

Figure SDSS2-23



Overlap of assessment area buffers with ELC rankings for preferred fall habitat - Northern Peninsula

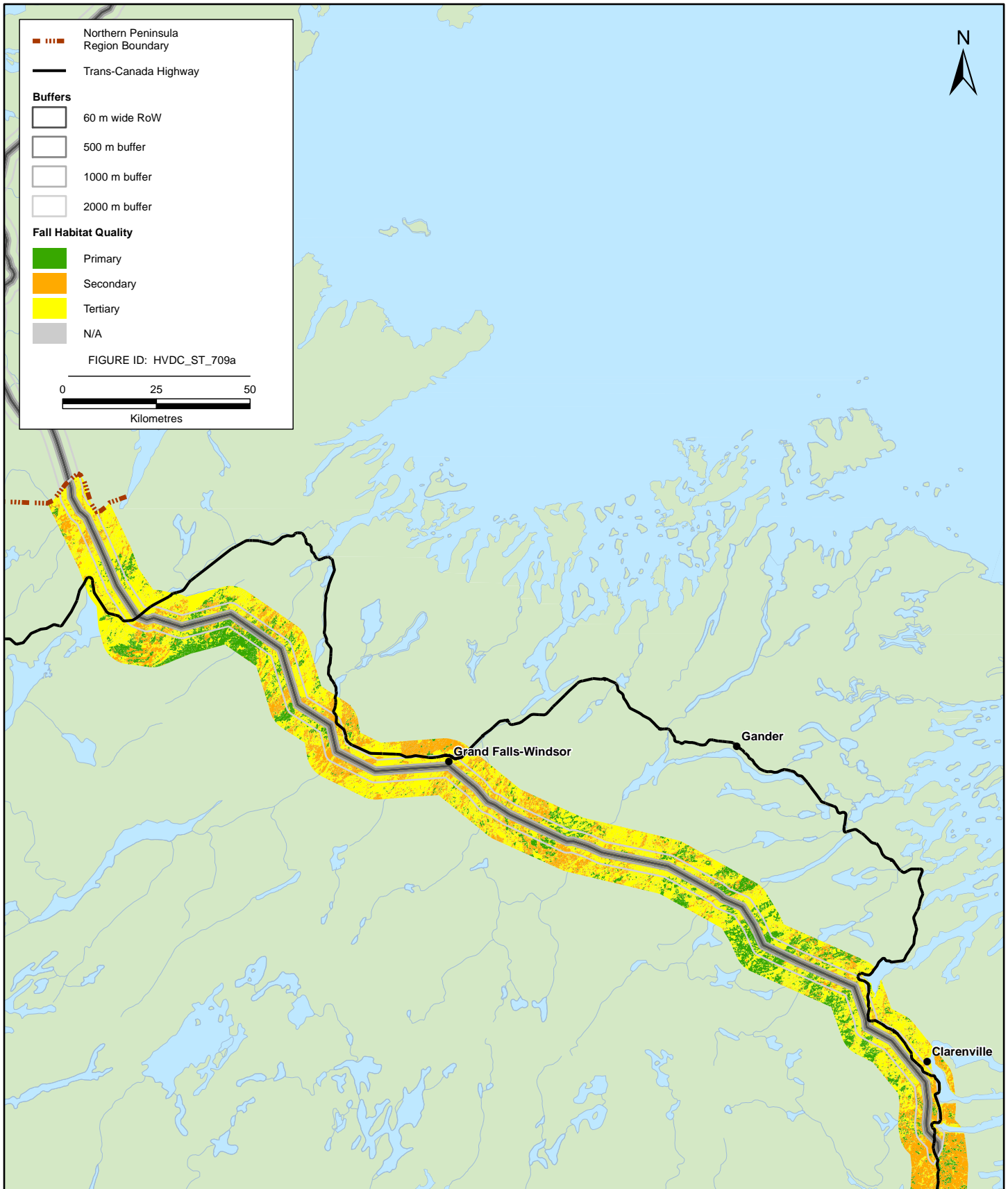


Figure SDSS2-24



Overlap of assessment area buffers with ELC rankings for preferred fall habitat - Central and Eastern Newfoundland

Requesting Organization: Department of Environment and Conservation

Information Request No.: DEC, Sustainable Development and Strategic Science Division – 3

Reference: Caribou and Their Predators Component Study; Volume 2B, Section 12.3 Caribou

Information Requested: Regional analysis of year round caribou kernels

A regional analysis will be undertaken using year round (overall) caribou kernels to determine if there are any regional impacts to caribou resulting from the project. Caribou information will be regionally grouped (i.e., Northern Peninsula and Central and Eastern Newfoundland) based on group interactions or geographical barriers.

Response:

In the EIS, Nalcor completed a regional analysis with respect to direct (i.e., habitat alteration / loss) and indirect (e.g., reduced habitat suitability resulting from disturbance) effects of the Project on caribou habitat by delineating the Regional Study Area (RSA) for the environmental assessment as the total Occupancy Area (i.e., 100% kernels) of woodland caribou in Newfoundland, as provided by the Wildlife Division.

To further inform the regional analysis completed by Nalcor, the 100% and 66% occurrence kernels for all seasons combined (i.e., year-round) were mapped for the Northern Peninsula region and for the Central and Eastern Newfoundland region. The assessment areas for the 60 m wide right-of-way, 500 m buffer, 1,000 m buffer and 2,000 m buffer are provided in the tables that follow, along with supporting discussions.

Through SDSS, Nalcor obtained 100% and 66% kernels representing caribou distribution for the entire year. The kernels include both 1979-2011 and 2005-2011 datasets for the Northern Peninsula (Figure SDSS3-1 and Figure SDSS3-3, respectively) and Central and Eastern Newfoundland (Figure SDSS3-2 and Figure SDSS3-4, respectively) and are compared to the seasonal calculations provided in Nalcor's response to Information Request SDSS-1 in the following tables.

Table 1 and Table 2 present the direct habitat alteration / loss that would likely occur as a result of the Project (i.e., construction of the 60 m wide right-of-way). However, the amount of habitat directly affected will depend on the habitat type being crossed. For example, not all habitat types will require clearing of the vegetation within the right-of-way, and disturbance will be limited to the tower locations and the access trail within the right-of-way. As such, even the values presented in the following tables represent a conservative and precautionary estimate of the Project effects.

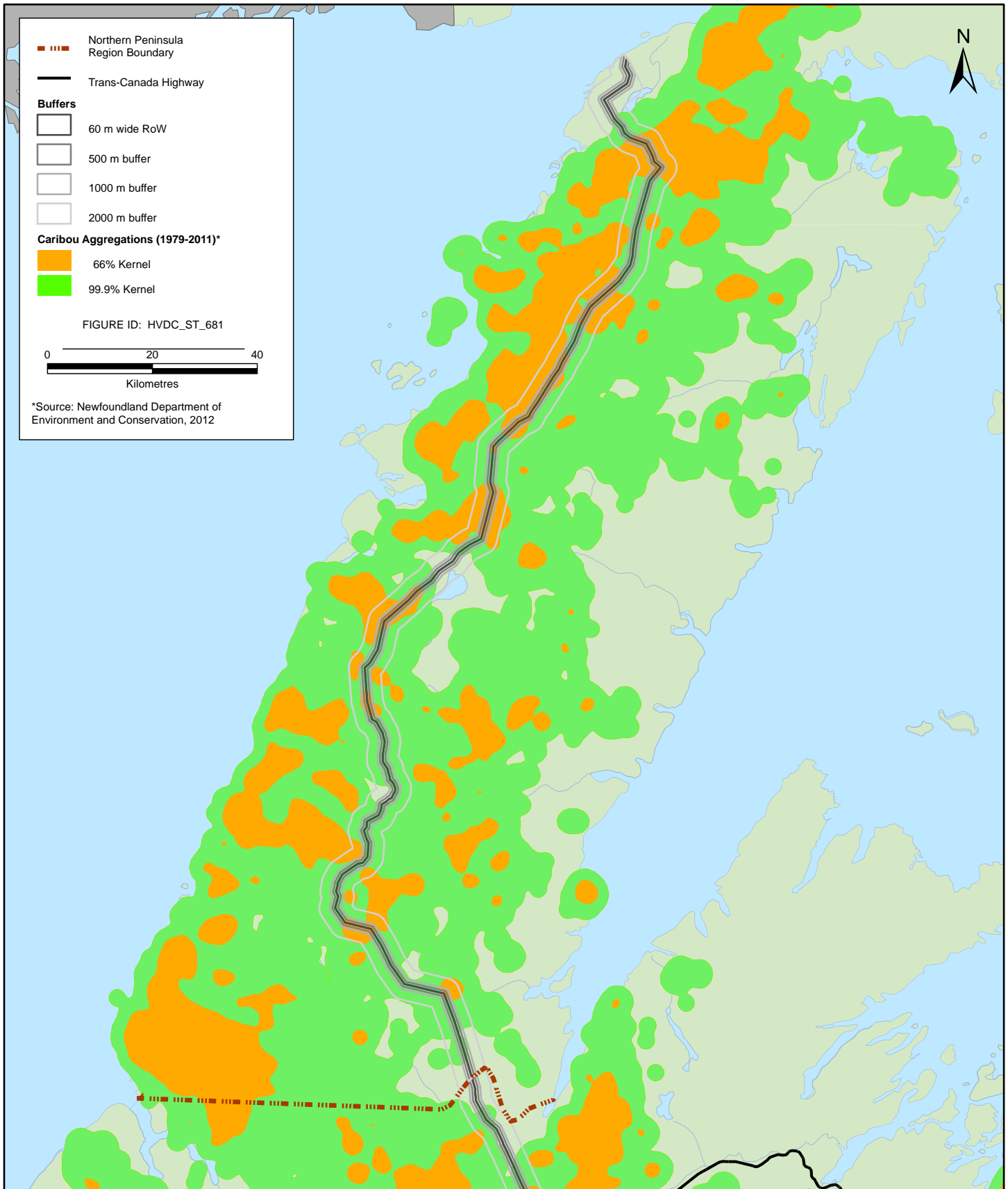


Figure SDSS3-1



All Season caribou occurrence in the Northern Peninsula Region and assessment area buffers (1979-2011)

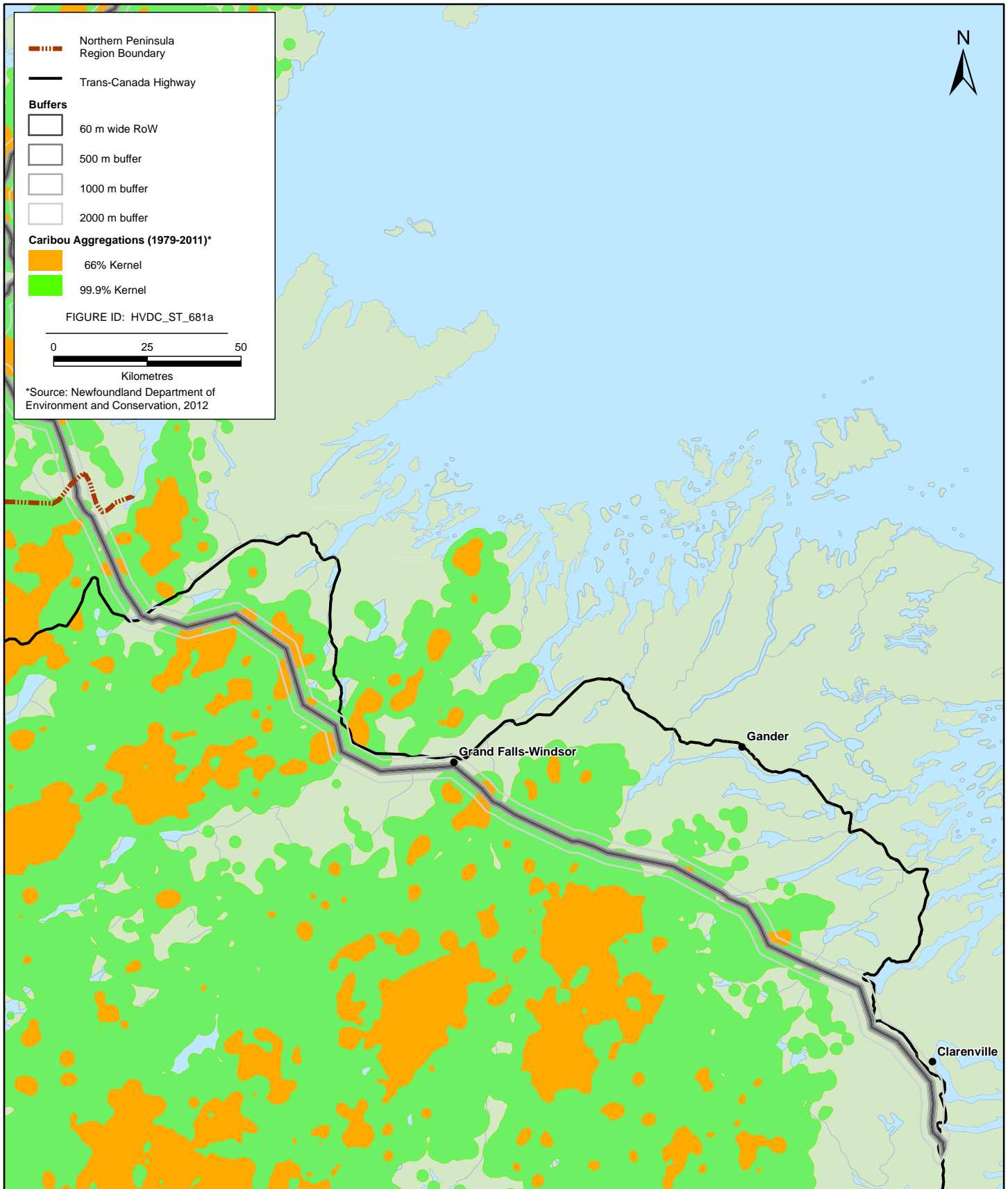


Figure SDSS3-2



All Season occurrence in the Central and Eastern Newfoundland Region and assessment area buffers (1979-2011)

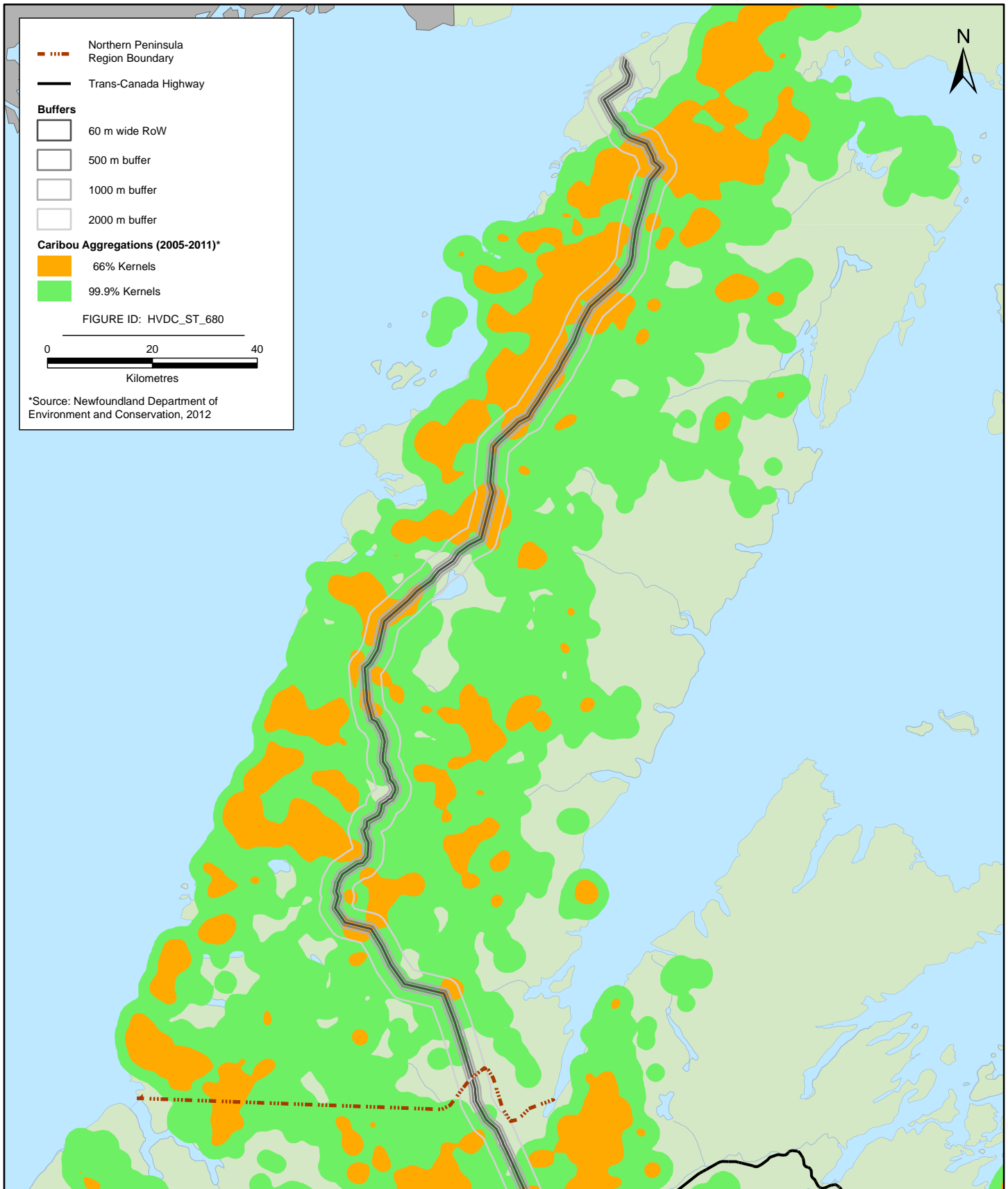


Figure SDSS3-3



All Season caribou occurrence in the Northern Peninsula Region and assessment area buffers (2005-2011)

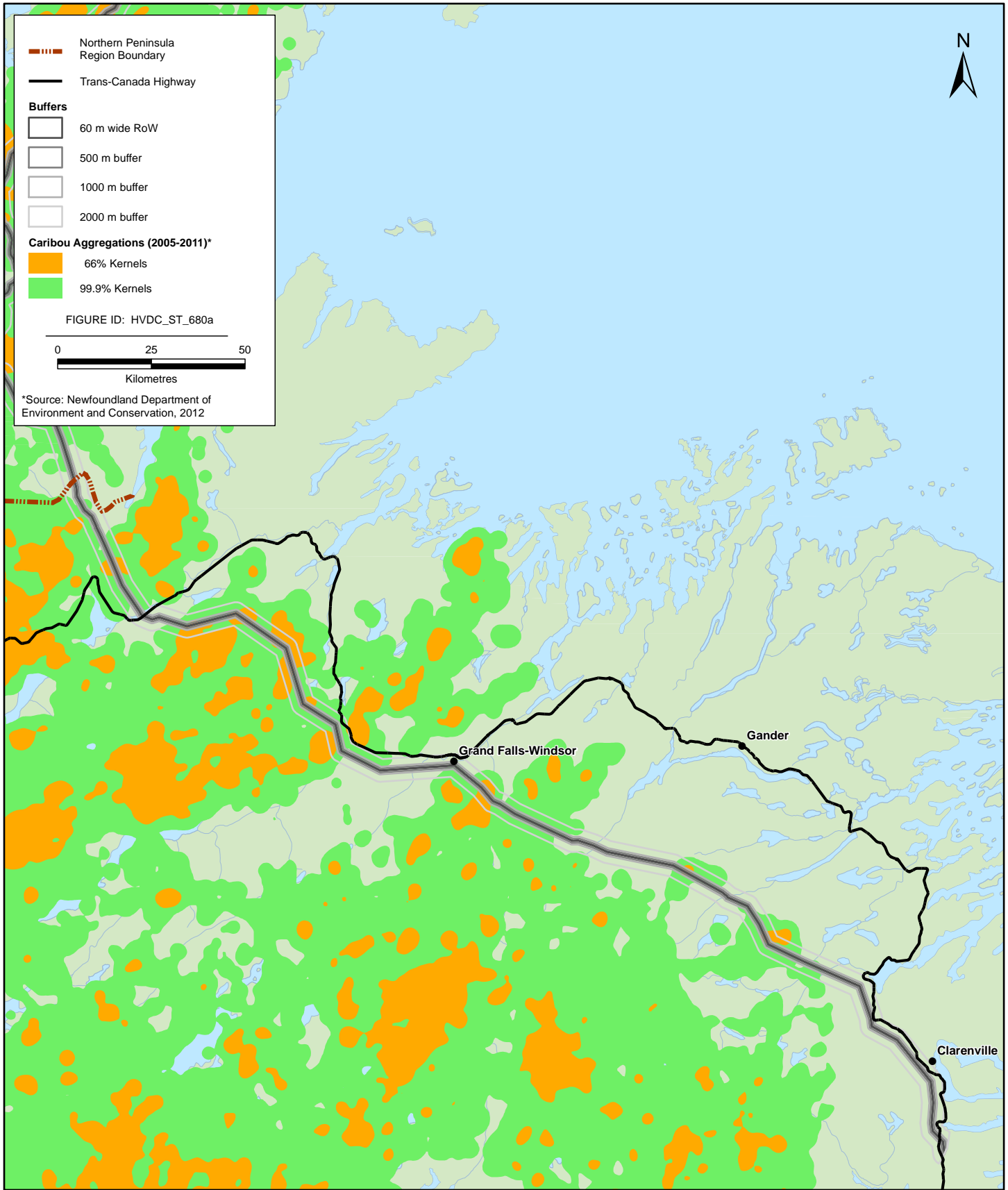


Figure SDSS3-4



All Season caribou occurrence in the Central and Eastern Newfoundland Region and assessment area buffers (2005-2011)

Table 1. Year round (and seasonal) caribou occurrence in the Northern Peninsula Region – Direct Alteration / Loss associated with the 60 m wide right-of-way (14.6 km²) (reference Figure SDSS3-1 and Figure SDSS3-3)

Dataset	100% Kernel			66% Kernel		
	Total in Region (km ²)	Total in RoW (km ²)	% in RoW	Total in Region (km ²)	Total in RoW (km ²)	% in RoW
Winter						
1979-2011	10,319	8.2	0.08	2,111	3.4	0.16
2005-2011	9,806	8.5	0.09	1,978	3.2	0.16
Spring						
1979-2011	8,808	8.1	0.09	1,867	3.4	0.18
2005-2011	8,582	8.2	0.10	1,558	3.5	0.22
Summer						
1979-2011	7,914	7.0	0.09	1,738	2.0	0.12
2005-2011	6,734	7.0	0.10	1,562	2.1	0.13
Fall						
1979-2011	8,685	8.6	0.10	2,051	2.1	0.10
2005-2011	8,188	8.7	0.11	1,713	1.8	0.11
Year Round						
1979-2011	11,888	8.2	0.07	3,237	4.8	0.15
2005-2011	11,836	8.1	0.07	3,063	4.9	0.16

Table 2. Year round (and seasonal) caribou occurrence in the Central and Eastern Newfoundland Region – Direct Alteration / Loss associated with the 60 m wide right-of-way (19.6 km²) (reference Figure SDSS3-2 and Figure SDSS3-4)

Dataset	100% Kernel			66% Kernel		
	Total in Region (km ²)	Total in RoW (km ²)	% in RoW	Total in Region (km ²)	Total in RoW (km ²)	% in RoW
Winter						
1979-2011	36,678	6.7	0.02	5,765	0.8	0.01
2005-2011	33,253	6.7	0.02	5,172	0.8	0.02
Spring						
1979-2011	35,845	8.4	0.02	6,251	1.5	0.02
2005-2011	29,989	7.4	0.02	4,435	1.5	0.03
Summer						
1979-2011	34,024	8.1	0.02	5,407	2.1	0.04
2005-2011	33,933	6.5	0.02	5,262	2.2	0.04
Fall						
1979-2011	31,426	6.7	0.02	5,560	1.1	0.02
2005-2011	24,817	6.4	0.03	4,264	1.1	0.03
Year Round						
1979-2011	44,720	8.9	0.02	9,812	2.4	0.02
2005-2011	40,871	7.6	0.02	7,835	2.5	0.03

The year round analyses indicate direct seasonal habitat alteration / loss in either of the kernels is similar or lower than either of the comparable seasons. All values were $\leq 0.2\%$ of that kernel in either the Northern Peninsula or the Central and Eastern Newfoundland regions.

Table 3 and Table 4 examine an assessment area recognizing a 500 m buffer consistent with Dyer et al. (2001) and the woodland caribou recovery strategy released by Environment Canada (Environment Canada 2012). The assessment area would be 1.06 km wide.

Table 3. Year round (and seasonal) caribou occurrence in the Northern Peninsula Region – Assessment Area of 60 m right-of-way + 500 m buffer (258 km²) (reference Figure SDSS3-1 and Figure SDSS3-3)

Dataset	100% Kernel			66% Kernel		
	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area
Winter						
1979-2011	10,319	145	1.4	2,111	61	2.9
2005-2011	9,806	149	1.5	1,978	58	2.9
Spring						
1979-2011	8,808	142	1.6	1,867	61	3.3
2005-2011	8,582	144	1.7	1,558	62	4.0
Summer						
1979-2011	7,914	122	1.5	1,738	37	2.1
2005-2011	6,734	121	1.8	1,562	38	2.4
Fall						
1979-2011	8,685	153	1.8	2,051	37	1.8
2005-2011	8,188	153	1.9	1,713	34	2.0
Year Round						
1979-2011	11,888	145	1.2	3,237	84	2.6
2005-2011	11,835	144	1.2	3,063	86	2.8

Table 4. Year round (and seasonal) caribou occurrence in the Central and Eastern Newfoundland Region – Assessment Area of 60 m right-of-way + 500 m buffer (348 km²) (reference Figure SDSS3-2 and Figure SDSS3-4)

Dataset	100% Kernel			66% Kernel		
	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area
Winter						
1979-2011	36,678	120	0.3	5,765	14	0.2
2005-2011	33,253	119	0.4	5,172	14	0.3
Spring						
1979-2011	35,845	148	0.4	6,251	26	0.4
2005-2011	29,989	132	0.4	4,435	26	0.6
Summer						
1979-2011	34,024	144	0.4	5,407	39	0.7
2005-2011	33,933	115	0.3	5,262	40	0.7
Fall						
1979-2011	31,426	118	0.4	5,560	20	0.3
2005-2011	24,817	113	0.5	4,264	18	0.4
Year Round						
1979-2011	44,720	157	0.4	9,812	43	0.4
2005-2011	40,871	132	0.3	7,835	46	0.6

If the buffer is 1,000 m (i.e., 2.06 km), the overlap of the assessment area with the kernels is shown in Table 5 and Table 6.

Table 5. Year round (and seasonal) caribou occurrence in the Northern Peninsula Region – Assessment Area of 60 m right-of-way + 1,000 m buffer (500 km²) (reference Figure SDSS3-1 and Figure SDSS3-3)

Dataset	100% Kernel			66% Kernel		
	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area
Winter						
1979-2011	10,319	282	2.7	2,111	115	5.4
2005-2011	9,806	290	3.0	1,979	111	5.6
Spring						
1979-2011	8,808	272	3.1	1,867	118	6.3
2005-2011	8,582	277	3.2	1,558	120	7.7
Summer						
1979-2011	7,194	236	3.3	1,738	70	4.0
2005-2011	6,734	231	3.4	1,562	73	4.7
Fall						
1979-2011	8,685	292	3.4	2,051	76	3.7
2005-2011	8,188	291	3.6	1,713	69	4.0
Year Round						
1979-2011	11,888	283	2.4	3,237	160	4.9
2005-2011	11,836	280	2.4	3,063	88	2.9

Table 6. Year round (and seasonal) caribou occurrence in the Central and Eastern Newfoundland Region – Assessment Area of 60 m right-of-way + 1,000 m buffer (675 km²) (reference Figure SDSS3-2 and Figure SDSS3-4).

Dataset	100% Kernel			66% Kernel		
	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area
Winter						
1979-2011	36,678	232	0.6	5,765	28	0.5
2005-2011	33,253	231	0.7	5,172	27	0.5
Spring						
1979-2011	35,845	288	0.8	6,251	48	0.8
2005-2011	29,989	256	0.8	4,435	49	1.1
Summer						
1979-2011	34,025	281	0.8	5,407	75	1.4
2005-2011	33,933	222	0.7	5,252	77	1.5
Fall						
1979-2011	31,426	228	0.7	5,650	37	0.6
2005-2011	24,817	218	0.9	4,264	33	0.7
Year Round						
1979-2011	44,720	307	0.7	9,812	83	0.8
2005-2011	40,870	258	0.6	7,835	88	1.1

If the buffer is 2,000 m on either side of the right-of-way (i.e., 4.06 km), the overlap of the assessment area with the kernels are shown in Table 7 and Table 8.

Table 7. Year round (and seasonal) caribou occurrence in the Northern Peninsula Region – Assessment Area of 60 m right-of-way + 2,000 m buffer (1,443 km²) (reference Figure SDSS3-1 and Figure SDSS3-3).

Dataset	100% Kernel			66% Kernel		
	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area
Winter						
1979-2011	10,319	851	8.2	2,111	293	13.9
2005-2011	9,806	856	8.7	1,978	288	14.6
Spring						
1979-2011	8,808	812	9.2	1,867	313	16.8
2005-2011	8,582	825	9.6	1,558	318	20.4
Summer						
1979-2011	7,194	609	8.5	1,738	231	13.3
2005-2011	6,734	606	9.0	1,562	234	15.0
Fall						
1979-2011	8,685	788	9.1	2,051	269	13.1
2005-2011	8,188	777	9.5	1,713	249	14.5
Year Round						
1979-2011	11,888	814	6.8	3,237	451	13.9
2005-2011	11,835	805	6.8	3,063	467	15.2

Table 8. Year round (and seasonal) caribou occurrence in the Central and Eastern Newfoundland Region – Assessment Area of 60 m right-of-way + 2,000 m buffer (1,959 km²) (reference Figure SDSS3-2 and Figure SDSS3-4).

Dataset	100% Kernel			66% Kernel		
	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area	Total in Region (km ²)	Total in Assessment Area (km ²)	% in Assessment Area
Winter						
1979-2011	36,678	708	1.9	5,765	72	1.2
2005-2011	33,253	709	2.1	5,172	71	1.4
Spring						
1979-2011	35,845	808	2.3	6,251	157	2.5
2005-2011	29,989	703	2.3	4,435	160	3.6
Summer						
1979-2011	34,025	857	2.5	5,407	191	3.5
2005-2011	33,933	666	2.0	5,262	197	3.7
Fall						
1979-2011	31,426	687	2.2	5,650	88	1.6
2005-2011	24,817	646	2.6	4,263	78	1.8
Year Round						
1979-2011	44,720	930	2.1	9,812	220	2.2
2005-2011	40,870	775	1.9	7,835	232	3.0

Based on the information provided in Nalcor's response to Information Request WD-4 (i.e., limited overlap of the Project right-of-way with the sensitive period (i.e., winter and calving) habitat, and the information provided in this response, the effects of the Project (e.g., habitat fragmentation) are not likely to affect caribou populations on a regional scale (Table 12.3.7-1). The use of the 500 m wide buffer for the environmental assessment of the Project was appropriate as per Dyer et al. (2001) and Environment Canada (2012), and was conservative and precautionary because it was the 2 km wide corridor that was buffered and not just the right-of-way. The analyses of the additional buffer widths (i.e., 1,000 m and 2,000 m buffers) also indicate that effects on caribou habitat may be of low magnitude. However, the quantification of habitat within 1,000 m and 2,000 m buffers is considered an unrealistic overestimation because the effects of the Project would result in only partial habitat avoidance, and any effects that far from the right-of-way would likely be greatly reduced. For example, Dyer et al. (2001) found that although use within 100 m of a road ranged from 4% in late winter to 34% in summer, use of areas 250 to 500 m from roads ranged from 32% in summer to 58% in calving season. Therefore, quantifying all habitat within 500 m of the right-of-way as potentially affected is precautionary and appropriate.

The effects of the Project relative to baseline (i.e., the contribution of the Project to the existing conditions) are not likely to affect the viability or recovery of woodland caribou populations in Central and Southeastern Labrador and Newfoundland. Therefore, the Project is not likely to result in significant adverse environmental effects on caribou (Section 12.3.7.2, page 12-134). The information presented in this response does not affect the mitigation, findings or confidence in the conclusions of the EIS.

References:

Dyer, S.J., J.P. O'Neill, S.M. Wasel and S. Boutin. 2001. Avoidance of Industrial Development by Woodland Caribou, *Journal of Wildlife Management* 65: 531-542.

Environment Canada. 2012. Recovery Strategy for Woodland Caribou (*Rangifer tarandas caribou*), Boreal population, in Canada. *Species at Risk Act Recovery Strategy Series*. Environment Canada, Ottawa. xi + 138 pp.

Requesting Organization: Department of Environment and Conservation

Information Request No.: DEC, Wildlife Division - 1

Reference: Caribou and Their Predators Component Study; Volume 2B, Section 12.3 Caribou

Information Requested: Examine validity of Labrador caribou habitat quality description.

Approach – As part of the baseline environment description, Nalcor completed an ELC of an approximate 15 km wide by 1,100 km long area. Each ecotype identified in the ELC was qualified as to its importance for caribou during the winter AND calving/post-calving periods. With these assigned values, the ELC ecotypes were mapped so that the various areas of interest in terms of overlap with these different quality habitats could be quantified. To examine the validity of this approach using the new information provided by the Wildlife Division, Nalcor proposes to:

- Review all recently received information to ensure assigned habitat quality values for each ecotype are consistent with the Wildlife Division’s latest understanding. Of particular relevance for this question is the draft report Range use, life history and trends in abundance of forest dwelling Threatened caribou populations in Labrador: An overview (Schmelzer 2012). Ecotypes identified by Schmelzer (2012) will be compared to those used by Nalcor. Thereafter, seasonal habitat selection from Schmelzer (2012) will be incorporated into the values assigned to ecotypes from the ELC. Any changes, particularly those dealing with Primary habitat quality values, would result in a recalculation of the amount of Primary habitat affected by the proposed Project;
- Display, quantify and discuss the amount of wintering and calving/post-calving habitat for the 60 m wide ROW (i.e., direct alteration/loss), 1.06 km (i.e., 500 m wide buffer) wide assessment area, 2.06 km (i.e., 1,000 m wide buffer) wide assessment area, and 4.06 km (i.e., 2,000 m wide buffer) wide assessment area in Southeastern Labrador; and
- Describe implications of this additional information on the environmental assessment predictions in the EA.

Response:

Nalcor reviewed the recent information provided by the Wildlife Division regarding caribou and habitat relationships in Labrador. Included in this information was the extensive and recently completed work on the movement rates, seasonal patterns of range use and habitat preferences for woodland caribou populations in Labrador (Schmelzer 2012). Schmelzer (2012) used telemetry data in association with mapped habitat features to examine the importance of each habitat for caribou populations. Habitats that are used in greater proportions than their abundance on the landscape are considered to be of greatest importance for that season. Similar to the habitat quality description used in the Labrador-Island Transmission Link EIS, such habitat would be considered as being of primary quality. Those habitats used in proportion to their abundance would be considered of secondary quality for caribou.

Habitats used in lower proportion to their abundance are considered to be avoided by caribou for that season and described as being of tertiary quality.

As part of the review, Nalcor compared the results of Schmelzer's (2012) seasonal habitat selection analyses [based on 16 female caribou from the Red Wine Mountains Herd (RWM)] and Habitat Mosaic of the RWM Herd range (Schmelzer 2012) with the Ecological Land Classification (ELC) completed for the Labrador Island Transmission Link. The comparison was completed on a pixel by pixel basis in the area of overlap between these two areas. Using only the use versus availability analysis completed by Schmelzer (2012) the comparison resulted in the adjustment of the apparent seasonal importance or quality of habitat types from the ELC during Calving/Post-calving and during winter that were formerly described in the Component Study and EIS (Table 1).

Table 1. Ecological Land Classification Habitat Type and Potential Caribou Use of the Study Area in Central and Southeastern Labrador based on Schmelzer (2012).

Habitat Type	Calving/ Post-calving ^(a)	Winter ^(a)	Comments
Black Spruce Lichen Forest	Tertiary (formerly Primary)	Secondary (formerly Primary)	Avoided during calving/post-calving. Analysis by the Wildlife Division suggests that this habitat type is associated with patches of lichen cover where canopy and ground conditions permit. Continuous lichen cover provides a source of food during winter where predator abundance is considered low (Fortin et al. 2008; Courtois et al. 2003).
Burn	Tertiary	Tertiary	Avoided during these periods. Note: no evidence documented during surveys in 2008 (Stantec 2011).
Conifer Forest	Secondary (formerly Primary)	Tertiary (formerly Primary)	Most strongly associated with dense coniferous forests of commercial value. Was primarily associated with 'forests-no lichen' from habitat mosaic. Note Chubbs et al. (1993) and Courtois et al. (2003) characterized use but unable to link directly with habitat type, documented during surveys in 2008 (Stantec 2011).
Conifer Scrub	Secondary (formerly Primary)	Tertiary (formerly Primary)	Was associated with low abundance of lichen and avoided during winter, but used in relation to its availability during calving/post-calving.
Exposed Earth (Anthropogenic)	Tertiary	Tertiary	Avoided. Note: (Stantec 2011) has similar conclusions.
Hardwood Forest	Tertiary	Tertiary	Avoided. No evidence of use in Stantec (2011).
Lichen Heathland	Tertiary (formerly Secondary)	Primary (formerly Secondary)	Associated with lichen woodlands and lichen-shrub woodlands, and is strongly selected during winter but avoided during calving/post-calving. Note: some evidence of use during surveys in 2008 (Stantec 2011).
Mixedwood Forest	Tertiary	Tertiary	Avoided. No evidence during 2008 surveys (Stantec 2011)
Open Conifer Forest	Secondary (formerly Secondary)	Tertiary (formerly Secondary)	Used during calving/post-calving but avoided during winter. Note: moss ground cover with some use during surveys in 2008 (Stantec 2011).
Wetland	Primary	Tertiary (formerly Secondary)	Reduced predation risk, selected during calving/post-calving. Documented use during surveys in 2008 (Stantec 2011).

^(a) Updated from Table 3.3, Section 3.2.2.3 of Stantec (2011).

Based on the revised seasonal habitat classification, Nalcor calculated the amount of primary (i.e., >15% use above availability), secondary (i.e., within \pm 15% use of availability) and tertiary (i.e., <15% use compared to availability) habitat that may be affected by the Project. Note that the extent of the ELC and the alignment for the Project overlaps the ranges (as calculated by MCP) of the RWM and Mealy Mountains (MM) Herds in Central and Southeastern Labrador only. However, due to the right-of-way (ROW) realignment, habitat within the 90% occupancy kernel for the RWM herd will not be directly or indirectly affected by the Project (see the response to WD-3). The area of overlap between the area assessed by the ELC and the 90% kernels for Central and Southeastern Labrador caribou was limited to the MM Herd. During winter the area of ELC overlap with the MM Herd range is 121 km², the majority (i.e., 118 km² or 97%) of which is considered tertiary habitat. During calving/post-calving the area of ELC overlap with the MM Herd range is 319 km², of which the majority (i.e., 237 km² or 74%) is considered secondary habitat. Primary habitat represents 66 km² or 21% of the area of overlap.

Primary habitat within the area of overlap between the ELC and herd ranges during the calving/post-calving season (i.e., Wetland and Lichen Heathland) represents 50 km² (< 6%) and 546 km² (27%) for the RWM and MM Herds, respectively (Table 2). Secondary habitats are more abundant for both these herds during this period (i.e., Conifer Forest, Conifer Scrub, and Open Conifer Forest) and comprise 726 km² (85%) and 1,320 km² (66%) of the area of overlap for the RWM and MM Herds, respectively (Table 2). During winter, primary habitat (i.e., lichen heathland) within the area of overlap between the ELC and herd ranges represents 3 km² (0.4%) for the RWM Herd, and 9 km² (0.5%) for the MM Herd. Secondary habitat (i.e., Black Spruce Lichen Forest) is also relatively uncommon in this area, representing only 7 km² (0.8%) for the RWM Herd and 49 km² for the MM Herd (2.5%) (Table 2).

Table 2. Caribou habitat quality within the area of overlap between the herds in Central and Southeastern Labrador and the Project alignment during calving/post-calving and winter.

Red Wine Mountains Herd				
Habitat Quality ^(a)	Calving/Post-calving		Winter	
	Amount in ELC Overlap (km ²)	Percentage (%)	Amount in ELC Overlap (km ²)	Percentage
Primary	50.2	5.87	3.2	0.4
Secondary	725.9	84.9	6.7	0.8
Primary + Secondary	776.1	90.8	9.9	1.2
Tertiary	37.8	4.4	804	94.0
Not Applicable	41.1	4.8	41.1	4.8
Total	855.0	100.0	855.0	100.0
Mealy Mountains Herd				
Primary	546.1	27.2	9.5	0.5
Secondary	1,319.8	65.7	49.3	2.5
Primary + Secondary	1,865.9	92.8	58.8	3.0
Tertiary	69.9	3.48	1,877.0	93.4
Not Applicable	74.5	3.7	74.5	3.7
Total	2,010.3	100.0	2,010.3	100.0

^(a) Based on Schmelzer (2012).

Table 3 presents the direct primary habitat alteration / loss that would likely occur as a result of the Project (i.e., construction of the 60 m wide right-of-way). However, the amount of primary habitat directly affected will depend on the habitat type being crossed. For example, not all habitat types will require vegetation clearing within the right-of-way. As such, the values presented in Table 3 represent a conservative and precautionary estimate of the Project effects. Table 3 also examines the habitat altered/lost as a result of indirect effects using an assessment area defined by 500 m, 1,000 m, and 2,000 m buffers around the 60 m wide right-of-way.

Table 3. Primary habitat in Red Wine Mountains and Mealy Mountains Caribou Herd ranges overlapping with assessment areas defined by 500 m, 1,000 m and 2,000 m buffers around the 60 m wide right-of-way (reference Figures WD1-1 and WD1-2).

Caribou Herd	Primary Calving/Post-calving Habitat in Area of Overlap (km ²)	Primary Winter Habitat in Area of Overlap (km ²)
60 m ROW		
Red Wine Mountains	0.18	0
Mealy Mountains	152.3	0.085
60 m ROW + 500 m buffer		
Red Wine Mountains	1.2	0
Mealy Mountains	238.9	0.1
60 m ROW + 1,000 m buffer		
Red Wine Mountains	2.0	0
Mealy Mountains	267.5	0.3
60 m ROW + 2,000 m buffer		
Red Wine Mountains	11.6	0
Mealy Mountains	365	104.2

The analysis indicates that direct habitat loss is limited to the RWM and MM Herd ranges, of which clearing for the 60 m wide ROW is predicted to affect 0.2 km² and 152.3 km², respectively. Effects are greatest in the MM Herd range relative to the RWM Herd range, and these relative differences are described in detail in the response to WD-2 and the response to WD-3. The effects of indirect habitat loss were assessed in the EIS using a 500 m wide buffer, following Dyer et al. (2001) and Environment Canada (2012). The potential alteration/loss to seasonal habitat within the ranges due to the right-of-way plus a 500 m buffer would be 1.2 km² in calving/post-calving and 0 km² in winter for the RWM Herd, 238.9 km² in calving/post-calving and 0.1 km² in winter for the MM Herd, and no overlap with the Joir River 'subpopulation'.