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Nalcor Energy Lower Churchill Project, Environmental Effects Monitoring Program – 2016 Red Wine Mountains Caribou Herd

2016 Aerial Survey



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Interim Report

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INTRODUCTION July 15, 2016

1.0 INTRODUCTION

The Red Wine Mountains Herd (RWMH) of sedentary caribou was assessed as a Key Indicator for the environmental assessment for the Lower Churchill Project (The Project). The environmental effects of Project activities on the RWMH were assessed in terms of change in habitat, mortality and health (Nalcor 2009). Overall, the results of the environmental assessment predicted that while there would be adverse environmental effects on the RWMH, Project related environmental effects were considered not significant (i.e., the Project would not cause a population decline, such that the viability or recovery of the Herd is threatened). However, cumulative environmental effects on the RWMH were predicted to be significant, and supported the conclusion that the ongoing pressures of predation and illegal hunting and the combined effects of all existing, planned and reasonably foreseeable projects and activities in the region would contribute to a further decline.

As part of the environmental assessment, the proponent of the Project - Nalcor Energy (Nalcor) - committed to continued participation in the Labrador Woodland Caribou Recovery Team, and support of research initiatives such as telemetry studies and aerial surveys. The Red Wine Mountains Environmental Effects Monitoring Program (EEMP) is one of several such initiatives.

This interim report describes the methods and results from the aerial survey completed in February 2016.

2.0 SURVEY OBJECTIVES

The primary objective of the RWMH EEMP is to monitor the effects of the Project on RWMH caribou in relation to the predictions made in the EIS (Nalcor 2009), and in particular, examine movement and distribution patterns of caribou in relation to Project activities (e.g., vegetation clearing). The objectives of this field program were:

- To record locations of caribou and/or their tracks in the winter range of the RWMH;
- To support ongoing Project mitigation.

3.0 METHODS

The Study Team for the field program included Stassinu Stantec personnel and members of the Newfoundland and Labrador Wildlife Division (Table 3.1).

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METHODS July 15, 2016

Table 3.1 Caribou Survey Team, February 15-19, 2016

Marina a		Organization			
Name	February 15	February 16	February 18	February 19	Organization
Richard Martin	Front right (Pilot)	Front right (Pilot)			Universal Helicopters
Darryl Hefler			Front right (Pilot)		Universal Helicopters
Tim Williams				Front right (Pilot)	Universal Helicopters
Tony Parr	Front left (observer / navigator	Front left (Observer / navigator)	Front left (Observer / navigator)	Front left (Observer / navigator)	Stassinu Stantec
Mary Ann Aylward	Back left (Observer)	Back left (Observer)	Back left (Observer)	Back left (Observer)	Stassinu Stantec
Richard Neville	Back right (Observer)	Back right (Observer)	Back right (Observer)	Back right (Observer)	NL Wildlife Division

Prior to start of the field program, all personnel reviewed Stantec's Risk Management Strategy (RMS) 1 and 2 forms to ensure safety hazards were identified.

An aerial strip transect survey was completed over a four day period between February 15 and February 19, 2016, covering a 20 km area of overlap between the Project footprint and core winter habitat/potential occupancy for the RWMH (identified by the NLWD). Three observers (two from Stassinu Stantec and one representing the NLWD) conducted the survey, with preestablished transects spaced at 2 and 4 km intervals, and with each observer searching an area of approximately 200 m either side of the aircraft.

A Bell 206L Long Ranger helicopter equipped with 'bubble' rear windows (to enhance visibility) was used throughout the survey. The aircraft was flown at 100-120 km/hour and an altitude of approximately 100 m above ground level (agl). Survey routes were uploaded into a Garmin aeronautical GPS device which projects a line for easy navigation; the pilot followed these routes and maintained a constant air speed. Waypoints of caribou sightings and/or tracks were geo-referenced using GPS and additional comments were recorded on field data sheets.

GPS locations of caribou recorded during surveys were relayed to NLWD to be used in collaring initiative [based on the relatively sedentary nature of RWMH caribou during early-winter (Rettie and Messier 2001)], whereby the area around the waypoint was searched to identify fresh tracks, and tracks were then followed to locate the animal.



RESULTS July 15, 2016

4.0 RESULTS

4.1 Survey Effort and Conditions

Weather conditions encountered during surveys were ideal for aerial observations. Weather was unsuitable on February 17 for surveying but resumed on February 18.

Table 4.1 Survey Effort and Weather Conditions

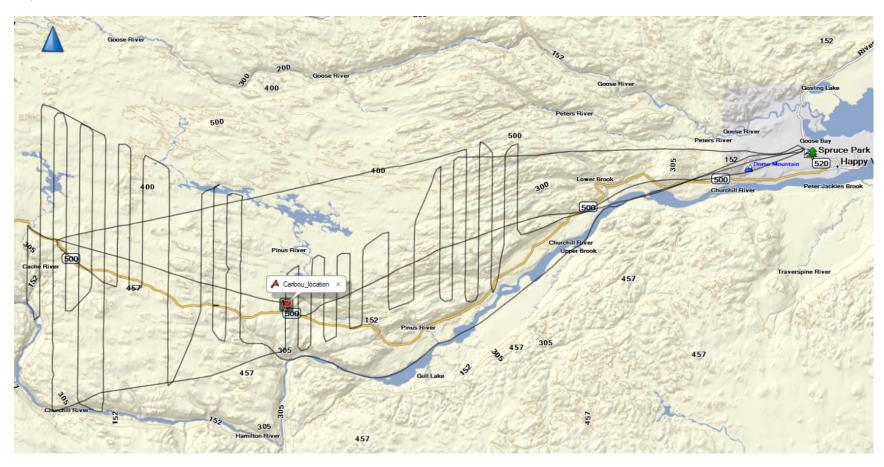
Date	Activities	Departure Time / Return Time	Survey Start Time	# Transects Flown	Total Flying Time (hours)	Weather
February 15	Strip transect survey	1100h / 1610h	1122h	13	4.8	Approximately -20 degrees Celsius, high winds (45 km/h) from the NW; skies broken and clear at midday.
February 16	Strip transect survey	0915h / 1520h	0942h	20.5	5.7	Approximately -14 degrees Celsius and winds calm. Sunny all day.
February 18	Strip transect survey	0915h / 1625	1048h	18.5	6.4	Approximately -20 degrees Celsius and winds 10 km/h from the NW. Full sun with high broken cloud
February 19	Strip transect survey	0915 / 1235	1015h	5	4.3	Approximately -19 degrees Celsius and winds calm from the NNW. Full sun (100% cloud cover by midday).

4.2 Strip transect Surveys

Approximately 13 transect lines were flown on February 15 (Figure 4-1). Caribou were not observed during this initial survey, but one area with evidence of cratering was documented. The cratering appeared to be old, as 2 caribou were spotted in this area by NLWD approximately 7-10 days earlier. One malfunctioning collar was seen on this group previously. Observations of moose and otter tracks were recorded on all transects flown.



RESULTS July 15, 2016



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Figure 4-1 Survey Transects and Observations, February 15-16, 2016



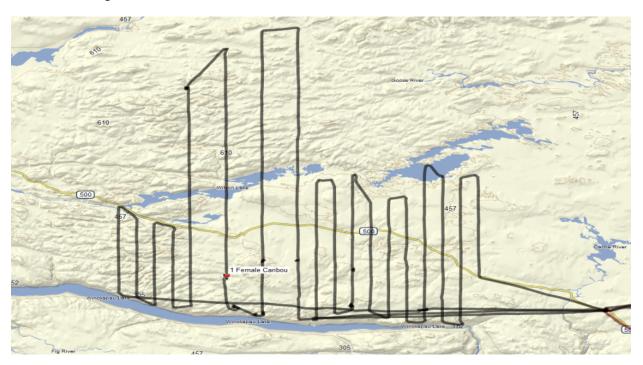
RESULTS July 15, 2016

On February 16, approximately 20.5 transect lines were flown, and fourteen caribou were observed and recorded (Figure 4-1). These caribou were observed approximately 1 km north of the Trans-Labrador Highway (TLH) (Figure 4-1). A classification was conducted; group consisted of one antlered stag, 5 antlered does with 5 calves, one antlerless male yearling and two antlerless female yearlings. Coordinates were recorded and transmitted to NLWD for follow up collaring efforts.

On February 18, approximately 18.5 transect lines were flown, and one observation of one antlered doe caribou was recorded (Figure 4-2). This lone female was located approximately 9 km south of the TLH without any other signs of caribou in the vicinity.

On February 19, approximately 5 transect lines were flown, and no sign of caribou activity were recorded.

Incidental observations of tracks of moose, otter and lynx were recorded throughout survey effort. The majority of moose tracks were found along the river/brook valleys, and most otter tracks in the highlands.



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Figure 4-2 Survey Transects and Observations, February 18, 2016



SUMMARY July 15, 2016

5.0 SUMMARY

Aerial transect surveys are an effective means of assessing ungulate populations, and may be particularly important for species of conservation concern, such as woodland caribou. Results from this survey have provided preliminary information on numbers, age and sex characteristics, distribution, and habitat use of caribou from the RWMH. This information will be used in combination with results of future surveys and collaring initiatives, to assess the movement and distribution patterns of RWMH caribou in relation to Project activities.



REFERENCES July 15, 2016

REFERENCES 6.0

Rettie, W.J. and F. Messier. 2001. Department of Biology, University of Saskatchewan, 112 Science Place, Saskatoon, SK S7N 5E2, Canada.



APPENDIX A

2016 Strip Transect Survey Results



2016 Strip Transact Survey Results Table A.1

Id	Waypoint	date	Lat	Long	Species	Observation	Elev
1	163	2/15/2016 11:52	53.20443	-61.0777	Otter	Tracks	1390 ft
2	164	2/15/2016 12:10	53.12421	-61.1206	Moose	Tracks	893 ft
3	165	2/15/2016 12:12	53.10135	-61.1376	Otter	Tracks	544 ft
4	166	2/15/2016 12:12	53.10448	-61.1377	Moose	Tracks	579 ft
5	167	2/15/2016 12:13	53.11974	-61.1377	Otter	Tracks	667 ft
6	167	2/15/2016 12:13	53.11974	-61.1377	Moose	Tracks	667 ft
7	168	2/15/2016 12:16	53.14741	-61.137	Moose	Tracks	1233 ft
8	169	2/15/2016 12:23	53.24714	-61.137	Otter	Tracks	1589 ft
9	170	2/15/2016 12:39	53.15414	-61.1672	Otter	Tracks	1369 ft
10	170	2/15/2016 12:39	53.15414	-61.1672	Moose	Tracks	1369 ft
11	171	2/15/2016 12:45	53.09564	-61.1979	Moose	Tracks	1357 ft
12	172	2/15/2016 12:47	53.11746	-61.1981	Moose	Tracks	1113 ft
13	173	2/15/2016 12:47	53.12442	-61.1978	Moose	Tracks	1038 ft
14	173	2/15/2016 12:47	53.12442	-61.1978	Otter	Tracks	1038 ft
15	174	2/15/2016 12:48	53.14223	-61.1975	Moose	Tracks	1361 ft
16	174	2/15/2016 12:48	53.14223	-61.1975	Otter	Tracks	1361 ft
17	175	2/15/2016 12:57	53.29676	-61.1972	Otter	Tracks	1806 ft
18	176	2/15/2016 14:02	53.18446	-62.0066	Otter	Tracks	1583 ft
19	177	2/15/2016 14:09	53.31768	-62.0066	Otter	Tracks	1662 ft
20	178	2/15/2016 14:18	53.17136	-61.9786	Otter	Tracks	1628 ft
21	179	2/15/2016 14:20	53.14395	-61.9793	Otter	Tracks	1653 ft
22	180	2/15/2016 14:24	53.11862	-61.949	Moose	Tracks	1617 ft
23	181	2/15/2016 14:33	53.28725	-61.9489	Moose	Tracks	1550 ft
24	182	2/15/2016 14:38	53.24062	-61.8875	Otter	Tracks	1549 ft
25	183	2/15/2016 14:48	53.08816	-61.8863	Lynx	Tracks	1514 ft
26	184	2/15/2016 14:55	52.94991	-61.8829	Moose	Tracks	1619 ft
27	185	2/15/2016 15:19			Caribou	Tracks (2 animals seen by WD 2 weeks prior)	1783 ft
28	186	2/15/2016 15:22	53.14544	-61.7832	Otter	Tracks	1808 ft
29	187	2/15/2016 15:45	53.08288	-61.7537	Moose	Tracks	1589 ft
30	188	2/15/2016 16:02	53.14965	-61.7195	Otter	Tracks	1608 ft
31	189	2/16/2016 10:18	53.16414	-61.2276	Otter	Tracks	1524 ft
32	190	2/16/2016 10:18	53.15233	-61.228	Otter	Tracks	1582 ft



ld	Waypoint	date	Lat	Long	Species	Observation	Elev
33	191	2/16/2016 10:19	53.13796	-61.2277	Moose	Tracks	1381 ft
34	192	2/16/2016 10:20	53.12422	-61.2278	Moose	Tracks	1098 ft
35	193	2/16/2016 10:25	53.12739	-61.2574	Otter	Tracks	1280 ft
36	194	2/16/2016 10:27	53.15816	-61.2572	Otter	Tracks	1668 ft
37	195	2/16/2016 10:45	53.08212	-61.3295	Moose	Tracks	1296 ft
38	196	2/16/2016 11:01	53.06493	-61.4363	Moose	Tracks	1301 ft
39	197	2/16/2016 11:02	53.05317	-61.4362	Moose	Tracks	1103 ft
40	198	2/16/2016 11:03	53.04385	-61.4661	Moose	Tracks	1416 ft
41	199	2/16/2016 11:04	53.05139	-61.4664	Moose	Tracks	1306 ft
42	200	2/16/2016 11:04	53.05912	-61.4666	Moose	Tracks	1098 ft
43	201	2/16/2016 11:10	53.15598	-61.491	Otter	Tracks	1492 ft
44	202	2/16/2016 11:15	53.08294	-61.4959	Moose	Tracks	1517 ft
45	203	2/16/2016 11:16	53.06479	-61.4959	Moose	Tracks	1349 ft
46	204	2/16/2016 11:23	53.06386	-61.5275	Moose	Tracks	1417 ft
47	205	2/16/2016 11:36	53.05601	-61.5556	Moose	Tracks	1337 ft
48	206	2/16/2016 11:44	53.09194	-61.5851	Moose	Tracks	1536 ft
49	207	2/16/2016 11:51	53.08296	-61.6152	Otter	Tracks	1558 ft
50	208	2/16/2016 11:51			Caribou	14 animals	1562 ft
51	209	2/16/2016 12:16	52.96155	-61.8303	Moose	Tracks	1599 ft
52	210	2/16/2016 12:21	52.9459	-61.9763	Moose	Tracks	1369 ft
53	211	2/16/2016 12:28	52.92052	-62.1555	Moose	Tracks	1444 ft
54	212	2/16/2016 12:28	52.9354	-62.1556	Otter	Tracks	1463 ft
55	213	2/16/2016 12:33	53.01267	-62.1546	Moose	Tracks	1562 ft
56	214	2/16/2016 12:34	53.03886	-62.1562	Moose	Tracks	1669 ft
57	215	2/16/2016 12:36	53.07578	-62.1558	Moose	Tracks	1665 ft
58	216	2/16/2016 12:37	53.09247	-62.1558	Moose	Tracks	1634 ft
59	216	2/16/2016 12:37	53.09247	-62.1558	Otter	Tracks	1634 ft
60	217	2/16/2016 12:39	53.1231	-62.1561	Moose	Tracks	1552 ft
61	218	2/16/2016 12:40	53.1405	-62.1562	Otter	Tracks	1518 ft
62	219	2/16/2016 12:41	53.16067	-62.1563	Moose	Tracks	1593 ft
63	220	2/16/2016 13:08	53.18541	-62.1583	Moose	Tracks	1506 ft
64	221	2/16/2016 13:13	53.28531	-62.1565	Otter	Tracks	1419 ft
65	222	2/16/2016 13:29	53.14704	-62.1264	Moose	Tracks	1573 ft
66	223	2/16/2016 13:30	53.12816	-62.1264	Moose	Tracks	1588 ft
67	224	2/16/2016 13:32	53.07631	-62.1266	Moose	Tracks	1678 ft
68	225	2/16/2016 13:37	53.13511	-62.067	Moose	Tracks	1668 ft



ld	Waypoint	date	Lat	Long	Species	Observation	Elev
69	226	2/16/2016 13:38	53.16475	-62.0667	Otter	Tracks	1670 ft
70	227	2/16/2016 13:59	53.1199	-62.0964	Otter	Tracks	1672 ft
71	227	2/16/2016 13:59	53.1199	-62.0964	Lynx	Tracks	1672 ft
72	228	2/16/2016 14:03	53.05154	-62.0968	Otter	Tracks	1566 ft
73	229	2/16/2016 14:03	53.04508	-62.0968	Moose	Tracks	1572 ft
74	230	2/16/2016 14:11	52.91541	-62.0352	Moose	Tracks	849 ft
75	231	2/16/2016 14:12	52.92516	-62.0359	Moose	Tracks	1311 ft
76	232	2/16/2016 14:23	53.14781	-62.037	Otter	Tracks	1590 ft
77	233	2/16/2016 14:25	53.1925	-62.0367	Otter	Tracks	1539 ft
78	234	2/16/2016 14:44	53.24543	-62.1868	Otter	Tracks	1419 ft
79	235	2/16/2016 14:48	53.18183	-62.1868	Moose	Tracks	1511 ft
80	236	2/16/2016 14:50	53.14789	-62.1866	Moose	Tracks	1434 ft
81	237	2/16/2016 14:50	53.14046	-62.1868	Otter	Tracks	1286 ft
82	237	2/16/2016 14:50	53.14046	-62.1868	Moose	Tracks	1286 ft
83	238	2/16/2016 14:50	53.13688	-62.1868	Moose	Tracks	1226 ft
84	239	2/16/2016 14:52	53.10626	-62.1869	Moose	Tracks	1018 ft
85	240	2/16/2016 14:52	53.10061	-62.1866	Moose	Tracks	1110 ft
86	241	2/16/2016 14:53	53.0818	-62.1865	Moose	Tracks	1110 ft
87	242	2/16/2016 14:54	53.06158	-62.1865	Moose	Tracks	986 ft
88	243	2/16/2016 14:58	53.10375	-62.2166	Moose	Tracks	1059 ft
89	244	2/16/2016 14:59	53.12087	-62.2164	Moose	Tracks	1465 ft
90	245	2/16/2016 15:01	53.13526	-62.2162	Moose	Tracks	1461 ft
91	246	2/16/2016 15:01	53.14926	-62.2164	Moose	Tracks	1385 ft
92	247	2/16/2016 15:02	53.161	-62.2168	Moose	1 animal	1449 ft
93	248	2/16/2016 15:03	53.1691	-62.2169	Moose	Tracks	1499 ft
94	249	2/18/2016 10:51	53.24647	-62.9658	Otter	Tracks	1713 ft
95	250	2/18/2016 11:07	53.2601	-62.9062	Otter	Tracks	1750 ft
96	251	2/18/2016 11:18	53.1899	-62.846	Otter	Tracks	1428 ft
97	252	2/18/2016 11:23	53.29518	-62.8472	Moose	Tracks	1640 ft
98	253	2/18/2016 11:23	53.30518	-62.8473	Otter	Tracks	1680 ft
99	254	2/18/2016 11:31	53.47876	-62.8494	Moose	Tracks	2087 ft
100	255	2/18/2016 11:34	53.50187	-62.8507	Moose	Tracks	1892 ft
101	256	2/18/2016 11:41	53.54405	-62.7881	Moose	Tracks	2192 ft
102	257	2/18/2016 11:54			Caribou	1 adult female	1441 ft
103	258	2/18/2016 12:03	53.18135	-62.7748	Moose	Tracks	1229 ft
104	259	2/18/2016 12:05	53.1664	-62.7379	Moose	Tracks	1483 ft



Id	Waypoint	date	Lat	Long	Species	Observation	Elev
105	260	2/18/2016 12:06	53.17047	-62.7265	Moose	Tracks	1270 ft
106	261	2/18/2016 12:08	53.19731	-62.7273	Otter	Tracks	1536 ft
107	262	2/18/2016 12:11	53.24499	-62.7252	Otter	Tracks	1714 ft
108	263	2/18/2016 12:17	53.39147	-62.7266	Moose	Tracks	1849 ft
109	264	2/18/2016 12:18	53.42191	-62.7266	Moose	Tracks	2068 ft
110	265	2/18/2016 12:19	53.44392	-62.7274	Moose	Tracks	2225 ft
111	266	2/18/2016 12:39	53.26151	-62.6673	Otter	Tracks	1718 ft
112	267	2/18/2016 12:40	53.24669	-62.6682	Moose	Tracks	1614 ft
113	268	2/18/2016 12:43	53.17853	-62.6662	Otter	Tracks	1411 ft
114	269	2/18/2016 12:44	53.1734	-62.6658	Moose	Tracks	1381 ft
115	270	2/18/2016 13:45	53.248	-62.6059	Otter	Tracks	1649 ft
116	271	2/18/2016 13:48	53.18144	-62.606	Otter	Tracks	1656 ft
117	272	2/18/2016 14:04	53.35011	-62.5606	Otter	Tracks	1789 ft
118	273	2/18/2016 14:10	53.20696	-62.549	Otter	Tracks	1596 ft
119	274	2/18/2016 14:21	53.33718	-62.4872	Otter	Tracks	1746 ft
120	275	2/18/2016 14:26	53.21289	-62.4858	Otter	Tracks	1648 ft
121	276	2/18/2016 14:28	53.18322	-62.4859	Moose	Tracks	1540 ft
122	277	2/18/2016 14:30	53.17352	-62.4567	Moose	Tracks	1506 ft
123	278	2/18/2016 14:33	53.24097	-62.4562	Otter	Tracks	1716 ft
124	279	2/18/2016 14:37	53.31175	-62.4571	Otter	Tracks	1776 ft
125	280	2/18/2016 14:37	53.32934	-62.4567	Otter	Tracks	1768 ft
126	281	2/18/2016 14:44	53.30924	-62.4262	Otter	Tracks	1764 ft
127	282	2/18/2016 14:50	53.17096	-62.4268	Moose	Tracks	1524 ft
128	283	2/18/2016 14:55	53.24381	-62.3958	Otter	Tracks	1730 ft
129	284	2/18/2016 15:05	53.27955	-62.3668	Otter	Tracks	1716 ft
130	285	2/18/2016 15:06	53.25915	-62.3667	Otter	Tracks	1685 ft
131	286	2/18/2016 15:06	53.25275	-62.3664	Otter	Tracks	1675 ft
132	287	2/19/2016 10:20	53.3036	-62.2167	Otter	Tracks	1660 ft
133	288	2/19/2016 10:38	53.19465	-62.2462	Otter	Tracks	1677 ft
134	289	2/19/2016 10:39	53.18085	-62.2464	Moose	Tracks	1651 ft
135	290	2/19/2016 10:43	53.08446	-62.2499	Moose	Tracks	1394 ft
136	291	2/19/2016 10:56	53.30064	-62.2769	Otter	Tracks	1618 ft
137	292	2/19/2016 11:23	53.16262	-62.3362	Moose	Tracks	1534 ft

