2)	<1	<1	0	<1	<1	2	0	4	3	0	0	<1	12 (2)
Total Area of Central and Eastern Newfoundland Transmission Corridor (km^2)	41	20	106	8	214	88	1	74	83	3	<1	14	654 (100)
Percent of Central and Eastern Newfoundland Transmission Corridor	**6**	**3**	**16**	**1**	**33**	**13**	**<1**	**11**	**13**	**<1**	**<1**	**2**	**100**
Percent of Entire Transmission Corridor (Newfoundland and Labrador)	**2**	**<1**	**5**	**<1**	**10**	**4**	**<1**	**3**	**4**	**<1**	**0**	**<1**	**30**

Note: Rounding errors <1% may occur.

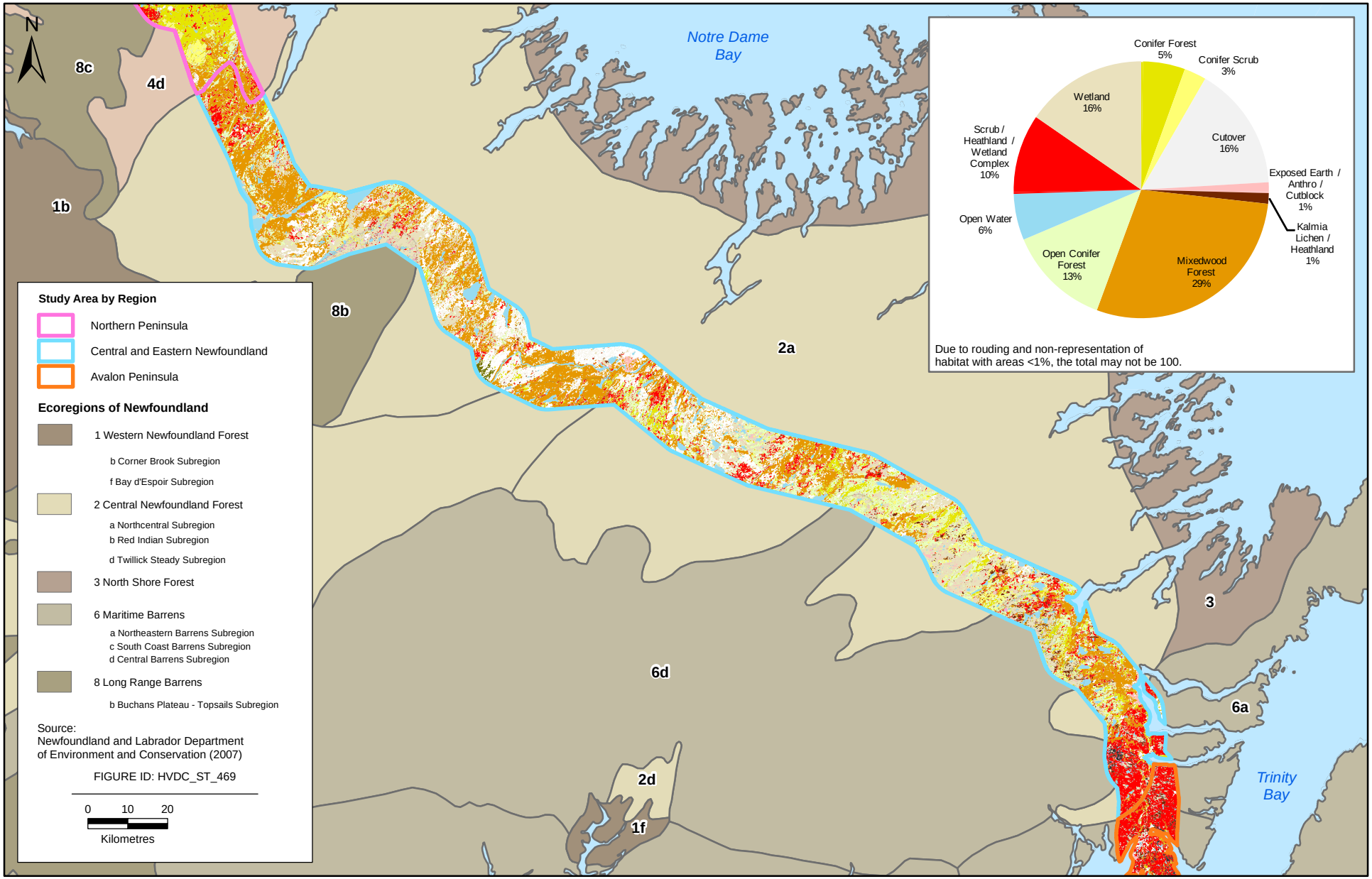


FIGURE 10.3.3-8

Habitat Types and Non-Habitat Areas within the Study Area for Central and Eastern Newfoundland

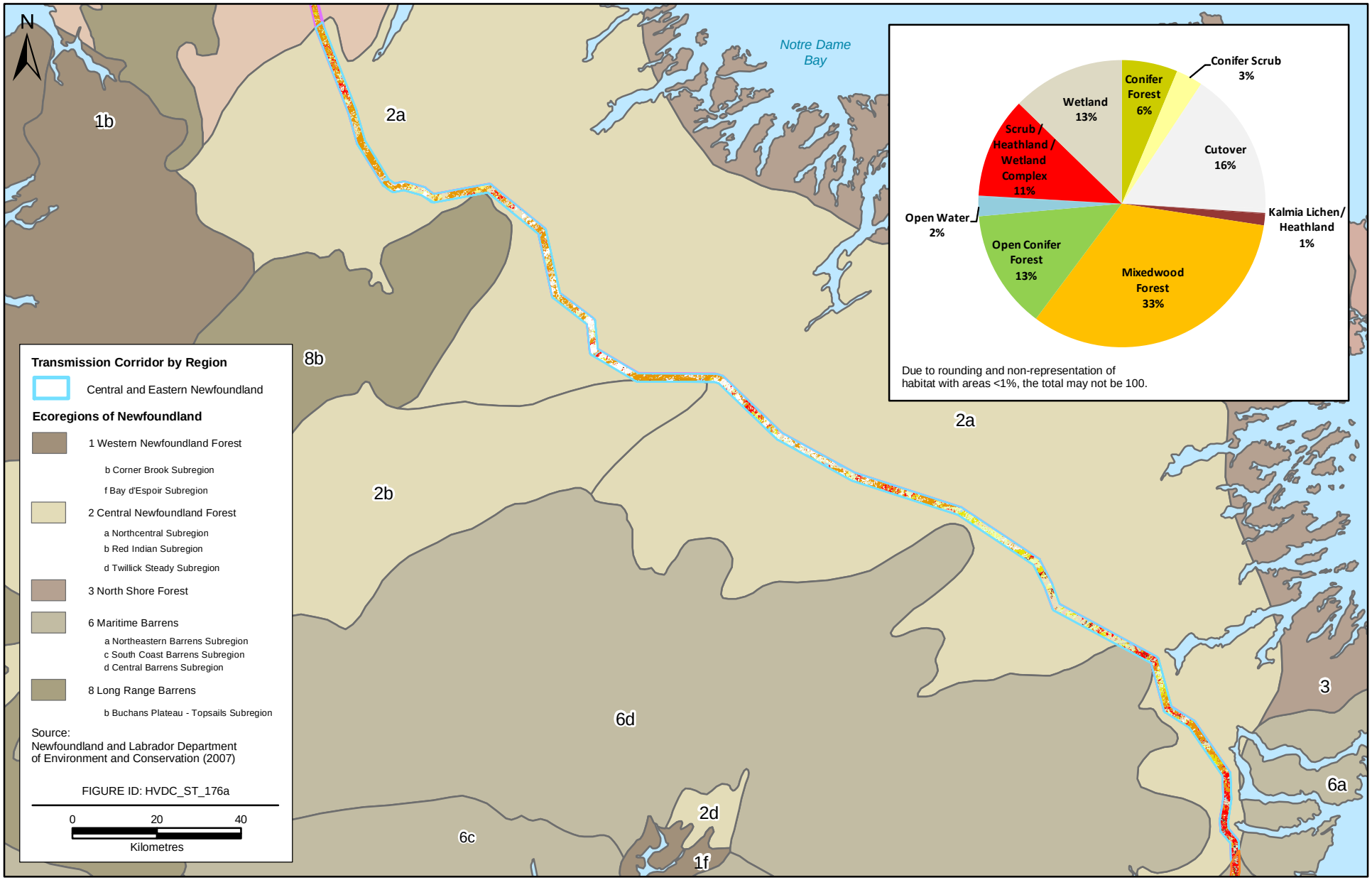


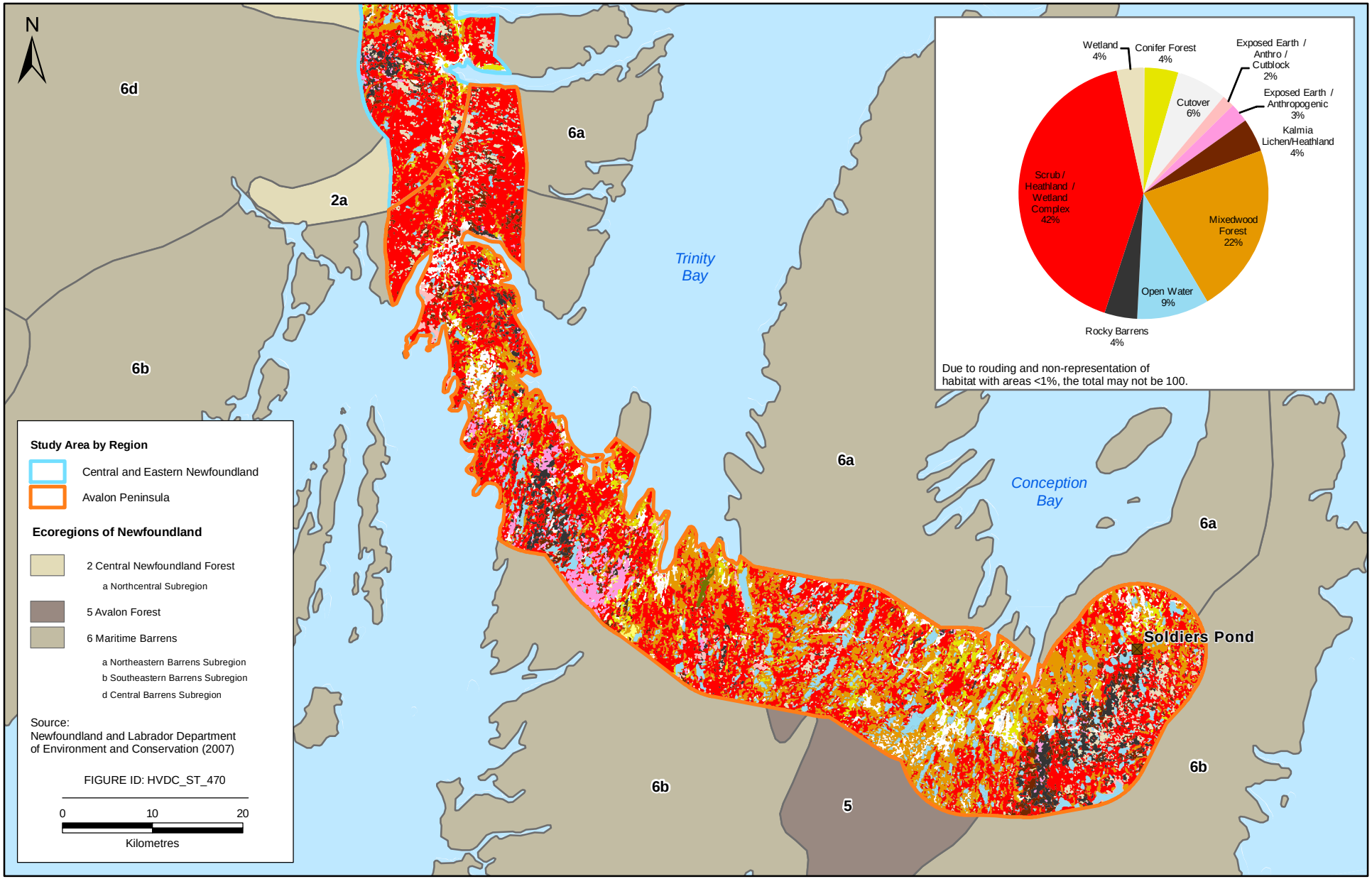
FIGURE 10.3.3-9

Habitat Types and Non-Habitat Areas within the Transmission Corridor for Central and Eastern Newfoundland

Table 10.3.3-8 Habitat Types and Non-Habitat Areas Crossed by the Transmission Corridor by Ecoregion for the Avalon Peninsula

Ecoregion	Habitat Types									Non Habitat Areas			Total Area (km^2) (Percent of Total - %)
	Burn	Conifer Forest	Conifer Scrub	Cutover	Kalmia Lichen / Heathland	Mixedwood Forest	Rocky Barrens	Scrub / Heathland / Wetland Complex	Wetland	Exposed Earth / Anthropogenic/ Cutblock	Exposed Earth / Anthropogenic	Open Water	
Within Transmission Corridor													
Maritime Barrens (km^2)	<1	11	<1	22	15	42	16	92	7	2	5	14	225 (91)
Avalon Forest (km^2)	0	2	0	4	<1	7	<1	7	0	0	<1	2	22 (9)
Total Area of Avalon Peninsula Transmission Corridor (km^2)	<1	13	<1	26	15	49	16	99	7	2	5	16	248 (100)
Percent of Avalon Peninsula Transmission Corridor	**<1**	**5**	**<1**	**10**	**6**	**20**	**7**	**40**	**3**	**<1**	**2**	**6**	**100**
Percent of Entire Transmission Corridor (Newfoundland and Labrador)	**<1**	**<1**	**<1**	**1**	**<1**	**2**	**<1**	**5**	**<1**	**<1**	**<1**	**<1**	**11**

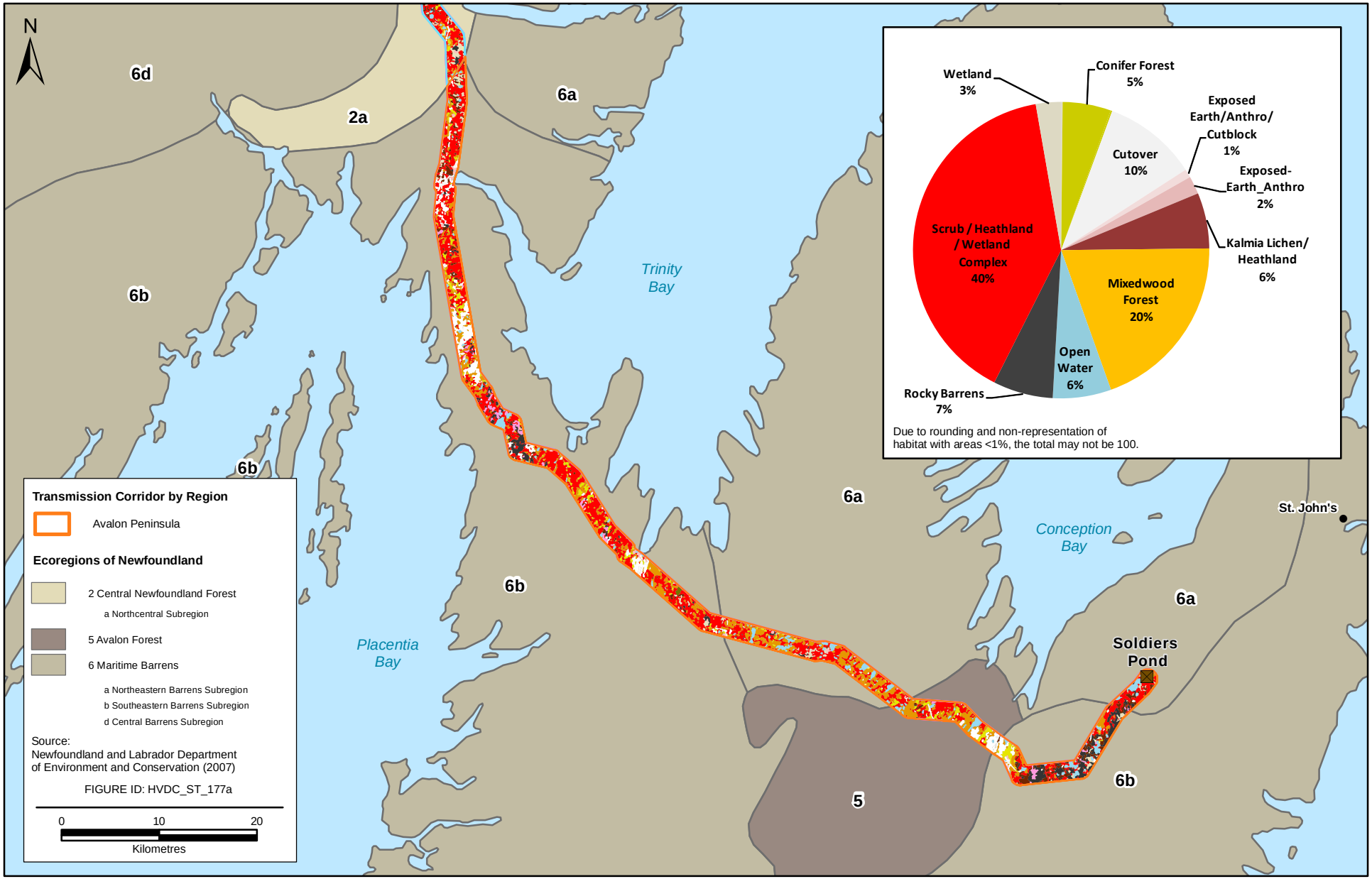
Note: Rounding errors <1% may occur.



nalcor energy

FIGURE 10.3.3-10

Habitat Types and Non-Habitat Areas within the Study Area for the Avalon Peninsula



nalcor energy

FIGURE 10.3.3-11

Habitat Types and Non-Habitat Areas Within the Transmission Corridor for the Avalon Peninsula

The Central and Eastern Newfoundland portion of the transmission corridor occupies a total of 654 km^2, of which 98% is located within the Central Newfoundland Forest Ecoregion (Table 10.3.3-7). The most common Habitat Type is Mixedwood Forest at over 33%, while uncommon Habitat Types were identified as Conifer Scrub, Kalmia Lichen / Heathland and Rocky Barrens.

The area of the transmission corridor within the Avalon Peninsula is 248 km^2 and just over 90% of this occurs within the Maritime Barrens Ecoregion (Table 10.3.3-8). Scrub / Heathland / Wetland Complex is the most common Habitat Type, representing 40% of the transmission corridor. Uncommon Habitat Types include Burn, Conifer Scrub and Wetland.

Table 10.3.3-9 provides a summary of the total area covered by each Habitat Type and Non-Habitat Area within the transmission corridor by Ecoregion for Newfoundland. Overall, the most common Habitat Types crossed by the transmission corridor are Mixedwood Forest and Scrub / Heathland / Wetland Complex, occupying an area of approximately 22% and 20%, respectively. A separate summary was not prepared for Labrador as it is comprised of only one geographic region – Central and Southeastern Labrador, which is described in Table 10.3.3-5.

A summary of Habitat Types and Non-Habitat Areas for the Study Area and transmission corridor for NL is provided in Table 10.3.3-10. Overall, the most common Habitat Types include Open Conifer Forest, Conifer Forest, Mixedwood Forest, Wetland and Scrub / Heathland / Wetland Complex. The least common Habitat Types (comprising <2% of the transmission corridor) include Alpine Vegetated, Black Spruce Lichen Forest, Burn, Hardwood Forest, Kalmia Lichen / Heathland, Rocky Barrens and Exposed Bedrock.

Table 10.3.3-9 Summary of Habitat Types and Non-Habitat Areas (Total) within the Transmission Corridor by Ecoregion for Newfoundland

Ecoregion	Habitat Types											Non-Habitat Areas				Total Area (km^2) (Percent of Total - %)
	Alpine Vegetated	Burn	Conifer Forest	Conifer Scrub	Cutover	Kalmia Lichen / Heathland	Mixedwood Forest	Open Conifer Forest	Rocky Barrens	Scrub / Heathland / Wetland Complex	Wetland	Cloud / Shadow	Exposed Earth / Anthropogenic / Cutblock	Exposed-Earth / Anthropogenic	Open Water	
Strait of Belle Isle Barrens	0	0	6	<1	<1	0	0	14	0	6	8	<1	2	<1	7	44 (3)
Northern Peninsula Forest	0	0	90	4	20	0	32	50	<1	44	20	7	<1	0	22	288 (21)
Long Range Barrens	<1	0	39	3	3	<1	5	22	0	59	12	0	0	<1	8	153 (11)
Central Newfoundland Forest	0	0	40	19	106	8	213	86	1	71	80	0	3	<1	13	641 (46)
Maritime Barrens	0	<1	12	1	22	15	43	2	16	96	9	0	2	5	15	238 (17)
Avalon Forest	0	0	2	0	4	<1	7	0	<1	7	0	0	0	<1	2	22 (2)
Total Area for Newfoundland Transmission Corridor (km^2)	<1	<1	189	28	154	24	299	174	18	281	130	7	8	7	67	1,387 (100)
Percent of Newfoundland Transmission Corridor	<1	**0**	**14**	**2**	**11**	**2**	**22**	**13**	**1**	**20**	**9**	**<1**	**<1**	**<1**	**5**	**100**
Percent of Entire Transmission Corridor (Newfoundland and Labrador)	**0**	**0**	**9**	**1**	**7**	**1**	**14**	**8**	**<1**	**13**	**6**	**<1**	**<1**	**<1**	**3**	**64**

Note: Rounding errors <1% may occur.

Table 10.3.3-10 Habitat Types and Non-Habitat Areas within the Transmission Corridor for Newfoundland and Labrador

Ecoregion	Labrador Area (km^2)	Newfoundland Area (km^2)	Total Area of Transmission Corridor (km^2)	Percent (Overall) of Transmission Corridor (%)
Habitat Types				
Alpine Vegetated	0	<1	<1	0
Black Spruce Lichen Forest	15	0	15	1
Burn	5	<1	5	<1
Conifer Forest	197	189	386	16
Conifer Scrub	155	28	182	8
Cutover	0	154	154	7
Hardwood Forest	0	0	0	<1
Lichen Heathland	44	0	44	2
Kalmia Lichen / Heathland	0	24	24	1
Mixedwood Forest	3	299	303	14
Open Conifer Forest	194	174	368	18
Rocky Barrens	0	18	18	<1
Scrub / Heathland / Wetland Complex	0	281	281	13
Wetland	145	130	274	14
Exposed Bedrock	0	0	0	0
Non-Habitat Areas				
Cloud / Shadow	<1	7	8	<1
Exposed Earth / Anthropogenic / Cutblock	<1	8	8	<1
Exposed Earth / Anthropogenic	0	7	7	<1
Open Water	124	674	794	4
Total (km^2) **(Percent of Total)**	**770** **(36)**	**1,386** **(64)**	**2,156** **(100)**	**100**

Note: Rounding errors <1% may occur.

Wetlands

5 Wetlands refer to land that has the water table at, near or above the land surface, such as bogs, fens, marshes, swamps and other shallow open water areas (GNL 2002b). The *Comprehensive Study List Regulations*, SOR/94-638. define wetlands as "swamp, marsh, bog, fen or other land that is covered by water during at least three consecutive months of the year". Wetlands comprise 18% of the land mass in NL, which represents 5% of the total wetland area in Canada (EC 1993).

Wetlands are one of the 15 Habitat Types identified during the Project ELC delineation (described in *Labrador - Island Transmission Link Wetland Inventory and Classification* (Stantec 2011b; Stantec 2010b), comprising approximately 14% of the Study Area. The total wetland area, the number of wetlands, and the percent wetland coverage of the Study Area, by region, are summarized in Table 10.3.3-11.

Table 10.3.3-11 Summary of Wetland Occurrence in the Study Area by Region

Region[(a)]	Total Land Area (km^2)	Number of Wetlands	Total Wetland Area (km^2)	Wetland Percentage of Landmass (%)
Central and Southeastern Labrador	5,754	4,427	1,194	21
Northern Peninsula	4,056	1,938	257	6
Central and Eastern Newfoundland	4,888	3,670	833	17
Avalon Peninsula	1,753	856	59	3
Total	**16,452**	**10,891**	**2,344**	**14**

Note: Rounding errors <1% may occur.
(a) Based on ELC Study Area mapping (Stantec 2010a).

A total of 1,731 wetlands were identified in the transmission corridor, comprising over 211 km^2 of wetland area and representing approximately 10% of the transmission corridor area (Table 10.3.3-12). The proportion of wetland area in the transmission corridor, wetland density (wetland number/km^2) and the average size of wetlands differs among the regions. Wetlands made up the largest proportion of the corridor in the Central and Eastern Newfoundland region (12%), and wetland density was greater than in other regions of the transmission corridor with 1.1 wetlands per km^2. Wetlands in the Avalon Peninsula region of the corridor were smaller than in the other regions (average 0.10 km^2), at the lowest density (0.8 wetlands per km^2) and represented the smallest proportion of the transmission corridor (8%). Wetlands in the Central and Southeastern Labrador and Northern Peninsula regions of the corridor occurred at similar density (0.6 and 0.7 wetlands per km^2, respectively), represented the same proportion of landmass of the corridor (9%) and similar average size (0.13 and 0.15 km^2, respectively).

Table 10.3.3-12 Summary of Wetland Occurrence in the Transmission Corridor by Region

Wetland Class/Form		Central and Southeastern Labrador		Northern Peninsula		Central and Eastern Newfoundland		Avalon Peninsula	
Class	Form	Area (km^2)	Number	Area (km^2)	Number	Area (km^2)	Number	Area (km^2)	Number
Bog	Plateau	2	3	11	65	0	0	0	0
	Slope	12	127	11	126	7	147	13	145
	String	14	69	0	0	0	0	0	0
	Domed	1	8	1	14	7	74	2	35
	Ribbed	<1	1	2	1	0	0	0	0
	Basin	0	0	0	0	<1	1	<1	2
	Blanket	<1	1	0	0	0	0	0	0

Table 10.3.3-12 Summary of Wetland Occurrence in the Transmission Corridor by Region (continued)

Wetland Class/Form		Central and Southeastern Labrador		Northern Peninsula		Central and Eastern Newfoundland		Avalon Peninsula	
Class	Form	Area (km^2)	Number	Area (km^2)	Number	Area (km^2)	Number	Area (km^2)	Number
Fen	Ladder	0	0	0	0	<1	2	0	0
	Ribbed	1	8	<1	8	13	113	0	0
	String	<1	1	0	0	0	0	0	0
	Domed	<1	1	0	0	<1	1	0	0
	Slope	5	75	1	17	13	221	0	0
Marsh	Riparian	0	0	1	6	<1	2	0	0
	Basin	0	0	<1	1	0	0	0	0
Peatland Complex	Domed Bog Ladder Fen	0	0	1	6	6	20	0	0
	Domed Bog Ladder Fen Slope Fen	0	0	<1	1	6	18	0	0
	Domed Bog Ribbed Fen	0	0	0	0	2	7	0	0
	Domed Bog Slope Fen	0	0	1	4	5	38	0	0
	Raised Bog Slope Fen	<1	2	0	0	0	0	0	0
	Ribbed Fen Slope Fen	16	90	1	5	5	24	0	0
	Domed Bog Slope Bog	<1	3	<1	9	0	0	6	18
	Slope Bog Ribbed Fen	<1	1	7	76	13	56	<1	2
	Plateau Bog Ribbed Fen	0	0	3	7	0	0	0	0
	Plateau Bog Slope Bog	0	0	2	2	0	0	0	0
	Plateau Bog Slope Fen	0	0	1	1	0	0	0	0
	Plateau Bog String Bog	1	3	0	0	0	0	0	0
	String Bog Ribbed Fen	10	31	0	0	0	0	0	0
	String Bog Slope Bog	7	29	0	0	0	0	0	0

Table 10.3.3-12 Summary of Wetland Occurrence in the Transmission Corridor by Region (continued)

Wetland Class/Form		Central and Southeastern Labrador		Northern Peninsula		Central and Eastern Newfoundland		Avalon Peninsula	
Class	Form	Area (km^2)	Number	Area (km^2)	Number	Area (km^2)	Number	Area (km^2)	Number
Peatland Complex (continued)	String Bog Slope Fen	<1	3	0	0	0	0	0	0
Total		**69**	**456**	**44**	**349**	**76**	**724**	**21**	**202**
Total Land Area in Transmission Corridor (km^2)		**770**		**484**		**654**		**248**	
Percent of Corridor Comprised of Wetland		**9**		**9**		**12**		**8**	

Note: Rounding errors <1% may occur.

As summarized in Table 10.3.3-12, three classes of wetland (i.e., bog, fen and marsh), and 29 forms, were identified within the transmission corridor, as defined by the Canadian Wetland Classification System (National Wetlands Working Group 1997). A fourth wetland class, peatland complex, was derived to encompass complexes of fen and bog that could not be separated at the 1:50,000 mapping scale used for the delineation and classification exercise. Bog and fen wetlands, and complexes of bog and fen, were ubiquitous in the transmission corridor, representing more than 99% of the wetland area identified. Detailed descriptions of the wetland classes and forms are provided in Stantec (2010b).

Nine marshes (riparian and basin form) were identified within the transmission corridor, comprising 0.4% (1 km^2) of the total delineated wetland area. Swamp and shallow water wetlands were not identified in the transmission corridor.

Given the geographic extent of the Project, it is not practical to assess the functional performance of individual wetlands. Five key wetland functional categories were identified as the most important ecological functions provided by wetlands within the transmission corridor and included biological productivity carbon cycling, hydrology, water quality and wildlife habitat (Stantec 2010b). This evaluation, including a definition of the function, the relative potential performance of the function between wetland classes and a description of the rationale is summarized in Table 10.3.3-13. The wetland class, based on hydrogeomorphic character, can be related to the wetland function (Tiner 2003).

Table 10.3.3-13 Summary of Functions Associated with Wetland Classes in the Transmission Corridor

Function[(a)]	Definition	Relative Potential Performance of Function		
		Bog	Fen	Marsh
Biological Productivity	Amount and rate of production of vegetation or biomass that occurs in that ecosystem over a given period of time	Low productivity as a result of low nutrient inputs (precipitation), depressed nutrient availability (low pH) and stable water levels (low oxygen)	Moderate productivity as a result of low nutrient influx (groundwater) and stable water levels (low oxygen)	High productivity due to nutrient influx (runoff), high nutrient availability (neutral pH) and fluctuating water table (high oxygen)
Carbon Cycling	Long-term storage of atmospheric carbon in wetland soils and biomass	High carbon storage in the form of peat accumulation, due to low decomposition rates	Moderate storage in the form of peat accumulation to a lesser extent than bogs	Low potential for long-term storage despite high biomass productivity due to high microbial decomposition rates
Hydrology	Attenuation of stormwater peak flows	Low as bogs receive direct precipitation; large bogs may attenuate flows during extreme storms	Moderate in large fens that receive water from the landscape (runoff, watercourses and groundwater)	High due to association with streams and riparian areas that allow direct attenuation of surface flows
Water Quality	Attenuation of anthropogenic water pollution constituents (nutrients and suspended sediments)	Low as bogs are isolated from land-originated hydrological systems that may be affected by pollution	Low as fens are isolated from land-originated hydrological systems that may be affected by pollution. Fens may attenuate nutrients where groundwater is affected by agriculture	Moderate due to run-off as a water source, the water-slowing effect of emergent vegetation and fluctuating water table providing alternating oxidized and reduced soil conditions
Wildlife Habitat	Provision of food, shelter and habitat for wildlife	Moderate as bogs have low consumable biomass productivity and moderate potential for habitat, staging and travel corridors for wildlife	Moderate as fens have low consumable biomass productivity and moderate potential for habitat, staging and travel corridors for wildlife. Fens have a higher occurrence of open water (than bogs) for waterfowl	Marshes are more productive biologically than both bogs and fens. The increase in available nutrients, combined with the adjacent areas, is likely to provide habitat for a wider variety of wildlife species than fens and bogs

(a) *Wetland Ecological Functions Assessment: An Overview of Approaches* (Hanson et al. 2008).

Riparian Habitat

Riparian habitat is defined as non-wetland habitat adjacent to watercourses and inland waterbodies that is unique in hydrology and vegetation from other upland habitat (Ilhardt et al. 2000). It is the unique hydrology and vegetation from other upland habitat that allows the functional width of a riparian area to be delineated in the field.

For this study, riparian shoreline length has been used as a measure of riparian area occurrence in the transmission corridor; width is defined by the buffer distance from a watercourse or waterbody that is locally prescribed or regulated. In a recent study of watercourses crossed by the transmission corridor (AMEC 2010a),

vegetation observed in riparian habitats was typically described as mature conifer, mature mixedwood, or shrub dominated. A summary of shoreline class lengths within the transmission corridor by region is provided in Table 10.3.3-14.

Table 10.3.3-14 Riparian Shoreline Class Lengths within the Transmission Corridor by Region

Administrative Unit	Shoreline Class	Central and Southeastern Labrador[(a)]	Northern Peninsula[(a)]	Central and Eastern Newfoundland[(a)]	Avalon Peninsula[(a)]
Within Protected Public Water Supply Area[(b)]	Intake area[(c)] shoreline length (km)	2	0	0	0
	Major river[(d)] shoreline length (km)	0	8	78	0
	Waterbody[(e)] shoreline length (km)	1	60	66	73
	Brook[(f)] shoreline length (km)	1	35	134	16
	All shoreline length (km)	***3***	***103***	***279***	***89***
	Scheduled salmon river[(g)] shoreline length (km)	0	0	36	0
Outside Protected Public Water Supply Area	Major river shoreline length (km)	95	45	107	0
	Waterbody shoreline length (km)	301	651	290	372
	Brook shoreline length (km)	491	279	374	177
	All shoreline length (km)	***886***	***975***	***771***	***549***
	Scheduled salmon river shoreline length (km)	0	13	34	12

Note: Rounding errors <1% may occur.

(a) Calculated from provincial hydrology mapping (NRCan 2010, internet site), PPWSA mapping (NLDEC 2010a, internet site) and scheduled salmon river mapping (DFO 2009a, internet site).

(b) Protected Public Water Supply Area (PPWSA) are designated and regulated by the Department of Environment and Conservation under the *Water Resources Act* (2002). Section 39 of the *Water Resources Act* prohibits all activities in PPWSA's which have potential to impair water quality. No development activity shall be permitted in specified buffer zones except those which are intended to promote vegetation.

(c) Intake Area: A pond, lake or river from which drinking water is extracted or withdrawn for public use. An intake pond or lake requires proponents to provide a minimum of 150 m width buffer zone, from the high water mark, along and around waterbodies in a designated area. In the case of river intake areas, a minimum of 150 m for a distance of one km upstream and 100 m downstream of the affected area is required for a buffer.

(d) Major River: A watercourse identified in the provincial hydrology mapping (NRCan 2010, internet site) as a waterbody-river. Major rivers are mapped as shape features (left and right bank). Proponents are required to provide a minimum of 75 m width buffer zone, from the high water mark, along and around rivers in a PPWSA.

(e) Waterbody: A waterbody identified in the provincial hydrology mapping (NRCan 2010, internet site) as a waterbody-freshwater and includes lakes and ponds (but not wetlands). Waterbodies are mapped as shape features. In a PPWSA proponents are required to provide a minimum of 50 m width buffer zone, from the high water mark of a waterbody.

(f) Brook: A watercourse identified in the provincial hydrology mapping (NRCan 2010, internet site) as a waterbody-brook. Brooks are mapped as line features and include minor tributaries and non-major rivers. In a PPWSA proponents are required to provide a minimum of 30 m width buffer zone, from the high water mark from a brook.

(g) Scheduled Salmon River: Includes the main stem of a river including tidal waters at the mouth of a river inside DFO bait and spinner signs; the waters of any connected pond or lake within 90 m of the river's entrance and outlet, or as indicated by DFO signs; in many cases, tributary streams; in a few cases, certain lakes and ponds. There are 186 scheduled salmon rivers in Newfoundland and Labrador (DFO 2009a, internet site).

Listed Plant Species

Based on a review of the *SARA* Public Registry (EC 2010k, internet site), outcomes of ACCDC database queries performed prior to field surveys (2008), and those conducted as part of the Stantec 2010c and Stantec 2011b

reports, four listed plant species are known to exist within the Study Area for the Project: Fernald's milk-vetch (*Astragalus robbinsii* var. *fernaldii*); Long's braya (*Braya longii*); Fernald's braya (*Braya fernaldii*); and boreal felt lichen (*Erioderma pedicellatum*). Details of these species and their habitat requirements are provided in *Labrador – Island Transmission Link Regionally Uncommon Plant Potential Mapping* (Stantec 2010c). The status of these species is provided in Table 10.3.3-15. Listed plants are assessed by the NLDEC (Endangered Species List Regulations under the *NLESA*) 2002) (GNL 2002a) and Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and assigned a status based on their abundance, population trends and depth of knowledge of populations. Under *SARA*, only Schedule 1 species (species designated extirpated, endangered, threatened, and of special concern) have listed protection. Schedule 2 species (those designated as endangered or threatened) and Schedule 3 species (those designated as special concern) have yet to be re-assessed by COSEWIC using revised criteria.

Table 10.3.3-15 Status of Listed Plant Species Known to Occur in the Study Area

Species	Scientific Name	Listed Species Status		
		NLESA	***SARA* Schedule**	**COSEWIC**
Fernald's Milk-vetch	*Astragalus robbinsii* var. *fernaldii*	Vulnerable	Schedule 1	Special concern
Long's Braya	*Braya longii*	Endangered	Schedule 1	Endangered
Fernald's Braya	*Braya fernaldii*	Threatened	Schedule 1	Threatened
Boreal Felt Lichen	*Erioderma pedicellatum*	Vulnerable	Schedule 1	Special concern

Fernald's milk-vetch is a perennial, herbaceous member of the pea and bean family that grows in small clumps. Its alternate leaves are compound, with nine to 17 hairy leaflets; flowering stalks borne along the stem bear 10 to 20 small flowers, which are purple to lilac in colour, and fruit that is hairy and on a short stalk (EC 2011, internet site). Occurrences of Fernald's milk-vetch are known primarily from the Strait of Belle Isle region, in the area of Battery Trail and Red Cliffs, east of L'Anse-au-Loup; at Point Amour near L'Anse Amour; and in proximity to Forteau Bay on the south-east coast of Labrador and at Blanc-Sablon, Québec (ACCDC 2010, internet site). Fernald's milk-vetch is an obligate calciphile. As such, its known range within the Study Area is primarily within areas of interrupted vegetative cover (i.e., tops of hills) where exposure to wind promotes a freeze-thaw cycle exposing limestone substrates and inhibiting vegetative cover.

Long's braya and Fernald's braya are closely related members of the mustard family (*Brassicaceae*) and are similar in appearance. Long's braya is a small, arctic-alpine-like plant, growing to a height of 1 to 10 cm; Long's braya is similar to Fernald's braya except for its pouch, which is hairless. Its petals are also larger, and its seedpods are not quite as purple (Limestone Barrens Habitat Stewardship Project 2010, internet site). Fernald's braya is small, growing to a height of 1 to 7 cm. Fernald's braya is a self-pollinating, perennial plant that lives for several years in ideal growing conditions (Limestone Barrens Habitat Stewardship Project 2010, internet site).

The distribution of Long's braya and Fernald's braya is well documented by the NLDEC (Wildlife Division). Both braya species are endemics, ranked G1 globally and restricted to the unique coastal limestone barren ecosystems of the Northern Peninsula in Newfoundland, from Port au Choix to Burnt Cape. Long's braya are found in five sites (along a 10 km stretch of land) and Fernald's braya are found in 14 sites (approximately 150 km in length spanning the north-south axis of the Northern Peninsula's limestone barrens). The known range of both braya species within the Study Area is restricted to the limestone barrens along a few small areas around Sandy Cove and Anchor Point on the Northern Peninsula. Identified habitat for these species is presented in Figure 10.3.3-12 and Figure 10.3.3-13.

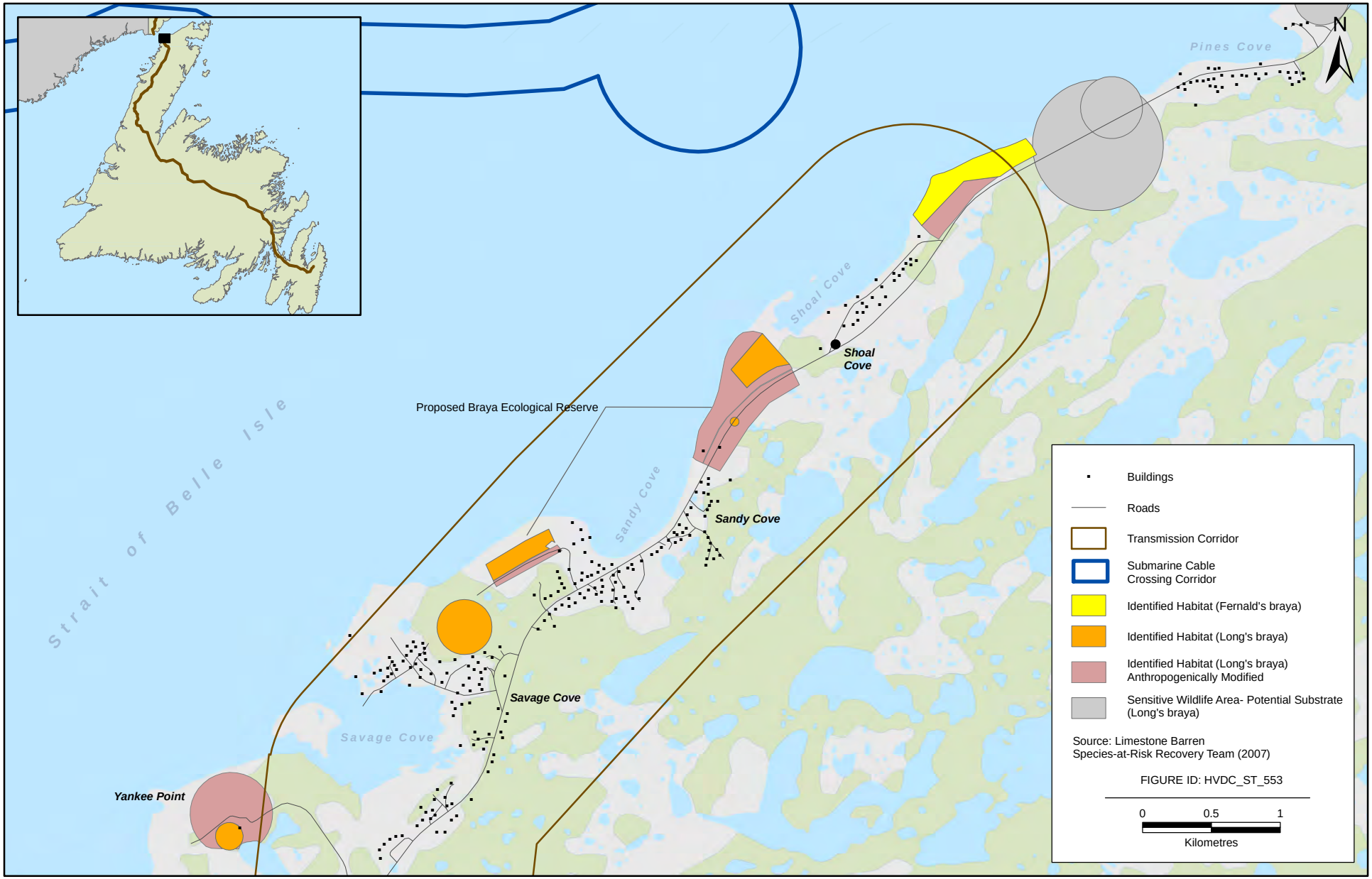


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FIGURE 10.3.3-12

Identified Habitat of Fernald's Braya and Long's Braya in Relation to the Transmission Corridor

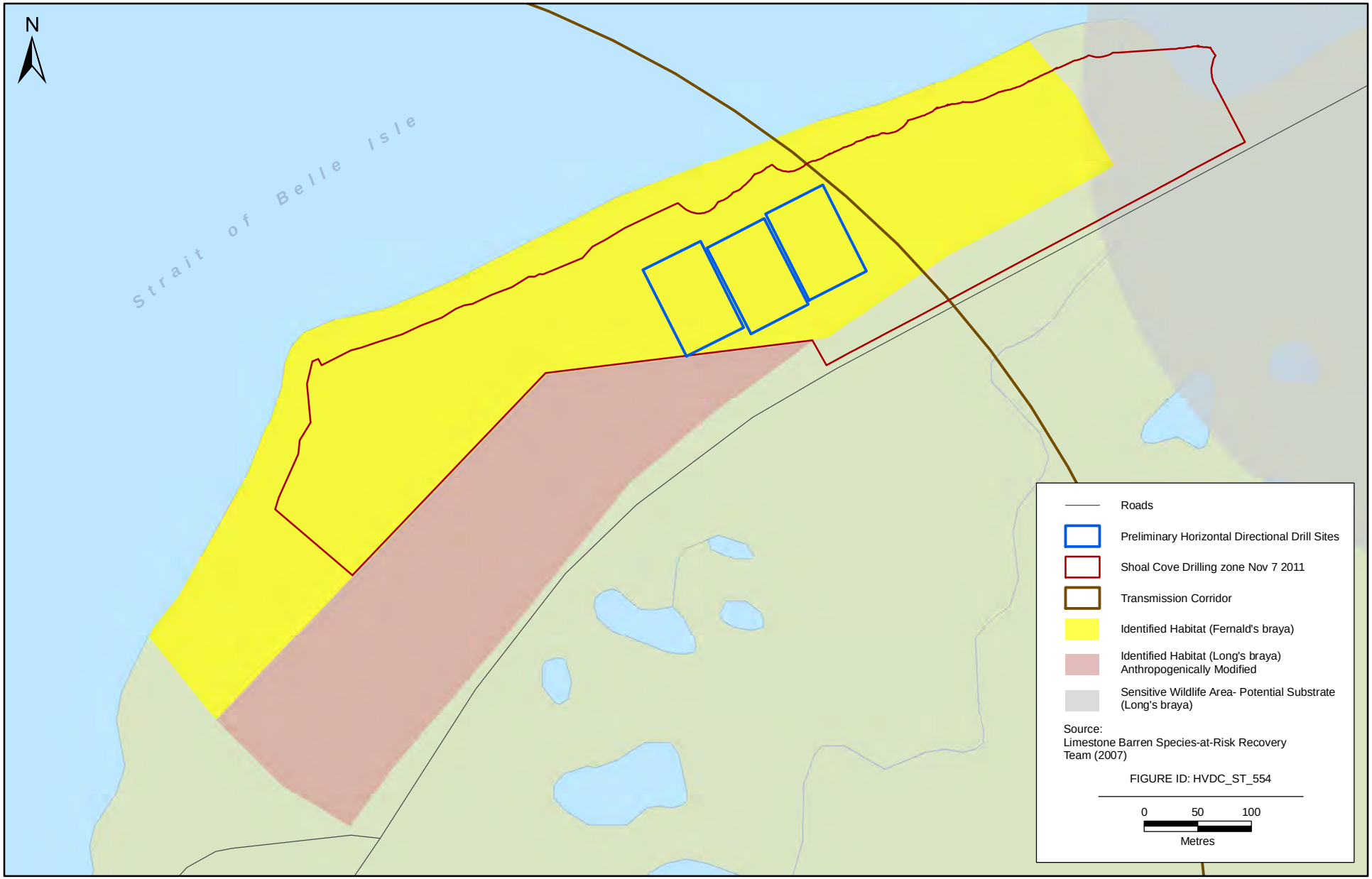

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FIGURE 10.3.3-13

Identified Habitat of Fernald's Braya and Long's Braya in Relation to Preliminary Horizontal Directional Drill Sites (Shoal Cove)

Boreal felt lichen is an epiphytic lichen species with narrow habitat requirements (primarily old growth, maritime coniferous forests). In Newfoundland, boreal felt lichen is generally found on sphagnum-rich sites that have a constant supply of moisture, and north- or east-facing aspects where cool and moist habitat conditions prevail throughout much of the year. Within these sites, the species is predominantly found on balsam fir (*Abies balsamea*) and to a lesser extent on black spruce (*Picea mariana*). Its leafy thallus is gray on the upper surface and white underneath, and its colour changes to greenish when wet. The edges of the thallus curl upward, giving the lichen a unique, white-fringed appearance when viewed from a distance. Its distinctive fruiting bodies look like reddish-brown warts on the upper surface. The species has very low growth and reproductive rates (Scheidegger 2003, internet site).

The conservation of boreal felt lichen is the focus of a management plan prepared by the GNL, titled *A 5 Year (2006 – 2011) Management Plan For the Boreal Felt Lichen* (Erioderma pedicellatum) *In Newfoundland and Labrador* (Keeping and Hanel 2006). Anthropogenic threats to boreal felt lichen populations include wood harvesting, industrial development, air pollution, pesticides, and climate change. Stressors of a natural origin include forest blow down, insect outbreaks, and fire and stand senescence. Wildlife in the form of herbivory by large ungulates (e.g., moose, caribou) and perhaps invertebrate herbivory represent additional natural disturbances under which this lichen has evolved. All of the identified threats and stressors may be found throughout the entire boreal felt lichen range and several threats may act concurrently on a single population (Keeping and Hanel 2006).

The range of boreal felt lichen, although documented, is not as well-defined as that of Long's braya, Fernald's braya, and Fernald's milk-vetch (ACCDC 2010, internet site). In relation to the Study Area, boreal felt lichen is known to occur on the Avalon Peninsula where a substantial population has been recorded throughout the Avalon Forest Ecoregion (Keeping and Hanel 2006). The Conifer Forest, Scrub / Heathland / Wetland, complex and Conifer Scrub are likely the primary Habitat Types for the boreal felt lichen. Current knowledge suggests that there are two disjunct concentrations of boreal felt lichen in Newfoundland that appear to be relatively isolated. Distributional maps of the species in Newfoundland (Maass and Yetmen 2002) depict one of these areas as centred on the Avalon Forest Ecoregion, notably in an area known as Hall's Gullies and Lockyer's Waters, and therefore potentially within the Study Area. Additional occurrences of boreal felt lichen, from the Northern Peninsula Forest Ecoregion near Port au Choix and Daniel's Harbour, and from the Maritime Barrens Ecoregion within the Bay du Nord Wilderness Reserve and near Goobies in Central and Eastern Newfoundland, occur in proximity to the Study Area.

Other Species of Special Conservation Concern

Species of Special Conservation Concern include those that have not been officially listed under *SARA* or the *NLESA* and thus are not legally protected. This includes species designated by COSEWIC and / or Species Status Advisory Committee (SSAC), and also includes species on Schedule 2 or Schedule 3 of *SARA.* An examination of the COSEWIC Status Reports, SSAC Species Status Reports and review of relevant background material revealed two SSCC that may occur within or in the vicinity of the Study Area, the graceful felt lichen (*Erioderma mollissimum*) and the blue felt lichen (*Degelia plumbea*). The graceful felt lichen was assessed as endangered by both the COSEWIC (COSEWIC 2009a) and SSAC (SSAC 2008), and the blue felt lichen was assessed as special concern by COSEWIC (COSEWIC 2010a).

The graceful felt lichen is part of a small group of rare foliose epiphytic cyanobacterial macrolichens found only in the humid coastal forests of eastern North America. It is a foliose (leafy), grayish (dry) to brownish-green (wet) macrolichen. It forms roundish patches that are very seldom more than 10 cm in diameter, and generally less than half this size. The lobes are thick (up to 0.5 mm), rounded with upturned edges, and loosely attached to the substrate (typically balsam fir). There is a distinctive felt-like tomentum (fine hairy covering) on the upper lobe surface and bluish granular soredia (granular asexual reproductive structures) are produced along the lobe margins of older thalli and sometimes at breaks in the upper surface. The white-fibrous lower surface lacks a protective outer layer and with the exception of a narrow band at the margin edge has a dense tomentum of light brown rhizohyphae.

In Newfoundland, the graceful felt lichen habitat is characterized by mature or uneven aged coniferous forests dominated by balsam fir (*Abies balsamea*), occurring on gently sloping (<10%), well drained slopes (COSEWIC 2009b). Within these sites, it is predominantly found on balsam fir and to a lesser extent on black spruce (*Picea mariana*), where ground vegetation is limited with moss cover and generally sphagnum mosses are abundant. Distribution of this species in the Study Area occurs within the Avalon Forest Ecoregion, notably in an area known as Hall's Gullies, and therefore potentially within the Study Area.

Current threats and / or limiting factors for the graceful felt lichen include anthropogenic threats such as forestry operations and wood harvesting, industrial development, air pollution, pesticides, and climate change. Natural stressors may include moose herbivory, invertebrate (mites and slugs) herbivory, blow down, insect outbreaks, fire and stand senescence.

The blue felt lichen is a foliose (leafy), blue-gray (paler when dry) macrolichen. It forms roundish patches (rosettes) seldom more than 10 cm in diameter, but may occur as an accumulation of overlapping thalli. The thallus of appressed scallop-like plates is marked above with longitudinal marks and striations and abundant red-brown to almost black fruiting-bodies (apothecia). The lobes are usually concentrically undulate-ridged, forming a thick blackish / greyish velvet mat with upturned margins (a thick hypothallus).

The blue felt lichen prefers mature to old-growth deciduous woods where it occupies the boles (trunks) and large lower branches of yellow birch (*Betula alleghaniensis*) and occasionally trembling aspen (*Populus tremuloides*). A review of relevant literature indicates that suitable habitat for this species may exist within or in close proximity to the Study Area. Specifically, occurrences of this species has been recorded in the vicinity of Sir Robert Bond Municipal Park at Whitbourne, and the Avalon Forest Ecoregion, notably in an area known as Hall's Gullies, and therefore potentially within the Study Area.

Current threats to the blue felt lichen include forest harvesting through direct removal or through reduced humidity within the stand as a result of the edge effect, and moose herbivory.

Regionally Uncommon Plants

Twenty regionally uncommon plant species were identified along the Labrador portion of the transmission corridor, and 122 species were identified along the Newfoundland portion, based on records from the ACCDC databases (ACCDC 2010, internet site). Habitat requirements for 112 of these species were determined using regionally-specific sources (Meades et al. 2000, internet site; Bouchard et al. 1991). Habitat requirements for the remaining 25 species in NL were determined using non-regionally specific sources, including Zinck (1998), Crum and Anderson (1981), unpublished literature and professional judgement. Regionally uncommon plant species' habitat requirements were compared to Habitat Types described and mapped in the ELC (Stantec 2010a). Where appropriate habitat for a given species was present, that Habitat Type was identified as having an elevated potential to support regionally uncommon plants.

Of the 23 Habitat Types (and / or their sub-units) and Non-Habitat Areas identified for Labrador, calcareous Exposed Bedrock, calcareous Lichen Heathland and calcareous Hardwood Forest, along with that of riparian sub-units found within other Habitat Types (Table 10.3.3-16) were identified through modelling as having a High potential to harbour regionally uncommon plant species. Areas characterized by calcareous subsoils, as found on the south-east coast of Labrador, make up only a small portion of the Study Area (<1%) and transmission corridor (<1%).

For Newfoundland, five Habitat Types and sub-units were rated as having High potential to support regionally uncommon plants (Table 10.3.3-17). When combined with specific polygons known to support regionally uncommon plant species, several areas (e.g., limestone barrens) were determined to have elevated (i.e., Very High) potential for regionally uncommon plant species. The highest potential ratings are associated with those habitats occurring on calcareous substrates, particularly, calcareous Kalmia Lichen / Heathlands, Coniferous Forests, Scrub / Heathland / Wetland complexes, and riparian areas.

Table 10.3.3-16 Regionally Uncommon Plant Species Potential within the Study Area for Labrador by Habitat Type and Non-Habitat Area

Habitat Type	Number of Regionally Uncommon Plant Species Potentially Present[a]	Regionally Uncommon Plant Species Potential	Percent Area of Study Area	Percent Area of Transmission Corridor
Habitat Types				
Exposed Bedrock	0	Low	–[b]	–
Exposed Bedrock (C)[c]	5	High	–	–
Lichen Heathland	0	Low	5	4
Lichen Heathland (C)	14	High	1	1
Black Spruce Lichen	0	Low	2	2
Open Conifer Forest	1	Low	24	25
Conifer Scrub	0	Low	15	17
Conifer Scrub (C)	0	Low	3	3
Coniferous Forest	1	Low	24	26
Coniferous Forest (C)	1	Low	<1	<1
Mixedwood Forest	2	Moderate	<1	<1
Mixedwood Forest (C)	2	Moderate	–	–
Hardwood Forest	2	Moderate	<1	–
Hardwood Forest (C)	6	High	0	–
Wetland	1	Low	21	19
Wetland (C)	0	Low	<1	<1
Burn	0	Low	1	1
Total	35	–	96	98
Non-Habitat Areas and / or Sub-units[d]				
Open Water (rated)[e]				
Rivers and Streams	5	High	–	–
Rivers and Streams (C)	0	Low	–	–
Lakes and Ponds	1	Low	–	–
Lakes and Ponds (C)	0	Low	–	–
Sea Shore	0	Low	–	–
Sea Shore (C)	0	Low	–	–
Subtotal	–	–	**3**	**2**
Clouds and Shadow (unrated)[f]	–	–	<1	0
Exposed Earth / Anthropogenic (unrated)[f]	–	–	<1	0
Exposed Earth / Anthropogenic / Cutblock (unrated)[f]	–	–	0	0
Total	**6**	–	**4**	**2**

Note: Rounding errors <1% may occur.

(a) Habitat affinities for identified species may not be present within the Study Area.

5 (b) – = Not applicable.

(c) (C) = with calcareous substrate.

(d) extracted from 1:50,000 NRCan Data.

(e) Rated using ACCDC species element occurrence data.

(f) Presence / absence of tracked species is not supported by ACCDC species element occurrence data.

Table 10.3.3-17 Regionally Uncommon Plant Species Potential within the Study Area for Newfoundland by Habitat Type and Non-Habitat Area

Habitat Type	Number of Regionally Uncommon Plant Species Potentially Present[(a)]	Regionally Uncommon Plant Species Potential	Percent Area of Study Area	Percent Area of Transmission Corridor
Habitat Types				
Mosaic of Conifer Scrub, Kalmia / Lichen Heathland, and Wetland (C)[(b)]	49	High	3	3
Conifer Forest (C)	11	High	1	2
Kalmia / Lichen Heathlands (C)	30	High	0	0
Mosaic of Conifer Scrub, Kalmia / Lichen Heathland, and Wetland	24	Moderate	18	18
Wetland	16	Moderate	9	8
Wetland (C)	22	Moderate	1	2
Alpine Vegetated	16	Moderate	<1	<1
Mixedwood Forest	3	Low	18	20
Conifer Forest	8	Low	11	12
Open Conifer Forest	7	Low	10	9
Cutover	0	Low	9	10
Open Conifer Forest (C)	4	Low	3	4
Mixedwood Forest (C)	3	Low	2	2
Conifer Scrub	4	Low	2	2
Kalmia / Lichen Heathlands	10	Low	2	2
Rocky Barrens	9	Low	<1	1
Cutover (C)	0	Low	<1	<1
Conifer Scrub (C)	3	Low	<1	<1
Burn	0	Low	<1	<1
Total	**219**	**—[(c)]**	**90**	**94**
Non-Habitat Areas and / or Sub-units[(d)]				
Open Water (rated)[(e)]				
Rivers and Streams	28	High	—	—
Rivers and Streams (C)	26	High	—	—
Lakes and Ponds	23	Moderate	—	—
Lakes and Ponds (C)	18	Moderate	—	-
Sea Shore	15	Moderate	—	—
Sea Shore (C)	15	Moderate	—	—
Subtotal	—	—	—	—
Clouds and Shadow (unrated)[(f)]	—	—	—	—
Exposed Earth / Anthropogenic (unrated)[(f)]	—	—	—	—
Total	**125**	**—**	**10**	**6**

Note: Rounding errors <1% may occur.
(a) Habitat affinities for identified species may not be present within the immediate Study Area.
(b) (C) = with calcareous substrate.
(c) — = Not applicable.
(d) Extracted from 1:50,000 NRCan Data.
(e) Rated using ACCDC species element occurrence data.
(f) Presence / absence of tracked species is not supported by ACCDC species element occurrence data.

A summary of the relative area of the regionally uncommon plant potential (expressed as %) for the Study Area and transmission corridor, by region, is presented in Table 10.3.3-18. Graphical representations of those Habitat Types predicted as having a Very High and High potential for the regionally uncommon plant species within the transmission corridor are presented in Figure 10.3.3-14; Figure 10.3.3-15; Figure 10.3.3-16; and Figure 10.3.3-17.

Table 10.3.3-18 Regionally Uncommon Plant Potential Habitat Percent Area by Region – Study Area and Transmission Corridor

Regionally Uncommon Plant Potential Habitat	Central and Southeastern Labrador	Northern Peninsula	Central and Eastern Newfoundland	Avalon Peninsula	Newfoundland (All Regions)	Newfoundland and Labrador
Study Area						
Low	94%	43%	68%	54%	56%	63%
Moderate	2%	25%	29%	46%	30%	27%
High	1%	22%	2%	0%	10%	7%
Very High	3%	10%	<1%	0%	4%	3%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Transmission Corridor						
Low	92%	43%	71%	56%	59%	64%
Moderate	3%	21%	28%	44%	28%	25%
High	1%	22%	<1%	<1%	8%	6%
Very High	4%	14%	<1%	0%	5%	5%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Note: Rounding errors <1% may occur.

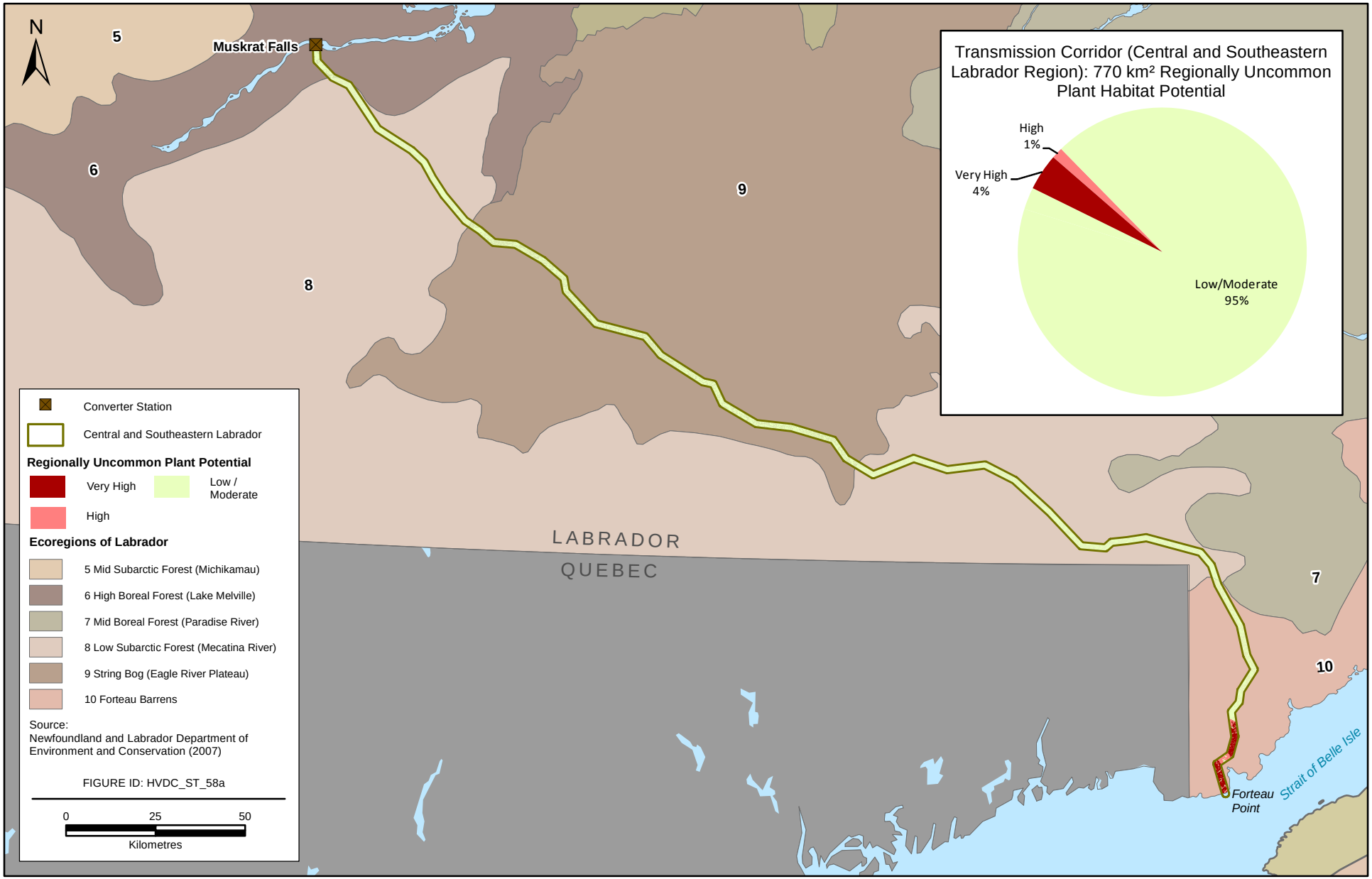

FIGURE 10.3.3-14

Regionally Uncommon Plant Potential Within the Transmission Corridor for Central and Southeastern Labrador

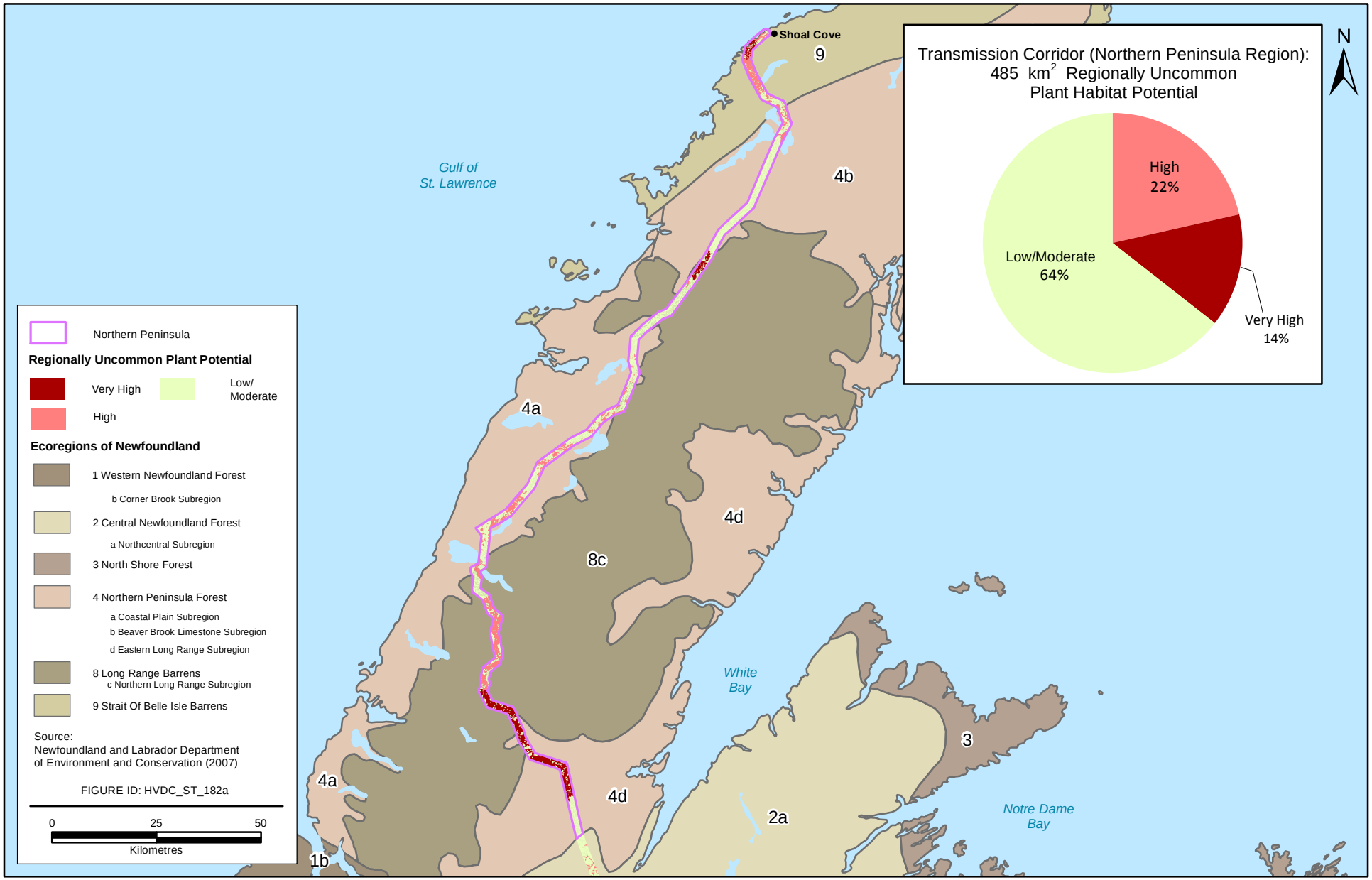

FIGURE 10.3.3-15

Regionally Uncommon Plant Potential within the Transmission Corridor for the Northern Peninsula

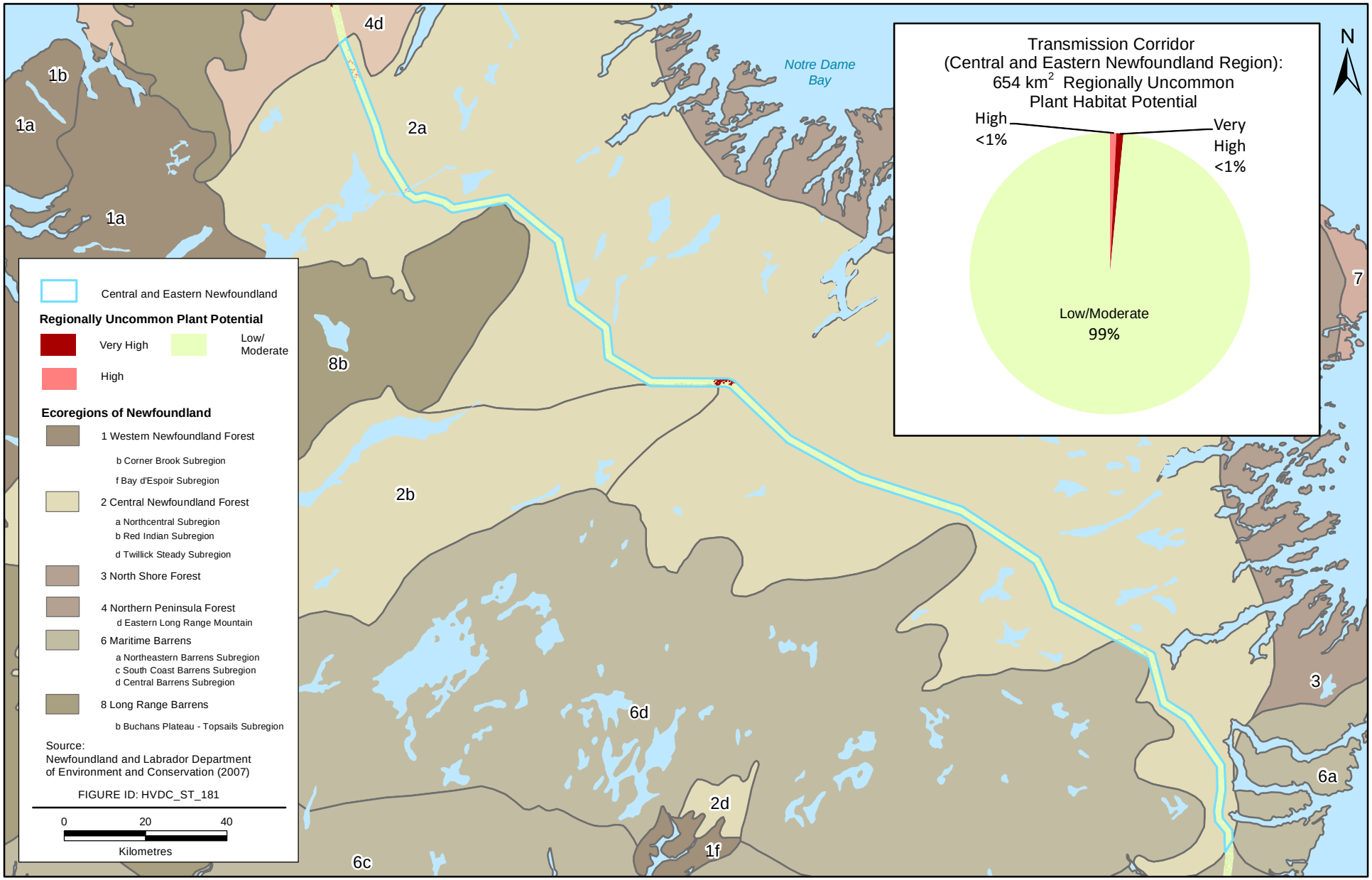

FIGURE 10.3.3-16

Regionally Uncommon Plant Potential within the Transmission Corridor for Central and Eastern Newfoundland

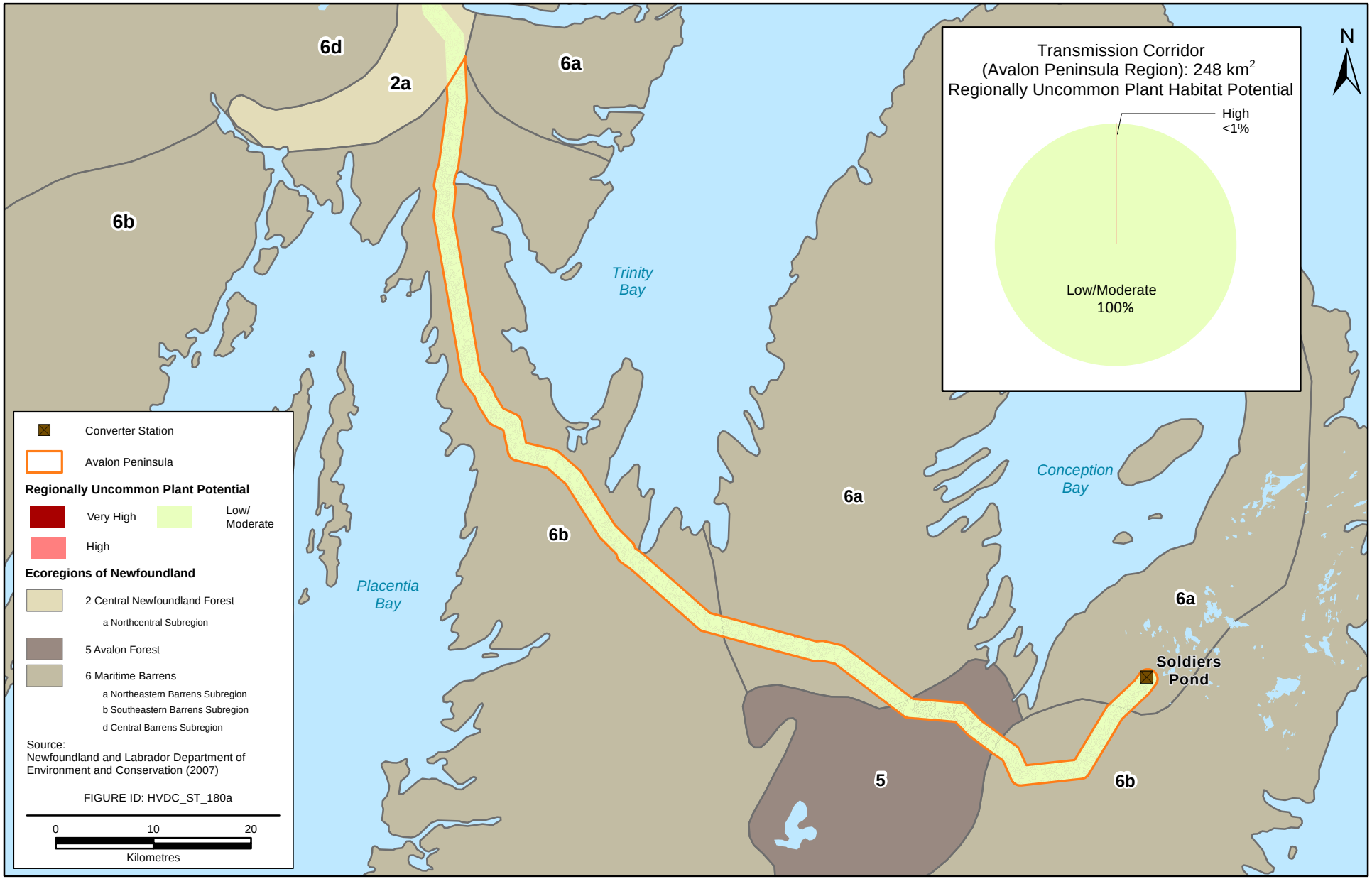

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FIGURE 10.3.3-17

Regionally Uncommon Plant Potential within the Transmission Corridor for the Avalon Peninsula

When specific areas known to contain regionally uncommon plant species are combined with that of the modelled potential assigned to their particular habitat affinity, a number of Habitat Types were identified as having elevated (i.e., High or Very High) potential to harbour regionally uncommon plant species. An area summary of High and Very High regionally uncommon plant potential for each of the geographic regions crossed by the Project is provided in Table 10.3.3-19.

Table 10.3.3-19 Summary of Regionally Uncommon Plant Potential (High to Very High) in the Study Area and Transmission Corridor by Geographic Region

Region	Land Area (km^2) in the Study Area / Transmission Corridor	Area (km^2) of High Regionally Uncommon Plant Potential	Area (km^2) of Very High Regionally Uncommon Plant Potential	Land Area Rated High or Very High in the Study Area (%)
Study Area				
Central and Southeastern Labrador	5,754	73	172	4
Northern Peninsula	4,056	893	410	32
Central and Eastern Newfoundland	4,888	114	14	3
Avalon Peninsula	1,753	4	0	<1
Total (all regions)	**16,452**	**1,084**	**595**	**11**
Transmission Corridor				
Central and Southeastern Labrador	770	10	32	5
Northern Peninsula	484	105	70	36
Central and Eastern Newfoundland	654	5	5	2
Avalon Peninsula	248	<1	0	<1
Total (all regions)	**2,156**	**120**	**107**	**11**

Note: Rounding errors <1% may occur.

Approximately 11% of the Study Area and the transmission corridor are comprised of habitat predicted to have a High or Very High potential for regionally uncommon plant species. The Northern Peninsula has the highest proportion of area rated as High and Very High plant potential, with 32% of the Study Area and 36% of the proposed transmission corridor classified as such.

With the exception of polygons characterized by lichen heathland habitats occupying calcareous substrates in Central and Southeastern Labrador, and those typically associated with riparian habitats as observed throughout the transmission corridor, the majority of Habitat Types are rated as Low to Moderate potential to support regionally uncommon plants. None of the habitat supporting, or potentially supporting regionally uncommon plant species is limiting in any of the regions crossed by the transmission corridor.

Timber Resources

In the *Labrador – Island Transmission Link Timber Resources Component Study* (Stantec 2011a), timber resources are defined as those natural resources collected from forests and woodlands of the province, including natural ecosystems, managed plantations (cutblocks), or wood lots, which are used as a source for wood (e.g., industrial round wood (pulpwood), sawn timber, wood chips / pellets, or home-heating fuel).

Several approaches and data sources were used to analyze and describe the existing timber resource within the proposed transmission corridor, as well as to estimate the quantities of timber resources likely affected as a result of clearing for the Project. Specifically, the analyses utilized existing NLDNR Forest Resources Branch forest inventory data incorporated into the Project's ELC (Stantec 2010a), to describe the existing forest landbase and to quantify the type and volume of timber resources within the proposed transmission corridor.

To provide a reliable estimate of timber resources, the most relevant and currently available forest inventory data were used. Forest inventory data, including stand tables, stock tables, and yield curves, provide the required base data to enable the large area mapping of timber resources, by stand type, for the transmission corridor. A detailed description of the GMV potentially removed from the transmission corridor, for each of the regions that comprise the Study Area (i.e., Central and Southeastern Labrador, Northern Peninsula, Central and Eastern Newfoundland, Avalon Peninsula), each FMD crossed by the transmission corridor, and for the Project as a whole is provided in the *Labrador – Island Transmission Link Timber Resources Component Study* (Stantec 2011a) and the Vegetation Supplementary Report (Stantec 2011b).

In Labrador, the GMV of productive forest is calculated for softwoods only, with the available timber volumes in the transmission corridor (as identified within FMD 19A) estimated at 706,207 m^3 (Figure 10.3.3-18). Differences in the landbase area evaluated and thus overall GMV determinations obtained through analysis of the data relevant to the transmission corridor are indicative of changes in the area of productive forest crossed by the Project and variability in the level of provincial inventory data available for FMD 19A. Provincial forest inventory data are presently unavailable for FMD 21, which encompasses the Forteau Barrens Ecoregion of Labrador. Similarly, inventory data for the String Bog (Eagle River Plateau) Ecoregion of Labrador, as contained within FMD 19C, are not available. Refer to the Approach and Methods section for further information on application of GMV calculation procedures. In Newfoundland, the GMV of productive forest (softwood / hardwood) within the transmission corridor is estimated at 3,872,124 m^3 (Figure 10.3.3-19, Figure 10.3.3-20 and Figure 10.3.3-21). The total volume of the timber resource is estimated at 4,578,331 m^3 for the transmission corridor.

Table 10.3.3-20 summarizes the timber resources identified within the transmission corridor for each FMD in NL.

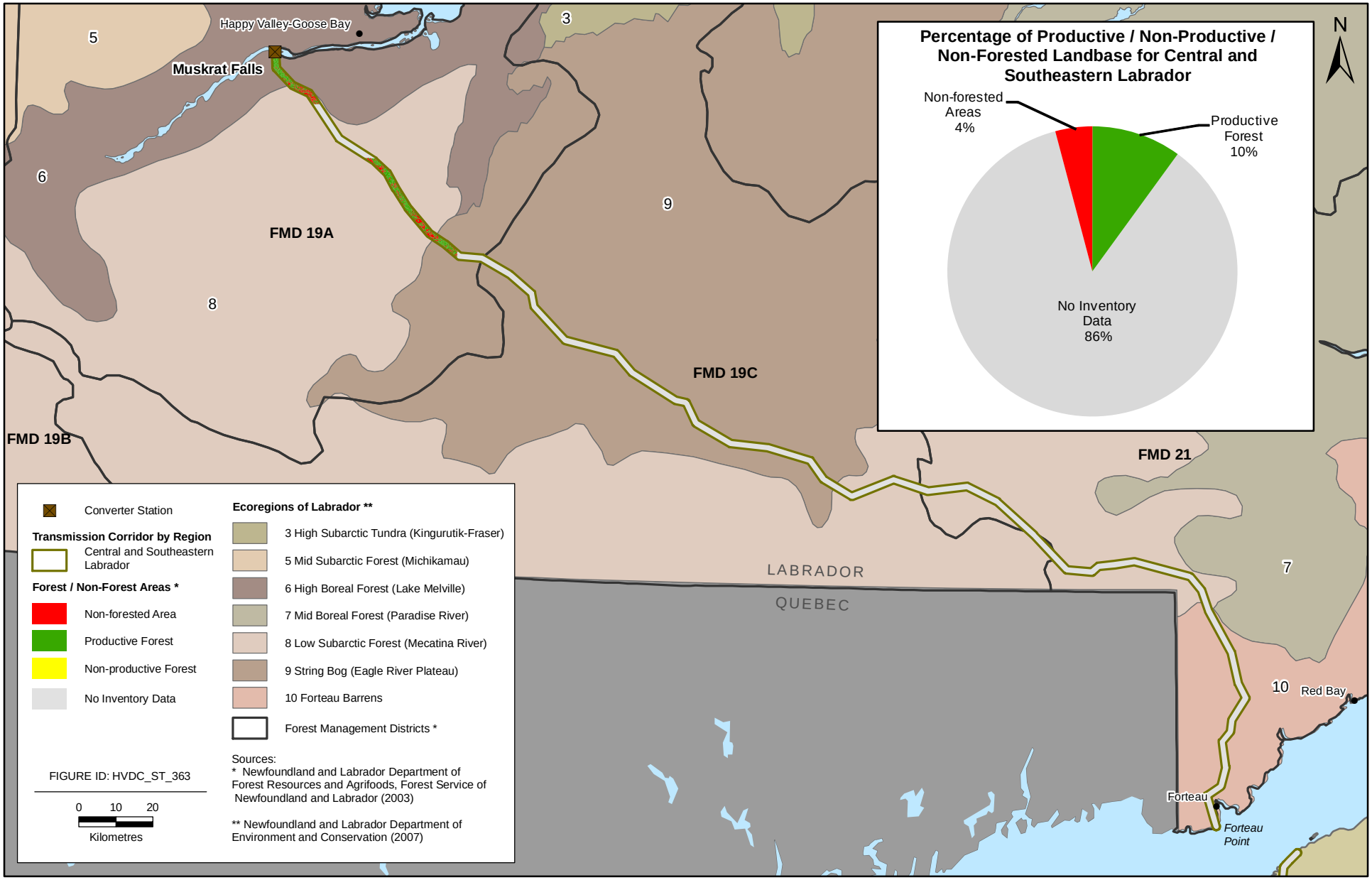

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FIGURE 10.3.3-18

Available Forest Landbase Summary within the Transmission Corridor for Central and Southeastern Labrador