5.9 Human Access Monitoring

Trail cameras were installed to monitor the amount of human access at all-weather construction access points (n = 7 in 2015/16, n = 9 in 2016/17, n = 9 in 2017/18; no data were available for 2018/19) and along the ROW associated with the winter ground track transects (n = 18 along N2 and N3 in 2015/16, n = 25 along N1, N2 and N3 in 2016/17, n = 37 along N1 through N4 in 2017/18, and n = 36 along N1 through N4). Results of the 2015 to 2019 sampling effort indicated most of the ROW access for a known purpose was for Project construction (>99% during each year of construction) with limited local public access (<1.0% during each year of construction) for recreation and resource use (Table 5-9-1). It is not known whether public use of the ROW will increase during the Operation phase, therefore continued monitoring is recommended.

5.10 Mitigation Effectiveness Monitoring

Clearing activities relevant to mammals monitoring were undertaken in the majority of construction segment N3 from February through March 2014, and in N2, south portion of N3 and N4 (primarily centerline clearing), prior to initiation of Year 1 (2014/15) of the mammals monitoring programs in January 2015. Clearing activities along the N3 and N4 ROW construction segments was completed during Year 2 (2015/16). In Year 3 (2016/17) tower erecting and line stringing was undertaken. In Year 4 (2017/18) Construction activities were completed and the Operation phase began in the summer of 2018.

This report concentrates on analysis from the Construction phase of the Project for the various mammal VECs being monitored at local and/or landscape scales through each Project phase. An updated assessment of use on mitigation areas has been undertaken and is provided in Part B report.

Ingress of white-tailed deer into the P-Bog range along the project ROW is a possible project effect and concern because of potential transmission of *P. tenuis* to woodland caribou. White-tailed deer sign was detected along the north end of the P-Bog survey area in Year 3 during the Multi-spp Aerial Survey (Section 5.4) and during the Year 4 caribou recruitment survey along the Highway 10 ROW. All current monitoring methods should continue to be used as outlined in Manitoba Hydro (2018) and as applied in this and previous mammals monitoring reports, to assess the extent of, and potential for, white-tailed deer ingress.

There were 3 deer-vehicle collisions involving project vehicles during the Construction phase to date, all collisions were in vicinity of the S1 construction segment and no other project-related wildlife-vehicle collisions have occurred (Section 5.6.4). No incidents of construction project-staff interactions (e.g., staff hunting or feeding wildlife, or problem wildlife incidents) with wildlife have been reported.

Public use of the project for access to date has been minimal (Section 5.9) and unlikely to have altered ungulate mortality from hunting.

No environmentally sensitive site (ESS) issues were reported during construction, except for one black bear hibernation den disturbed during Year 1 along construction segment C2 (Section 5.8).

Effects of the project on furbearer species harvest levels and rates appear to be unaffected by the project during construction except for a suspected reduction of beaver harvest during the Construction phase in traplines intersected by the Project along N1 through N4. The Multi-spp Aerial Survey indicates beaver are common and widely distributed. This is consistent with predicted project effects of temporary local effects to beaver of no measurable population-level decline; but evidence of localized effects because of sensory disturbance during construction are reflected in the lower harvest of beaver (Section 5.5). Some furbearers are more frequently recorded at distances farther from the ROW than closer suggesting a local scale level of avoidance for some species. However local avoidance is not anticipated to have population level consequences.

Table 5-1-1: Summary of Annual Population Structure, Winter Calf Recruitment and Kaplan-Meier (K-M) Adult Female Survival Estimates for Boreal Woodland Caribou from Mid-winter Aerial Surveys and Telemetry Study

Caribou Range	Year	Number of Caribou Observed					Bulls/100 Cows	Calves/100 Cows	Calves/100 Adults	% Calves	K-M Adult Female Survival Rate (%)	Population Trend ***
		Bulls	Cows	Calves	Unkn*	Total						
P-Bog	23-29 Jan 2015	12	53	13	4	82	22.6	24.5	20.0	16.7	90.0	Stable
	25-26 Feb 2016	5	49	11	1	66 **	10.2	22.4	20.4	16.9	88.0	Stable **
	20-24 Jan 2017	6	49	11	0	66 **	12.2	22.4	20.0	16.7	90.2	Stable **
	27-29 Jan 2018	22	55	14	1	92	40.0	25.5	18.2	15.4	88.7	Stable
	1-4 Feb 2019	4	29	5	0	37 **	13.8	17.2	15.2	13.2	89.7	Declining**
N-Reed (Boreal Plain portion of population)	29 Jan -1 Feb 2015	15	52	11	5	81	28.8	21.2	16.4	14.1	82.9	Declining
	14-15 Jan 2016	1	25	11	0	37 **	4.0	44.0	42.3	29.7	86.7	Stable **
	25-27 Jan 2017	13	50	13	0	76	26.0	26.0	20.6	17.1	88.6	Stable
	2-3 Feb 2018	23	35	13	0	71	65.7	37.1	22.4	18.3	84.8	Declining
	4-7 Feb 2019	42	56	9	0	107	75.0	16.1	9.2	8.4	84.8	Declining
Wabowden (Boreal Plain portion of population)	19-22 Jan 2015	17	61	15	7	100	27.9	24.6	19.2	16.1	84.4	Stable
	12-13 Jan 2016	24	68	14	1	107	35.3	20.6	15.2	13.2	81.5	Stable
	17-18 Jan 2017	10	44	9	0	63 **	22.7	20.5	16.7	14.3	87.0	Stable **
	29 Jan-1 Feb 2018	18	55	11	1	85	32.7	20.0	15.1	13.1	85.5	Stable
	3-4 Feb 2019	12	46	8	0	66 **	26.1	17.4	13.8	12.1	88.4	Stable
Charron Lake	3-6 Feb 2015	19	50	16	2	87	38.0	32.0	22.5	18.8	91.7	Increasing
	17-19 Jan 2016	58	131	23	0	212	44.3	17.6	12.2	10.8	90.6	Stable
	1-5 Feb 2017	39	108	17	11	175	36.1	15.7	10.8	10.4	90.9	Stable
	22-24 Jan 2018	55	114	20	1	190	48.2	17.5	11.8	10.6	90.9	Stable
	22-27 Feb 2019	54	109	34	11	207	49.5	31.2	20.9	17.3	90.9	Increasing

Notes:
* Not classified to age or sex.
** Small sample size for caribou observations; interpret with caution.
*** Demographic Indicators of Population Trend:

- Assuming annual adult survival is >85%, if the proportion of calves (% Calves) in winter is >15% the population is likely growing, stable if 12 to 15%, or in decline if <10%.
- Calf recruitment rates >28.9 calves/100 cows indicates a stable to increasing population (assuming annual adult female survival is ≥85%). If calf recruitment drops below this threshold and/or annual female survival rates are <85%, the population is likely declining

Table 5-1-2: Population Abundance Estimates of Monitored Boreal Woodland Caribou Winter Ranges

Caribou Range	Survey Area Size (km²)	Survey Year	Survey Area				Range			
			# Unique Genotypes (from CMR Sampling)	Min. Count (From Winter Calf Recruitment Survey)	CMR Population Estimate ±95% CI	CMR Density Estimate (Caribou /km²)	100% MCP Size (km²)	Projected Population Size	Projected Population Density Estimate (Caribou/km²)	MB Gov's Caribou Population Size Estimate (as of 2015)
P-Bog	2,224	2015	88	82	120 ± 3.0	0.0542	5,476	147	0.0268	175-200
		2016	---	66	---	---		---	---	
		2017	97	66	230 ±4.2	0.1032		230	0.0419	
		2018	---	92	---	---		---	---	
		2019	60	37	80 ±1.6	0.0124		97	0.0177	
N-Reed (Boreal Plain Portion)	1,822	2015	109	81	294 ± 11.6	0.1614	6,329	343	0.0542	250-300
		2016	---	37	---	---		---	---	
		2017	143	76	358 ±11.0	0.1964		358	0.0565	
		2018	---	71	---	---				
		2019	118	107	174 ±1.0	0.0955		203	0.0321	
Wabowden (Boreal Plain Portion	2,130	2015	108	100	108 ± 1.8	0.0509	3,919	128	0.0327	150-200
		2016	---	107	---	---		---	---	
		2017	98	63	160 ±5.2	0.0750		189	0.0482	
		2018	---	85	---	---		---	---	
		2019	97	66	126 ±3.1	0.0590		149	0.0379	
Charron Lake (MB Portion)	2,032	2015	131	87	832 ± 5.1	0.4093	15,777	1164	0.0738	300-500
		2016	---	212	---	---		---	---	
		2017	176	175	860 ±3.6	0.4230		1203	0.0762	
		2018	---	190	---	---		---	---	
		2019	170	207	893 ±3.9	0.4396		1250	0.0792	

Notes:

Range abundance estimates for P-Bog, N-Reed and Wabowden were proportionately calculated based on the amount of winter core area of occupation estimated from a 70% kernel probability isopleth estimator within each study area, relative to the amount occurring within the Boreal Plain Ecozone for each respective caribou range. A 20% correction factor was then applied to account for potential caribou occurrence on the remaining unaccounted portion of non-core winter range occurring within the Boreal Plain Ecozone for each respective caribou range. This yields a projected population estimate for the portion of each caribou range occurring on the Boreal Plain Ecozone (i.e., excludes the portion of range occurring on the Boreal Shield).

The range abundance estimate for Charron Lake range (portion within Manitoba) was proportionately calculated based on the amount of winter core area of occupation estimated from a 70% kernel probability isopleth estimator within the area sampled relative to total amount within the caribou range, all of which occurs on the Boreal Shield Ecozone.

Table 5-3-1: Comparison of Long-term Mean Population Metrics and Recent (≥2010) Survey Results for Modeled Moose Populations Intersected by the Bipole III Transmission Project ROW

Moose Population	Year	Winter Population (±90% CI)	Winter Density (#/km^2)	Adult Sex Ratio (M/100F)	Calf Recruitment (calves/100F)
Monitored / Sensitive Moose Populations					
Tom Lamb WMA (GHA 8)	**Long Term Mean (1971-2018)**	**634**	**0.201**	**61.3**	**58.8**
	January 2012	317 ±32.0%	0.101	84.5	46.6
	January 2016	339 ±18.5%	0.107	57.7	52.1
Moose Meadows (portion of GHA 14)*	**Long Term Mean (1971-2018)**	**79**	**0.423**	**35.7**	**56.0**
	January 2011	7	0.040	72.7	52.3
Pine River (GHA 14A/19A)	**Long Term Mean (1971-2018)**	**526**	**0.169**	**53.4**	**52.0**
	January 2013	104 ±12.8%	0.033	37.5	87.5
	January 2014	100 ±19.0%	0.032	138.5	76.9
Split Lake (Keeyask GS 2015 Survey Area)	**Long Term Mean (1971-2018)**	**1,106**	**0.066**	**90.8**	**52.9**
	January 2010	961 ±21.0%	0.057	118.3	35.5
	January 2015	1,349 ±22.6%	0.080	50.0	51.4
	January 2018	1,159 ±26.9%	0.069	28.8	44.7
Regional Reference Moose Populations in Manitoba					
Upper SK Delta (GHA 6/6A)	**Long Term Mean (1971-2018)**	**354**	**0.191**	**48.2**	**47.4**
	January 2010	255 (100% census)	0.141	---	---
Red Deer Bog (GHA11/12)	**Long Term Mean (1971-2018)**	**493**	**0.103**	**48.3**	**58.5**
	January 2013	199 ±24.6%	0.042	31.6	34.2
	January 2016	100 ±46.7%	0.043	66.7	66.7
Swan-Pelican (GHA14/14A)	**Long Term Mean (1971-2018)**	**1,509**	**0.264**	**40.1**	**54.4**
	January 2011	144 ±12.8%	0.029	72.7	52.3
	February 2014	150 ±18.9%	0.030	---	---
Porcupine Hills (GHA 13/13A)	**Long Term Mean (1971-2018)**	**813**	**0.314**	**47.8**	**42.0**
	February 2011	817 ±17.8%	0.315	32.3	30.5
	February 2017	1,057 ±16.4%	0.408	63.6	48.7
Duck Mountains (GHA 18/18A/18B/18C)	**Long Term Mean (1971-2018)**	**2,225**	**0.398**	**65.1**	**45.4**
	February 2011	1,466 ±12.4%	0.257	63.0	45.0
	February 2017	1,958 ±15.1%	0.344	69.3	34.7

Note:
* Estimates for Moose Meadows were projected (based on proportion of habitat area) from the Swan-Pelican moose population model using GHA 14 data only to calculate relative population size and trend.

Table 5-5-1: Comparison of Pre-construction (5-year Mean; 2009/10 – 2013/14) Annual Harvest to Construction (4-year Mean; 2014/15 – 2017/18, by Construction Segment and Species

Species	Project Phase	N1 (n = 11 RTLs)	N2 (n = 16 RTLs)	N3 (n = 13 RTLs)	N4 (n = 2 RTLs)	Total (n = 42 RTLs)
Beaver	**Pre-Construction**	**42.2 ±25.8**	**37.4 ±24.7**	**63.6 ±31.8**	**545.6 ±211.2**	**688.8 ±201.5**
	Construction	**7.3 ±5.3**	**3.5 ±3.4**	**4.3 ±3.6**	**112.5 ±98.0**	**127.5±95.7**
Coyote	Pre-Construction	--NR--	--NR--	11.8 ±12.9	28.2 ±11.8	40.0 ±11.0
	Construction	--NR--	0.3 ±0.5	4.0 ±2.9	26.3 ±30.0	30.5 ±32.1
Fisher	Pre-Construction	0.4 ±0.8	1.4 ±1.8	18.8 ±12.7	42.2 ±12.9	62.8 ±19.7
	Construction	--NR--	1.8 ±2.0	15.8 ±11.6	26.5 ±17.2	44.0 ±28.7
Fox Cross	Pre-Construction	3.4 ±0.8	3.2 ±2.1	0.2 ±0.4	0.6 ±0.8	7.4 ±1.6
	Construction	2.3 ±15	0.3 ±0.5	0.3 ±0.5	0.3 ±0.5	3.0 ±2.1
Fox Red	Pre-Construction	6.8 ±2.3	3.0 ±2.1	14.2 ±6.7	5.4 ±2.6	29.4 ±5.8
	Construction	5.5 ±1.9	2.5 ±2.8	6.5 ±2.8	2.5 ±2.6	17.0 ±1.8
Fox Sliver	Pre-Construction	1.2 ±1.1	0.6 ±0.8	1.0 ±1.2	--NR--	2.8 ±1.9
	Construction	0.5 ±0.6	--NR--	0.3 ±0.5	--NR--	0.8 ±0.9
Fox Arctic	Pre-Construction	5.4 ±7.3	--NR--	--NR--	--NR--	5.4 ±7.3
	Construction	3.8 ±3.2	1.3 ±1.9	--NR--	--NR--	5.0 ±4.7
Canada Lynx	Pre-Construction	6.8 ±3.6	27.0 ±28.4	23.6±7.9	13.2 ±9.3	70.8 ±34.6
	Construction	5.5 ±2.0	14.3 ±9.5	13.0 ±6.8	7.8 ±5.6	40.5 ±19.1
Marten	**Pre-Construction**	**373.4 ±110.2**	**140.2 ±104.9**	**79.2 ±28.0**	**323.0 ±74.9**	**915.8 ±156.1**
	Construction	**110.8 ±75.3**	**81.3 ±54.0**	**94.0 ±44.3**	**131.0 ±69.8**	**417.0 ±202.0**
Mink	Pre-Construction	14.4 ±6.9	36.2 ±19.1	27.8 ±14.5	59.8 ±36.4	138.2 ±48.6
	Construction	9.0 ±14.5	41.5 ±25.9	12.5 ±7.2	33.3 ±29.3	96.3 ±40.6
Muskrat	Pre-Construction	8.0 ±11.5	27.2 ±49.9	564.8 ±743.0	434.0 ±276.6	1034.0 ±1013.1
	Construction	5.8 ±6.8	25.3 ±25.0	54.3 ±64.5	97.3 ±137.3	182.5 ±132.0
Otter	Pre-Construction	4.2 ±2.1	10.0 ±7.1	12.4 ±12.7	27.6 ±14.4	54.2 ±14.9
	Construction	1.8 ±1.7	11.3 ±6.8	8.0 ±2.0	6.0 ±2.9	27.0 ±8.1
Squirrel	Pre-Construction	--NR--	0.4 ±0.5	11.2 ±10.4	126.6 ±53.6	138.2 ±55.4
	Construction	--NR--	--NR--	1.8 ±2.8	42.3 ±51.4	44.0 ±53.6
Weasel	Pre-Construction	0.4 ±0.5	19.2 ±9.7	24.4 ±14.5	133.0 ±42.6	177.0 ±41.7
	Construction	0.8 ±0.9	16.5 ±20.4	9.3 ±7.4	42.5 ±47.6	69.0 ±69.7
Wolf	**Pre-Construction**	**1.0 ±0.9**	**6.0 ±1.2**	**1.8 ±1.9**	**7.0 ±4.0**	**15.8 ±3.2**
	Construction	**0.8 ±0.9**	**2.3 ±3.2**	**2.5 ±1.3**	**7.3 ±4.8**	**12.8 ±5.3**
Wolverine	**Pre-Construction**	**1.8 ±1.7**	**2.8 ±2.0**	**1.0 ±0.9**	**--NR--**	**5.6 ±1.8**
	Construction	**1.3 ±1.2**	**2.5 ±1.3**	**--NR--**	**--NR--**	**3.8 ±1.9**

Notes:
RTL = Registered Trap Line
--NR-- = no reported harvest for the period assessed
Highlighted cells indicate significant difference between Project phases for that species

Table 5-5-2: Comparison of Pre-Construction (5-year Mean; 2009/10 - 2013/14) Annual Harvest Rate (#/license) to Construction (4-year Mean; 2014/15 – 2017/18, by Construction Segment and Species

Species	Project Phase	N1 (n = 11 RTLs)	N2 (n = 16 RTLs)	N3 (n = 13 RTLs)	N4 (n = 2 RTLs)	Total (n = 42 RTLs)
Beaver	**Pre-construction**	**0.641 ±0.345**	**0.642 ±0.244**	**0.804 ±0.187**	**2.299 ±0.608**	**1.515 ±0.352**
	Construction	**0.127 ±0.107**	**0.082 ±0.084**	**0.093 ±0.069**	**1.068 ±0.517**	**0.481 ±0.273**
Coyote	Pre-construction	--NR--	--NR--	0.135 ±0.092	0.125 ±0.059	0.087 ±0.017
	Construction	--NR--	0.006 ±0.012	0.075 ±0.049	0.317 ±0.250	0.112 ±0.070
Fisher	Pre-construction	0.003 ±0.006	0.023 ±0.023	0.241 ±0.109	0.189 ±0.072	0.143 ±0.055
	Construction	--NR--	0.037 ±0.042	0.290 ±0.190	0.279 ±0.051	0.169 ±0.031
Fox Cross	Pre-construction	0.059 ±0.038	0.062 ±0.025	0.002 ±0.003	0.002 ±0.003	0.016 ±0.004
	Construction	0.050 ±0.028	0.006 ±0.011	0.005 ±0.009	0.003 ±0.006	0.016 ±0.011
Fox Red	Pre-construction	0.146 ±0.158	0.052 ±0.018	0.181 ±0.069	0.023 ±0.010	0.066 ±0.014
	Construction	0.137 ±0.107	0.060 ±0.067	0.183 ±0.170	0.018 ±0.016	0.084 ±0.036
Fox Sliver	Pre-construction	0.024 ±0.024	0.012 ±0.014	0.019 ±0.027	--NR--	0.006 ±0.004
	Construction	0.015 ±0.023	--NR--	0.004 ±0.007	--NR--	0.003 ±0.004
Fox Arctic	Pre-construction	0.047 ±0.060	--NR--	--NR--	--NR--	0.011 ±0.015
	Construction	0.073 ±0.050	0.029 ±0.046	--NR--	--NR--	0.020 ±0.017
Canada Lynx	Pre-construction	0.074 ±0.048	0.482 ±0.364	0.334 ±0.128	0.049 ±0.028	0.150 ±0.054
	Construction	0.118 ±0.039	0.332 ±0.206	0.253 ±0.082	0.064 ±0.048	0.179 ±0.069
Marten	**Pre-construction**	**8.166 ±8.191**	**2.412 ±1.170**	**1.120 ±0.449**	**1.368 ±0.170**	**2.054 ±0.455**
	Construction	**2.005 ±0.449**	**2.155 ±0.762**	**1.795 ±0.635**	**1.636 ±0.673**	**1.729 ±0.211**
Mink	Pre-construction	0.326 ±0.316	0.671 ±0.100	0.363 ±0.168	0.236 ±0.085	0.306 ±0.091
	Construction	0.113 ±0.160	1.112 ±0.476	0.224 ±0.095	0.284 ±0.127	0.445 ±0.212
Muskrat	Pre-construction	0.104 ±0.154	0.395 ±0.685	5.502 ±6.205	1.748 ±1.077	2.059 ±1.773
	Construction	0.112 ±0.131	0.565 ±0.580	0.902 ±0.865	0.872 ±1.448	0.761 ±0.480
Otter	Pre-construction	0.076 ±0.063	0.175 ±0.088	0.141 ±0.120	0.107 ±0.031	0.119 ±0.029
	Construction	0.034 ±0.023	0.296 ±0.086	0.160 ±0.046	0.083 ±0.044	0.129 ±0.060
Squirrel	Pre-construction	--NR--	0.010 ±0.015	0.125 ±0.080	0.527 ±0.159	0.296 ±0.086
	Construction	--NR--	--NR--	0.027 ±0.039	0.326 ±0.380	0.144 ±0.161
Weasel	Pre-construction	0.003 ±0.004	0.550 ±0.446	0.315 ±0.120	0.570 ±0.130	0.389 ±0.066
	Construction	0.010 ±0.012	0.339 ±0.389	0.164 ±0.093	0.331 ±0.382	0.251 ±0.164
Wolf	**Pre-construction**	**0.009 ±0.007**	**0.142 ±0.072**	**0.019 ±0.016**	**0.032 ±0.025**	**0.036 ±0.010**
	Construction	**0.012 ±0.017**	**0.054 ±0.079**	**0.057 ±0.037**	**0.077 ±0.031**	**0.057 ±0.020**
Wolverine	**Pre-construction**	**0.031 ±0.029**	**0.054 ±0.030**	**0.015 ±0.017**	**--NR--**	**0.012 ±0.003**
	Construction	**0.026 ±0.021**	**0.069 ±0.024**	**--NR--**	**--NR--**	**0.018 ±0.013**
Number of Trappers	**Pre-construction**	**83.8 ±40.9**	**51.4 ±22.3**	**78.0 ±31.3**	**242.6 ±73.4**	**455.8 ±74.1**
	Construction	**52.5 ±27.3**	**37.5 ±16.1**	**50.8 ±14.7**	**104.8 ±87.3**	**245.5±134.6**

Notes:
RTL = Registered Trap Line
--NR-- = no reported harvest for the period assessed
Highlighted cells indicate significant difference between Project phases for that species

Table 5-5-13: Summary of Remote IR Camera Trap Deployments for Bipole III

Constr. Segment	Monitoring Year of Deployment	Number of Active Cameras Deployed			Comments
		Near ROW	1.5 km from ROW	Total	
N1	1 (2014/15)	---	---	---	No access / not sampled in 2015
	2 (2015/16)	10	10	20	Cameras deployed on 10 transects
	3 (2016/17)	6	5	11	4 additional cameras deployed but inactive (not serviced in Feb 2017); 3 deployed in 2016 were missing/stolen and not replaced; 2 from 2016 were retrieved for servicing and not replaced
	4 (2017/18)	4	4	8	9 additional cameras deployed but inactive (not accessed/serviced in Feb 2018))
	5 (2018/19)	8	9	17	
N2	1	8	10	18	Cameras deployed on 10 transects
	2	10	9	19	2 additional cameras deployed; 1 camera deployed in 2015 was stolen and not replaced
	3	9	8	17	2 cameras deployed in 2016 were retrieved for servicing but not replaced
	4	3	3	6	11 additional cameras deployed but inactive (not accessed/serviced in Feb 2018)
	5	8	8	16	
N3	1	10	9	19	Cameras deployed on 10 transects
	2	9	9	18	1 camera deployed in 2015 was missing (trees cleared) and not found/replaced
	3	8	7	15	3 additional cameras deployed but inactive (not serviced in Feb 2017)
	4	10	8	18	
	5	10	9	20	
N4	1	---	---	---	No access / not sampled in 2015
	2	---	---	---	No access / not sampled in 2016
	3	10	10	20	Cameras deployed on 10 transects
	4	7	7	14	6 additional cameras deployed but inactive (not accessed/serviced in Feb 2018)
	5	10	10	20	
Total	1	18	19	37	
	2	29	28	57	
	3	33	30	63	4 additional cameras on N1 and 3 cameras on N3 deployed but not active (for logistical reasons were not accessed for servicing in Year 3)
	4	24	22	46	26 cameras were not accessed or serviced because of line stringing or no helicopter or vehicle access availability
	5	36	36	72	

Table 5-5-14: Comparison of Furbearer Observations from Camera Trap Data, near ROW vs 1.5 km from ROW during Construction Phase (February 2015 to February 2018)

Mammal Species	Number of Observations		Number of Transects Species was Detected (n)	Mean Number of Observations *		z-Test Two Sample for Means		Annual Occurrence Relative to ROW
	ROW	1.5 km		ROW	1.5 km	z Stat	p (1-tail)	
Black Bear	64	79	22	1.68	2.08	-0.6089	0.2713	No significant difference
Wolf	41	16	21	1.46	062	1.9213	**0.0273**	**Significantly closer**
Coyote	10	16	8	1.00	1.78	-1.2855	0.0993	No significant difference
Fox	39	10	15	1.50	0.40	3.8953	**<0.0001**	**Significantly closer**
Wolverine	2	7	4	0.29	1.17	-2.4198	**0.0078**	**Significantly further**
Marten	5	20	10	0.50	1.82	-1.8255	0.0340	**Significantly further**
Fisher	5	7	5	0.71	0.88	-0.3280	0.3715	No significant difference
Ermine	2	1	3	---	---	---	---	Insufficient data for analysis
Canada Lynx	19	65	18	0.83	2.71	-1.3984	0.0810	Trend further from ROW
Hare	84	158	17	3.82	6.32	-0.7974	0.2126	No significant difference
Squirrel	14	18	6	2.33	2.57	-0.1083	0.4569	No significant difference
Beaver	0	1	1	---	---	---	---	Insufficient data for analysis

Notes:

* Mean Number of Observations for each species were calculated using only transects and years where the species occurred in the camera trap data (either at the ROW camera trap station, or 1.5 km camera trap station, or both, on a particular transect)

Table 5-6-1: Summary Mortality Source for Collared Adult Female Boreal Woodland Caribou

Boreal Woodland Caribou Range	Telemetry Study Duration	# of Collared Caribou	Project Phase	Mortality Investigations / Source					
				Natural Cause	Wolf	Bear	Vehicle	Unknown	Total
P-Bog	Feb 2010 – Aug 2019	86	Pre-disturbance	3	9	---	---	3	15
			Disturbance	---	6	1	1	2	10
N-Reed	Jul 2010 – Aug 2019	55	Pre-disturbance	2	4	1	---	4	11
			Disturbance	---	3	---	---	5	8
Wabowden	Jan 2010 – Aug 2019	85	Pre-disturbance	---	11	---	---	6	17
			Disturbance	---	7	---	1	3	17
Charron Lake	Jan 2011 – Aug 2019	76	2011-2014	1	2	---	---	5	8
			2015-2019	---	2	1	---	3	6
	Total	**302**		**6**	**44**	**3**	**2**	**31**	**86**

Note:
Pre-disturbance = February 2010 to Oct 2014
Disturbance (Construction phase) = November 2014 to August 2019

Table 5-6-2: Predation-risk (Wolf Distance to Ungulate Prey) Assessment for Monitored Boreal Caribou Survey Areas in Mid-Winter during All Years of Construction Phase (2014/15 to 2017/18) Pooled, and First Year of Operation Phase (2018/19)

Woodland Caribou Survey Area	Project Phase	Mean Distance (km) from Wolf ±95%CI		Pearson Correlation Coefficient *	Paired 2-sample t-Test for Means			
		Woodland Caribou	Moose		t-Stat	P (2-tailed)	df	Predator Encounter Risk
P-Bog	Construction	4.5 ±0.83	4.3 ±1.04	0.219	-0.305	0.761	78	No significant difference
	Operation	5.8 ±1.90	7.8 ±1.49	**0.981 ***	7.616	**0.005**	4	**Significantly greater for Moose**
Wabowden	Construction	8.0 ±1.27	5.2 ±0.59	0.065	-3.942	**<0.001**	122	**Significantly greater for Moose**
	Operation	4.8 ±1.04	2.4 ±0.72	-0.194	-3.373	**0.001**	22	**Significantly greater for Moose**
N-Reed	Construction	2.8 ±0.29	8.1 ±0.98	0.074	10.335	**<0.001**	14	**Significantly greater for W Caribou**
	Operation	3.0 ±0.56	2.4 ±0.45	0.201	-2.021	**0.049**	44	**Significantly greater for Moose**
Charron Lake (Control)	Construction	3.5 ±0.40	8.6 ±1.14	0.469	9.969	**<0.001**	147	**Significantly greater for W Caribou**
	Operation	3.5 ±1.38	4.1 ±2.36	0.172	0.501	0.631	8	No significant difference

Notes:

No other ungulate species (i.e., white-tailed deer or elk) were detected during aerial surveys in any of the woodland caribou survey areas in any monitoring year sampled during the Construction phase or first winter of Operation phase.

* High correlation (i.e., values closer to 1.0 or -1.0) corresponds to a strong relationship between moose and caribou mean distance variables. Values of 0 indicate no association between variables. A value >0 indicates a positive association (as the value of one variable increases, so does the value of the other). A value <0 indicates a negative association (as the value of one variable increases, the other decreases).

Table 5-9-1: Observations of Human Access of ROW during Construction Phase

Sample Period	Number of Trail Cameras Deployed	Project-related Access		Public Access		Unknown Purpose of Use	Total Observations
		Observed	Known Use (%)	Observed	Known Use (%)		
February 2015 - February 2016	25	1,584	99.1	14	0.9	9	1,607
February 2016 - February 2017	34	1,974	99.2	15	0.8	96	2,085
February 2017 - February 2018	46	2,085	99.5	10	0.5	0	2,095
February 2018 - February 2019	34	1,323	99.6	5	0.4	6	1,334

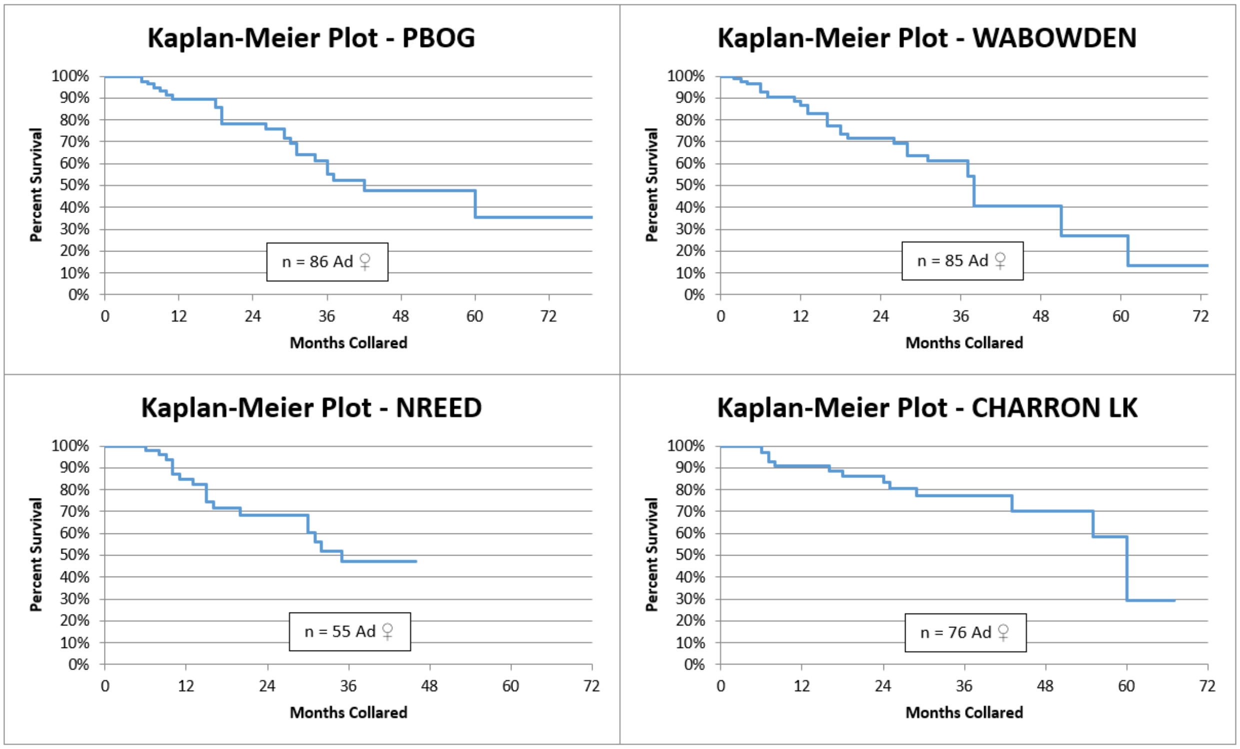

Figure 5-1-1: Kaplan-Meier Plots of Adult Female Woodland Caribou Monitored using GPS Telemetry Collars, February 2010 to August 2019

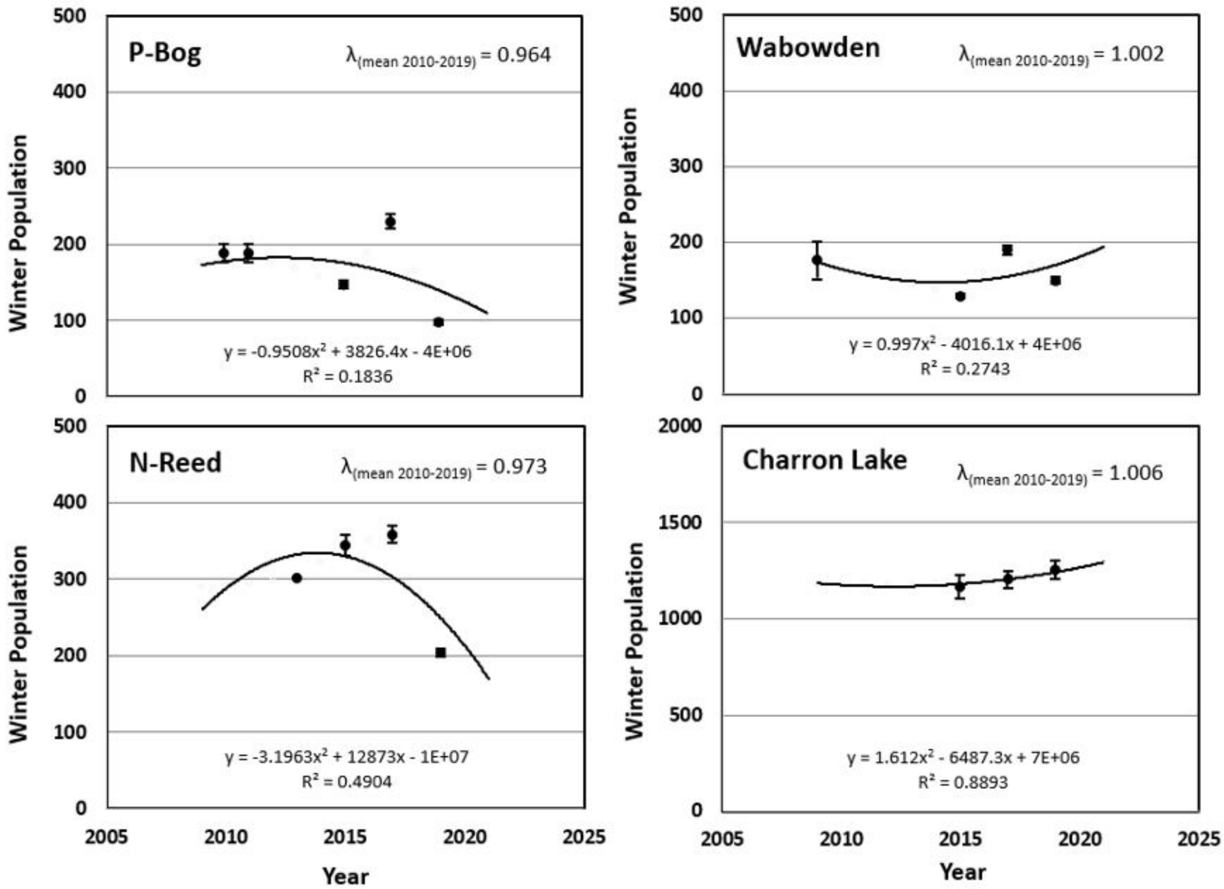

Figure 5-1-2: Preliminary Abundance Trend Models of Woodland Caribou based on Genetic Capture-Mark-Recapture (CMR) Genotyping Analyses and Historical Population Estimates, 2009 to 2019

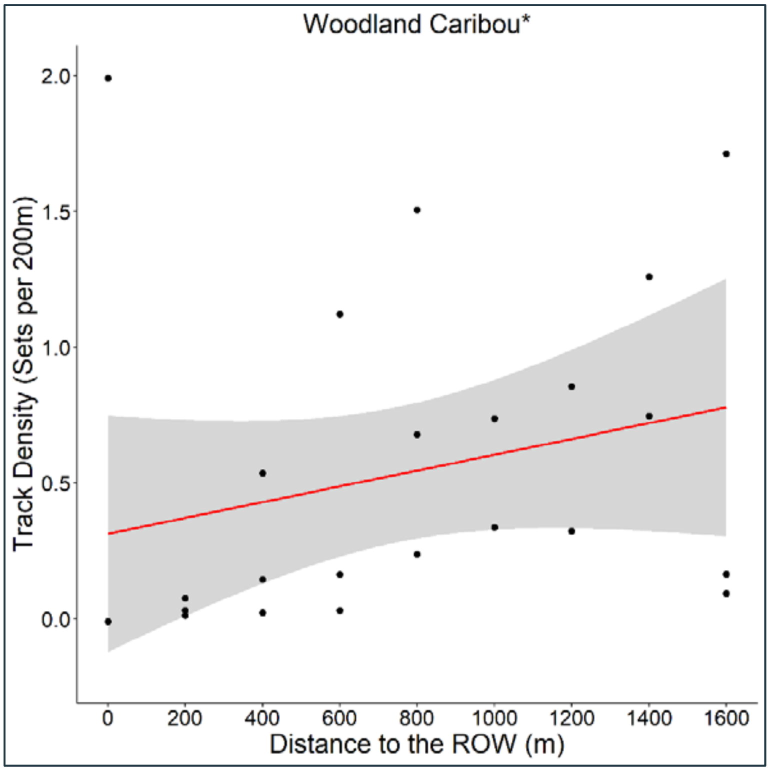

Figure 5-1-3: Correlation between Track Density and Distance to the ROW for Woodland Caribou during First Year of Operation (2019)

A significant (P< 0.001) positive correlation between track density and distance to the ROW for woodland caribou during the first year of operation (2019) of the Project. Caribou were recorded more frequently farther from the ROW than at distances closer to the ROW suggesting they were avoiding the Project during construction. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

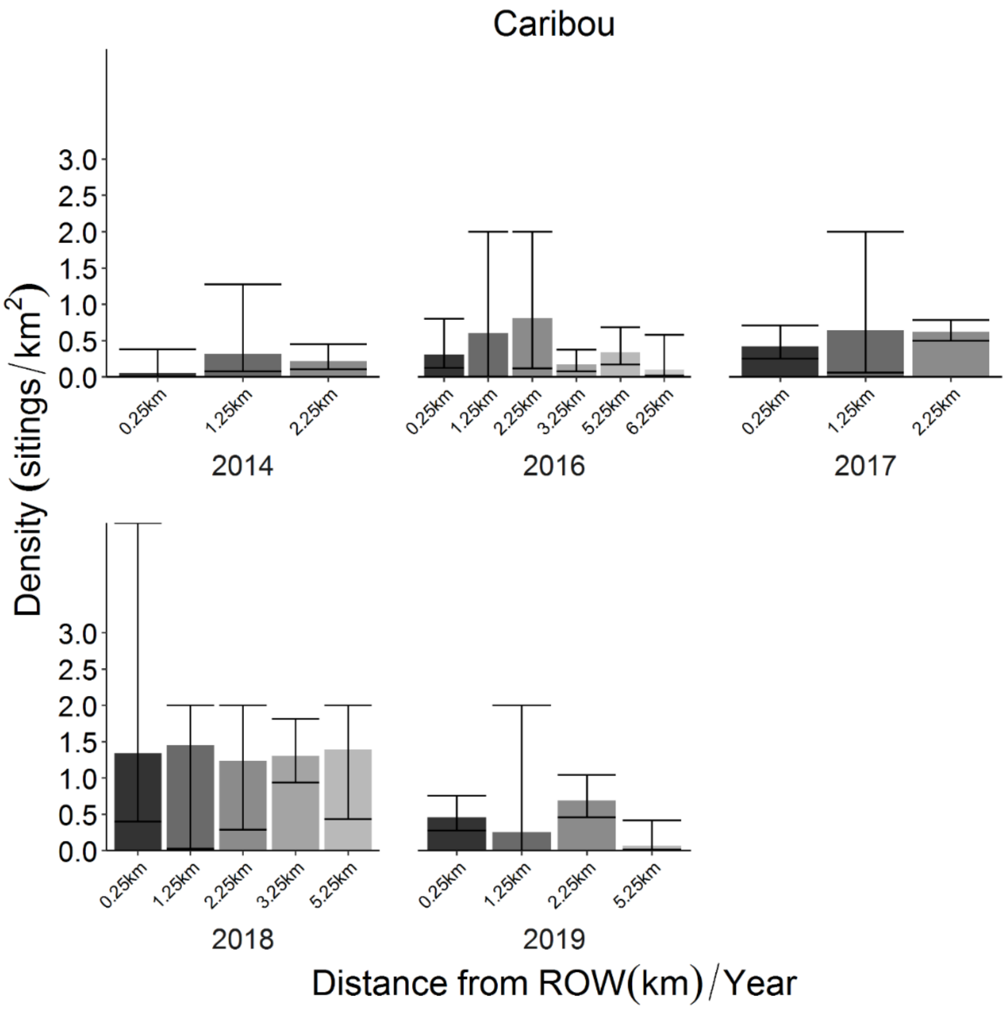

Figure 5-1-4: Correlation between Track Density and Distance to the ROW for Woodland Caribou during First Year of Operation (2019)

Analysis of aerial survey data revealed that there was no significant relationship between density of caribou and distance to the ROW. Density of animals is estimated with a Horvitz-Thompson-like estimator and a detection function that models the probability of detection based on the distribution of counts with distance from the observer to correct for this bias. Twenty-five models per species are tested (Section 4.5.2.3) and include combination land cover type, the type of observation, observer and canopy height and the best model fit evaluated using AIC. Overlap in confidence limits for caribou densities in each distance bin from revealed that there is currently no significant relationship between density of caribou and distance to ROW for any year monitored.

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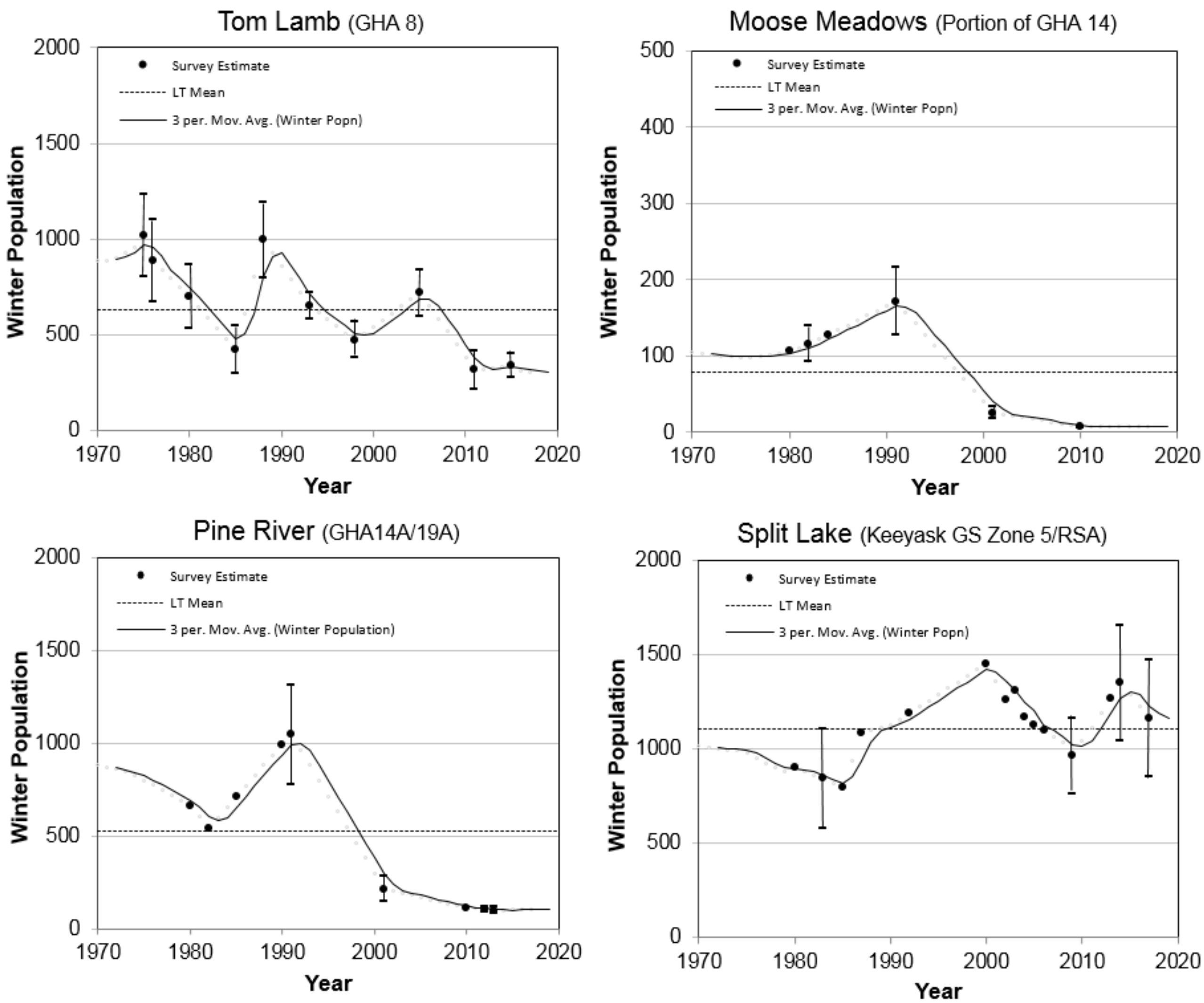


Figure 5-3-1: Long term Abundance Trends for the Three Monitored Sensitive Moose Populations and Split Lake Moose Population

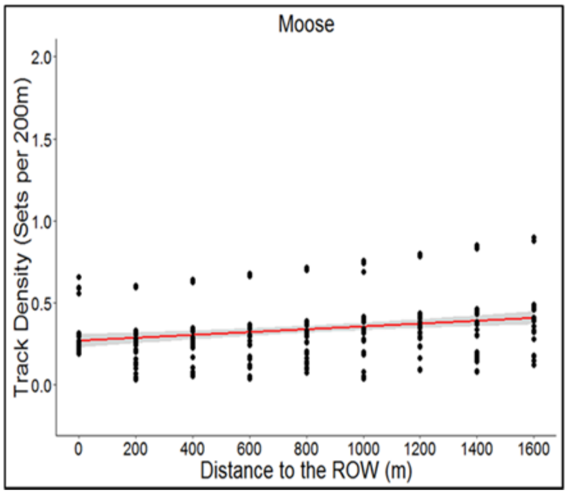


Figure 5-3-2: Correlation between Track Density and Distance to the ROW for Moose during the Construction Phase (2015 to 2018)

For moose, the best fit model included vegetation communities as covariates, however there was no significant relationship (P≤ 0.35) between track density and distance to the ROW for moose during the Construction phase (2015 to 2018) of the Project. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values. Moose are monitored through aerial surveys which is a more appropriate scale of assessment for this large mammal and range extent use.

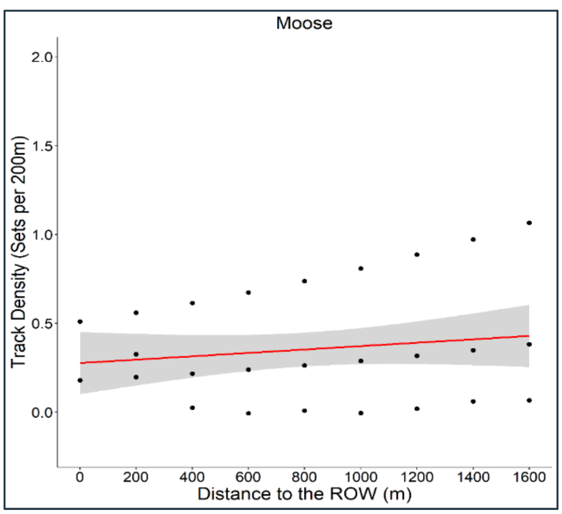


Figure 5-3-3: Correlation between Track Density and Distance to the ROW for Moose during the First Year of Operation (2019)

For moose, the best fit model included vegetation communities as covariates, however there is no significant relationship (P≤ 0.47) between track density and distance to the ROW for moose during the first year of Operation. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values. Moose are monitored through aerial surveys which is a more appropriate scale of assessment for this large mammal and range extent use.

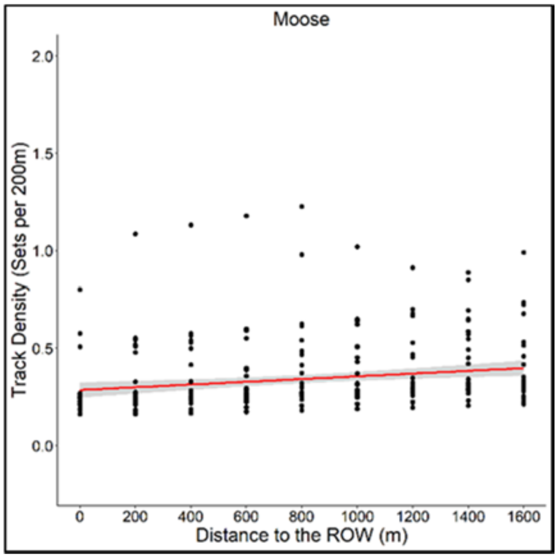


Figure 5-3-4: Correlation between Track Density and Distance to the ROW for Moose for all Years Monitored (2015 to 2019)

There is no significant relationship between track density and distance to the ROW ($P \leq 0.34$) for moose during the Construction phase (2015 to 2019) of the Project. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values. Moose are monitored through aerial surveys which is a more appropriate scale of assessment for this large mammal and range extent use.

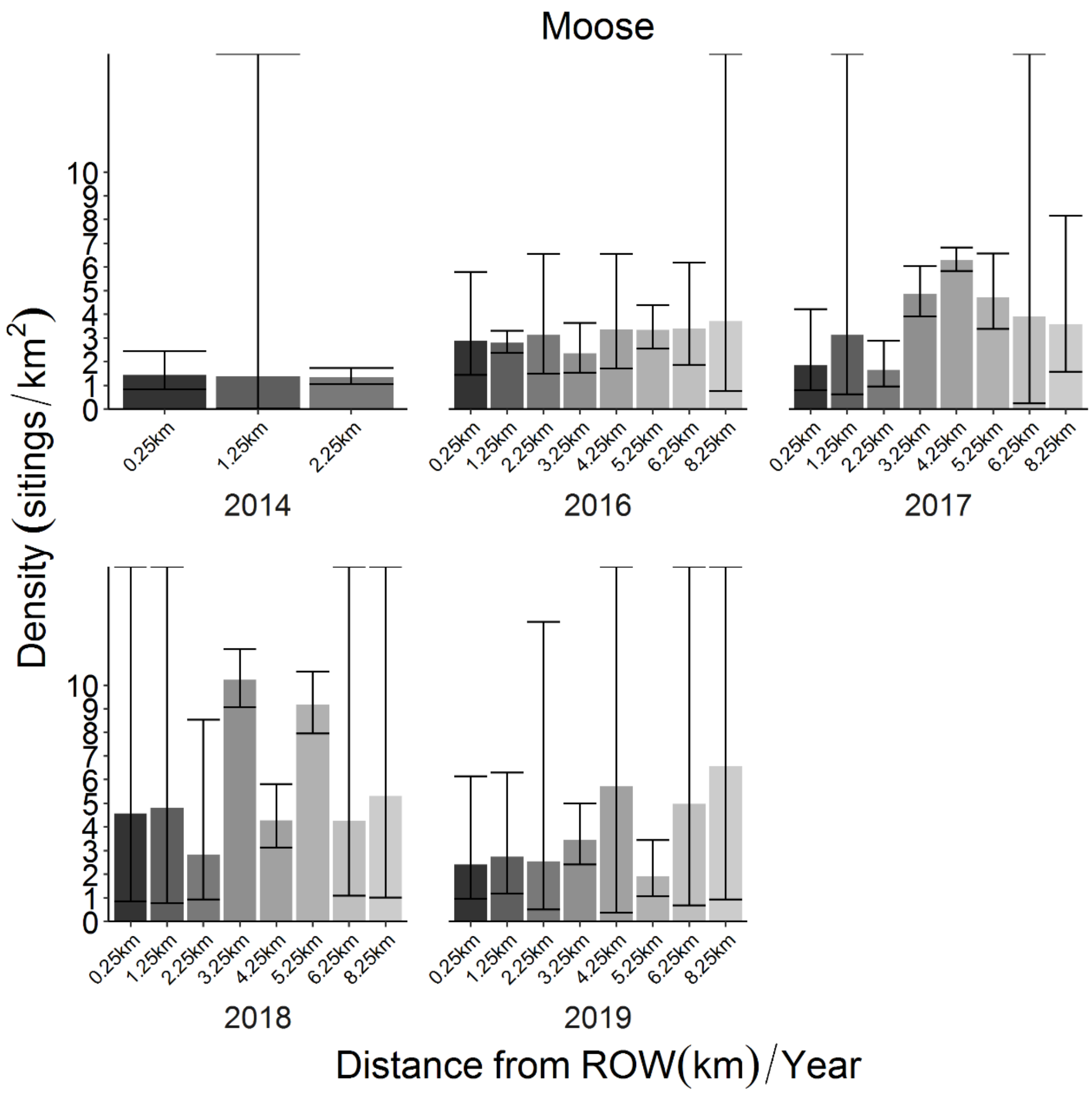
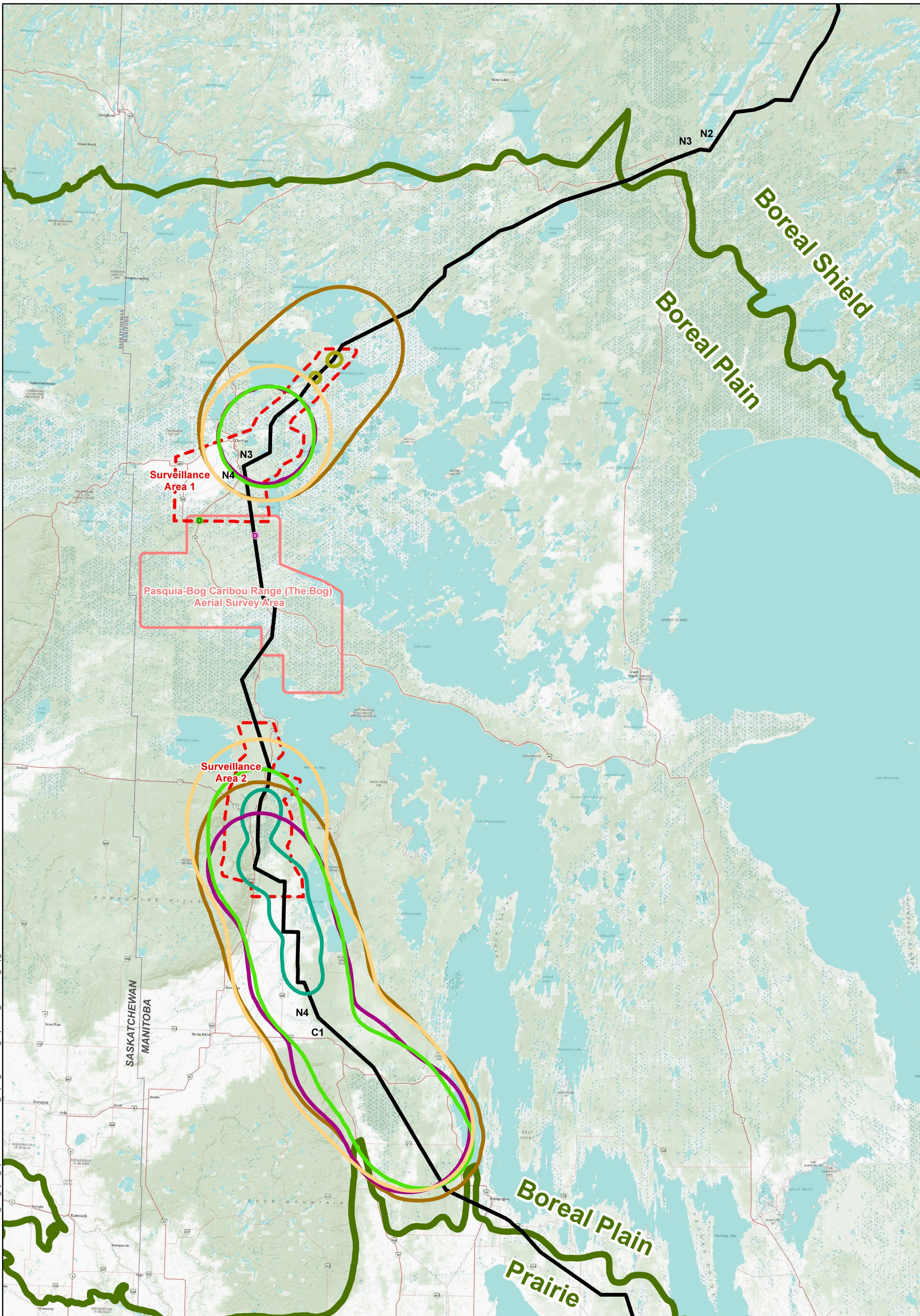


Figure 5-3-5: Correlation between Track Density and Distance to the ROW for Moose (2014 to 2019) based on Aerial Survey Observations

Analysis of aerial survey data revealed that there was no significant relationship between density of moose and distance to the ROW. Density of animals is estimated with a Horvitz-Thompson-like estimator and a detection function that models the probability of detection based on the distribution of counts with distance from the observer to correct for this bias. Twenty-five models per species are tested (Section 4.5.2.3) and include combination land cover type, the type of observation, observer and canopy height and the best model fit evaluated using AIC. Overlap in confidence limits for moose densities in each distance bin from revealed that there is currently no significant relationship between density of moose and distance to ROW for any year monitored.



LEGEND

BPIII Transmission Line Route (labelled at segment divides)

White-tailed Deer Occurrences within or Directly Adjacent to P-Bog Survey Area, by year

2017 | 2018

White-tailed Deer Occurrences 90% Adaptive Kernel Contour, by year

2019 | 2017 | 2015

2018 | 2016 | 2014

Ecozone Boundaries

P. tenuis Surveillance Area Boundary

Pasquia-Bog (The Bog) Aerial Survey Area Boundary

0 30 60 90 120 150 Kilometres

NOTES:
- Background topographic map extracted from ESRI online basemap services
- Elk and White-tailed Deer occurrence data is a combination of trail camera data, ground transect data, P. tenuis survey data and aerial survey data.

Datum: NAD83
Projection: UTM Zone 14N

Manitoba Hydro | wood.

MANITOBA HYDRO BIPOLE III TRANSMISSION PROJECT

White-tailed Deer Distribution Summary Map

PROJECT N°: WX17393 | **FIGURE: 5-4-1**

SCALE: 1:1,165,000 | DATE: December 2019

G:\WX17393_Man_Hydro_Bipole\Mammal\Annual_Report_2019\MXD_Maps\WTD_Distribution_Map_2.mxd

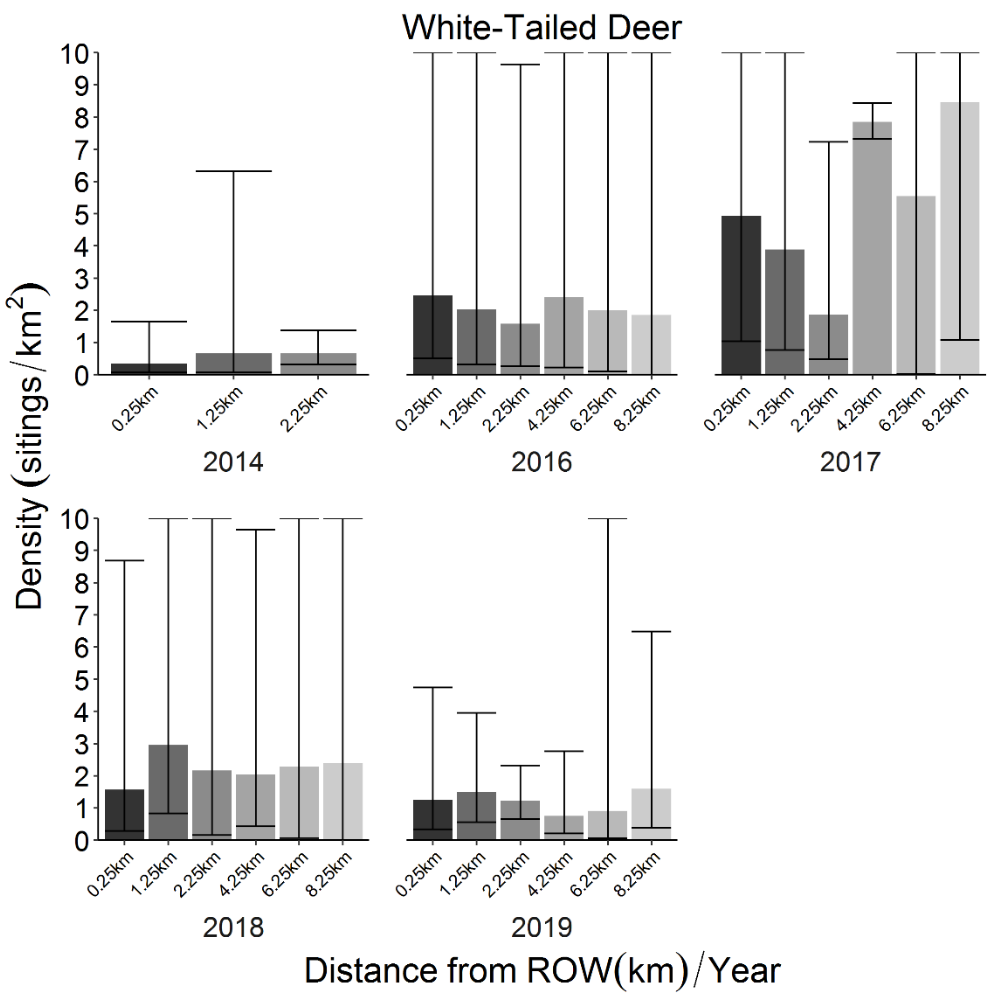


Figure 5-4-2: Correlation between Track Density and Distance to the ROW for White-tailed Deer (2014 to 2019) based on Multi-Species Aerial Survey Observations

Analysis of aerial survey data revealed that there was no significant relationship between density of white-tailed deer and distance to the ROW. Density of animals is estimated with a Horvitz-Thompson-like estimator and a detection function that models the probability of detection based on the distribution of counts with distance from the observer to correct for this bias. Twenty-five models per species were tested (Section 4.5.2.3) and include combination land cover type, the type of observation, observer and canopy height and the best model fit evaluated using AIC. Overlap in confidence limits for white-tailed deer densities in each distance bin from revealed that there is currently no significant relationship between density of white-tailed deer and distance to ROW for any year monitored.

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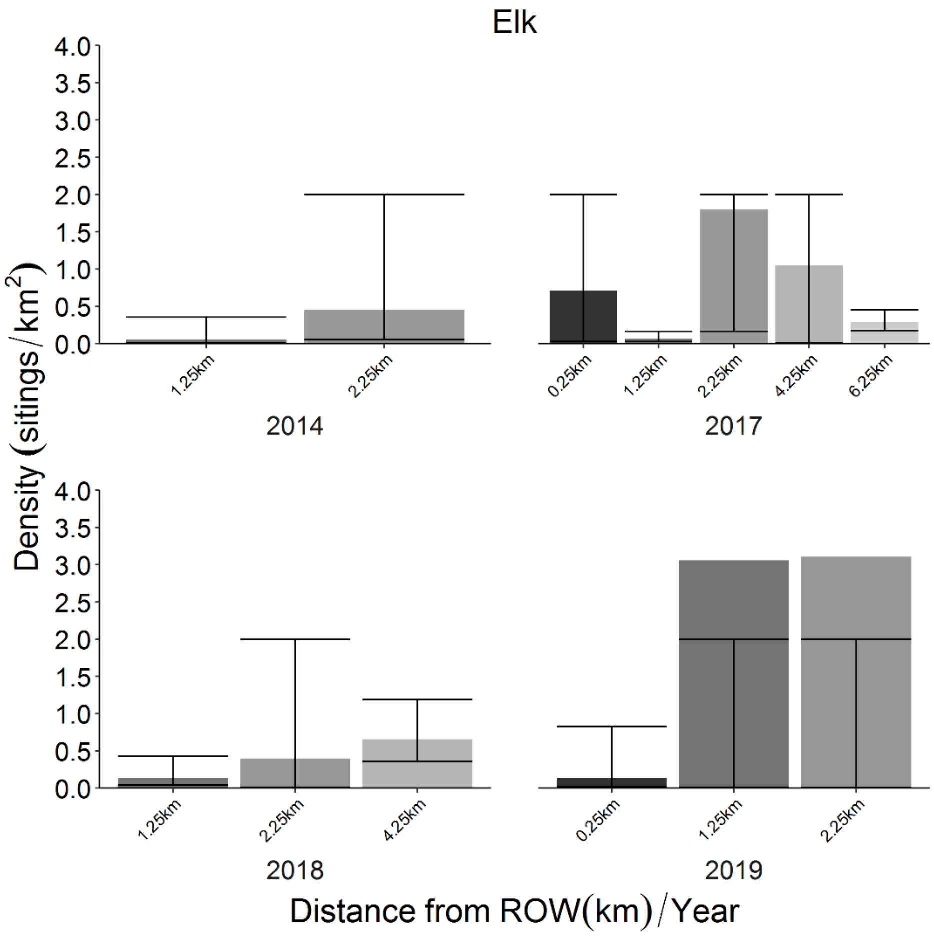

Figure 5-4-4: Correlation between Track Density and Distance to the ROW for Elk (2014 to 2019) based on Multi-Species Aerial Survey Observations

Analysis of aerial survey data revealed that there was no significant relationship between density of elk and distance to the ROW. Density of animals is estimated with a Horvitz-Thompson-like estimator and a detection function that models the probability of detection based on the distribution of counts with distance from the observer to correct for this bias. Twenty-five models per species are tested (Section 4.5.2.3) and include combination land cover type, the type of observation, observer and canopy height and the best model fit evaluated using AIC. Overlap in confidence limits for elk densities in each distance bin from revealed that there is currently no significant relationship between density of elk and distance to ROW for any year monitored.

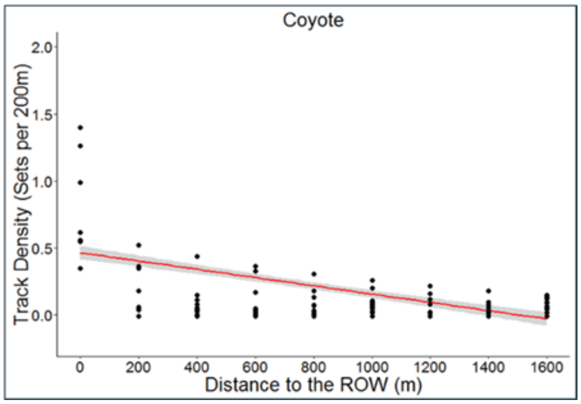

Figure 5-5-1: Correlation between Track Density and Distance to the ROW for Coyotes during Construction Phase (2015 to 2018)**

A significant (p<0.001) negative correlation between track density and distance to the ROW for coyotes during the Construction phase (2015 to 2018) of the Project. Coyotes were recorded more frequently closer to the ROW than at distances farther away and may be using the ROW as a movement corridor. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

**Coyote sample size too small to run analysis for 2019 (only 2 track occurrences)

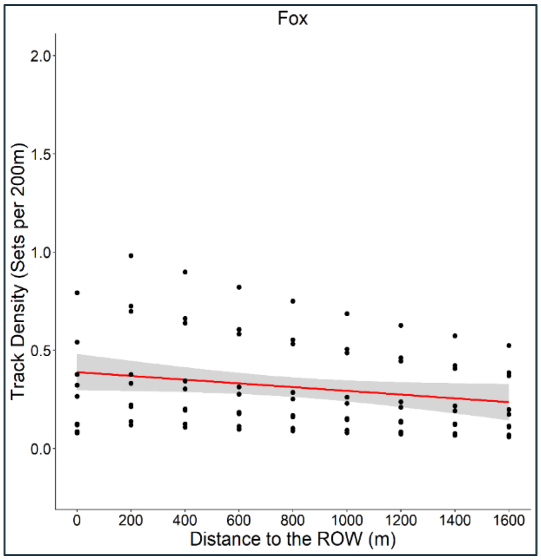

Figure 5-5-2a: Correlation between Track Density and Distance to the ROW for Fox during First Year of Operation (2019)

A significant ($p<0.001$) negative correlation between track density and distance to the ROW for fox during the first year of Operation (2019) of the Project. Fox were recorded more frequently closer to the ROW than at distances farther away and may be using the ROW as a movement corridor. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

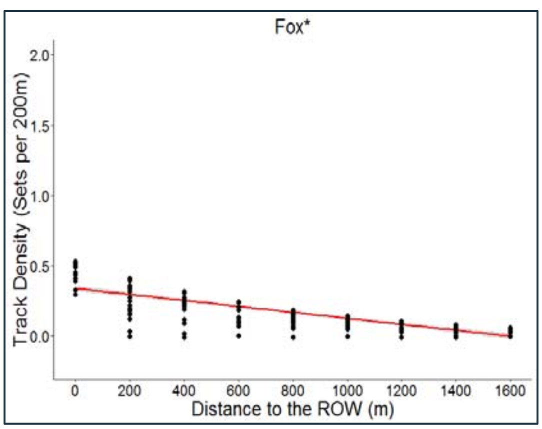

Figure 5-5-2b: Correlation between Track Density and Distance to the ROW for Fox during Construction (2015 to 2018)

A significant ($p<0.001$) negative correlation between track density and distance to the ROW for fox during the Construction phase (2015 to 2018) of the Project. Fox were recorded more frequently closer to the ROW than at distances farther away and may be using the ROW as a movement corridor. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

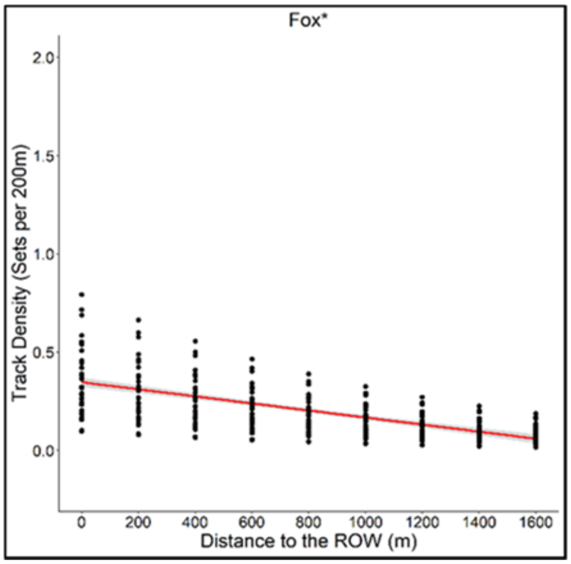

Figure 5-5-2c: Correlation between Track Density and Distance to the ROW for Fox for Total Pooled Observations across All Years (2015 to 2019)

A significant ($p<0.001$) negative correlation between track density and distance to the ROW for fox during the Construction phase (2015 to 2019) of the Project. Fox were recorded more frequently closer to the ROW than at distances farther away and may be using the ROW as a movement corridor. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

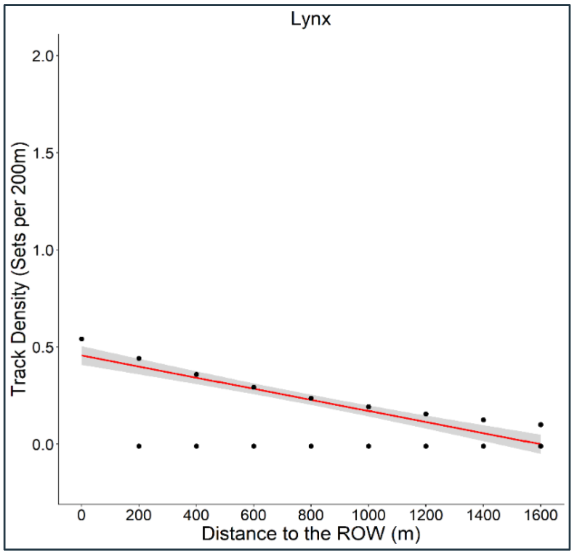

Figure 5-5-3a: Correlation between Track Density and Distance to the ROW for Canada lynx during the First Year of Operation (2019)

There is no significant relationship between track density and distance to the ROW for Canada lynx during the first year of Operation (p = 0.47) of the Project. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

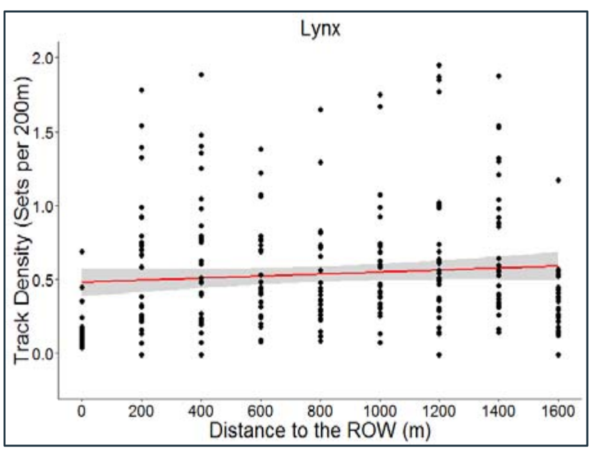

Figure 5-5-3b: Correlation between Track Density and Distance to the ROW for Canada lynx during the Construction Phase (2015 to 2018)

There is no significant relationship between track density and distance to the ROW for Canada lynx during the Construction phase (2015 to 2018) of the Project. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

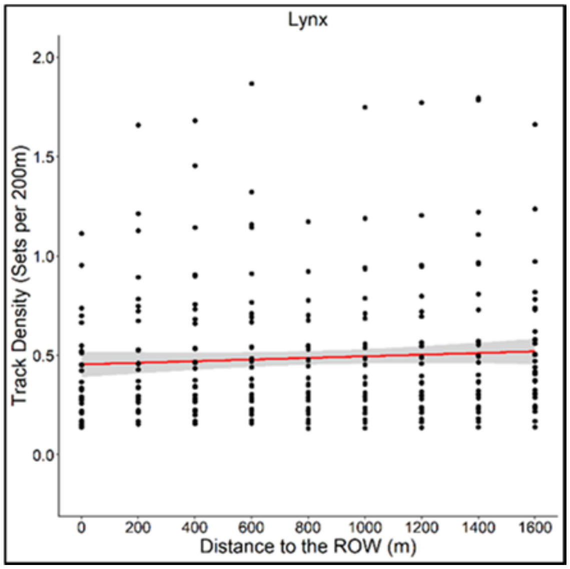

Figure 5-5-3c: Correlation between Track Density and Distance to the ROW for Canada lynx for Total Pooled Observations across All Years (2015 to 2019)

There is no significant relationship between track density and distance to the ROW for Canada lynx during the Construction phase (2015 to 2019) of the Project. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

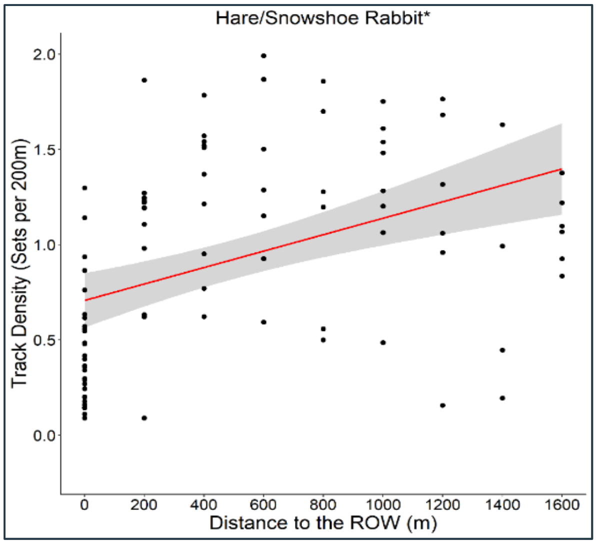

Figure 5-5-4a: Correlation between Track Density and Distance to the ROW for Snowshoe Hare / Rabbit during the First Year of Operation (2019)

A significant ($p < 0.001$) positive correlation between track density and distance to the ROW for snowshoe hare / rabbit during the first year of operations of the Project. Snowshoe hare / rabbit were recorded more frequently farther from the ROW than at distances closer to the ROW suggesting they were avoiding the Project during construction. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

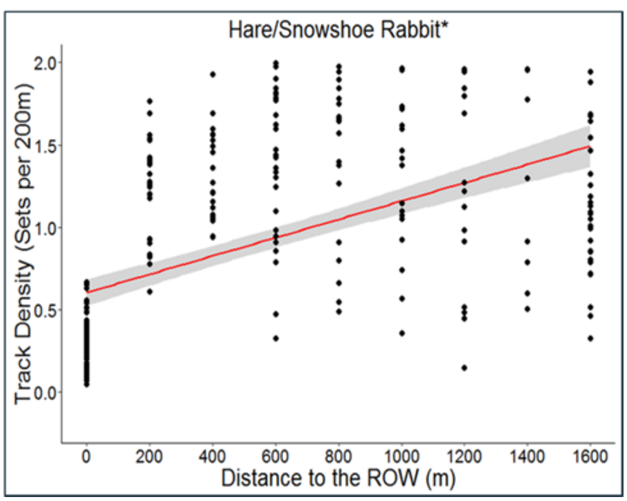

Figure 5-5-4b: Correlation between Track Density and Distance to the ROW for Snowshoe Hare / Rabbit for Construction Phase (2015 to 2018)

A significant ($p < 0.001$) positive correlation between track density and distance to the ROW for snowshoe hare / rabbit during the Construction phase (2015 to 2018) of the Project. Snowshoe hare / rabbit were recorded more frequently farther from the ROW than at distances closer to the ROW suggesting they were avoiding the Project during construction. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

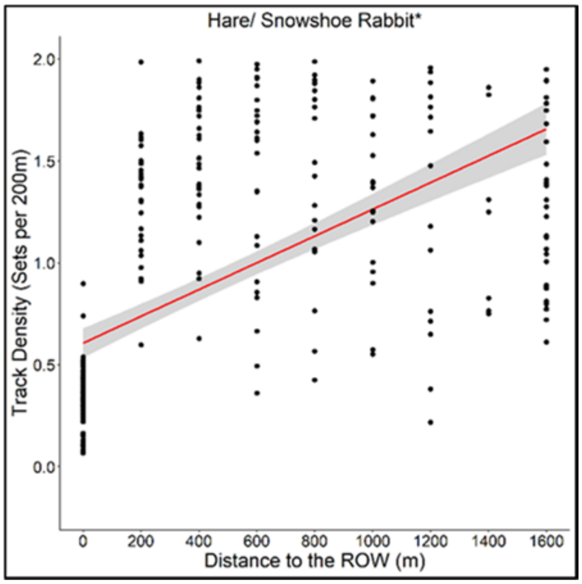

Figure 5-5-4c: Correlation between Track Density and Distance to the ROW for Hare / Rabbit for Total Pooled Observations across All Years (2015 to 2019)

A significant ($p < 0.001$) positive correlation between track density and distance to the ROW for snowshoe hare / rabbit during the Construction phase (2015 to 2019) of the Project. Snowshoe hare / rabbit were recorded more frequently farther from the ROW than at distances closer to the ROW suggesting they were avoiding the Project during Construction. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

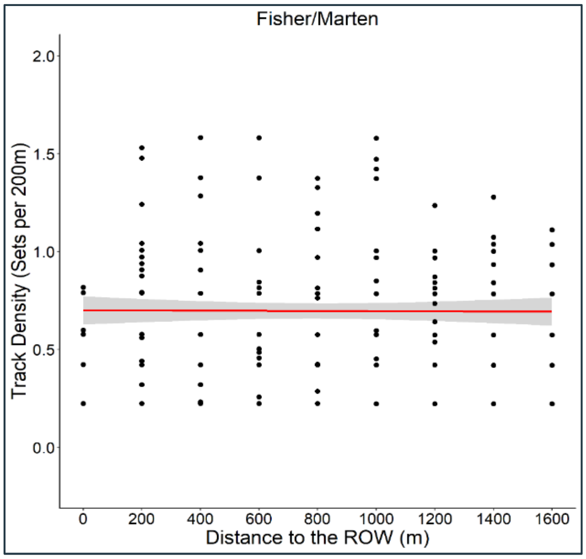

Figure 5-5-5a: Correlation between Track Density and Distance to the ROW for Fisher / Marten during the First Year of Operation (2019)

There is no significant relationship (p = 0.980) between track density and distance to the ROW for fisher / marten during the first year of Operation. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

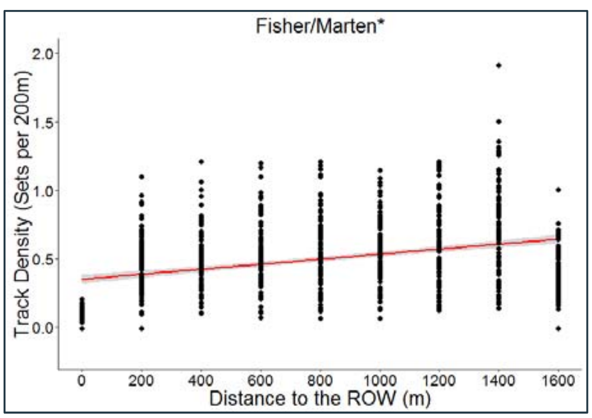

Figure 5-5-5b: Correlation between Track Density and Distance to the ROW for Fisher / Marten for Construction Phase (2015 to 2018)

A significant (p < 0.001) positive correlation between track density and distance to the ROW for fisher / marten during the Construction phase (2015 to 2018) of the Project. Fisher / marten were recorded more frequently farther from the ROW than at distances closer to the ROW suggesting they were avoiding the Project during construction. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

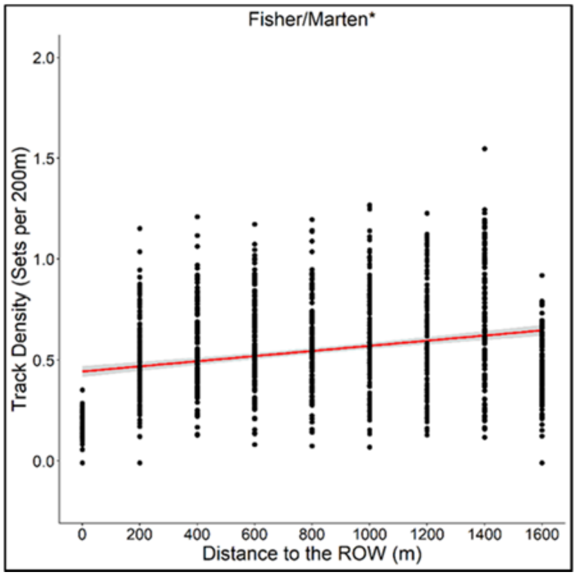

Figure 5-5-5c: Correlation between Track Density and Distance to the ROW for Fisher / Marten for Total Pooled Observations across All Years (2015 to 2019)

A significant ($p < 0.001$) positive correlation between track density and distance to the ROW for fisher / marten during the entire monitoring period (2015 to 2019) of the Project. Fisher / marten were recorded more frequently farther from the ROW than at distances closer to the ROW suggesting they were avoiding the Project during construction. The plotted values are those predicted by the model. The shaded area represents the standard error for predicted values.

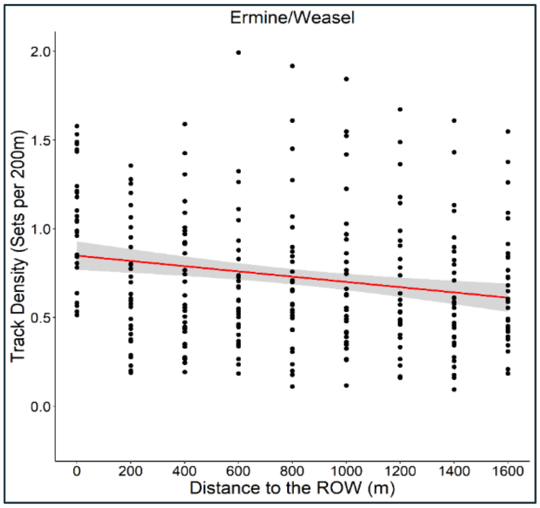

Figure 5-5-6a: Correlation between Track Density and Distance to the ROW for Ermine / Weasel during the First Year of Operation (2019)

There is no significant relationship ($p = 0.31$) between track density and distance to the ROW for ermine / weasel during the first year of Operation. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

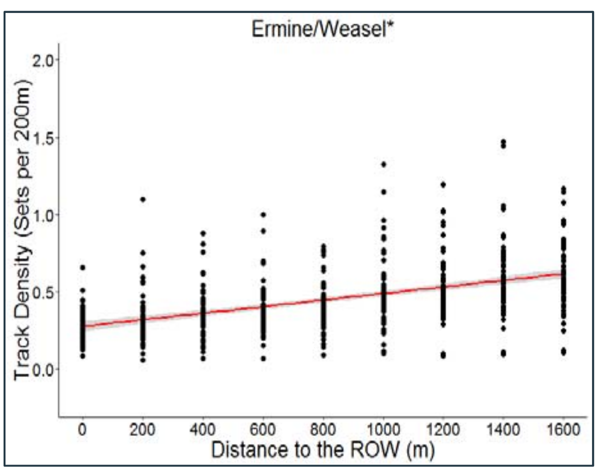

Figure 5-5-6b: Correlation between Track Density and Distance to the ROW for Ermine / Weasel during the Construction Phase of the Project (2015 to 2018)

A significant ($p < 0.001$) positive correlation between track density and distance to the ROW for ermine / weasel during the Construction phase (2015 to 2018) of the Project. Ermine / weasel were recorded more frequently farther from the ROW than at distances closer to the ROW suggesting they were avoiding the Project during construction. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

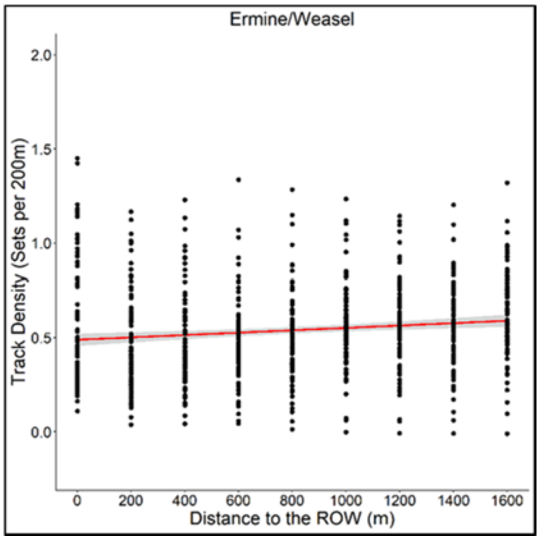

Figure 5-5-6c: Correlation between Track Density and Distance to the ROW for Ermine / Weasel for Total Pooled Observations across All Years (2015 to 2019)

A significant ($p < 0.001$) positive correlation between track density and distance to the ROW for ermine / weasel during the Construction phase (2015 to 2019) of the Project. Ermine / weasel were recorded more frequently farther from the ROW than at distances closer to the ROW suggesting they were avoiding the Project during Construction. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

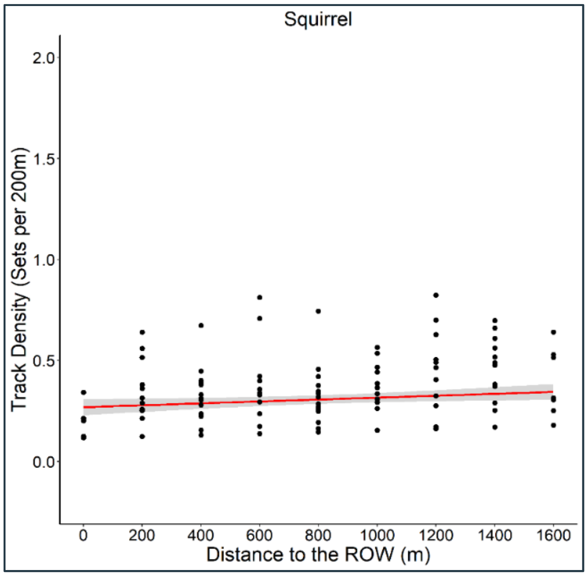

Figure 5-5-7a: Correlation between Track Density and Distance to the ROW for Squirrel during the First Year of Operation (2019)

There is no significant relationship (p = 0.31) between track density and distance to the ROW for squirrel (p = 0.740) during the first year of Operation. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

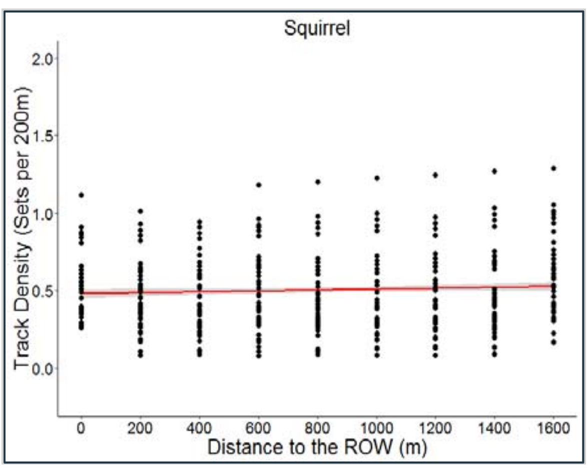

Figure 5-5-7b: Correlation between Track Density and Distance to the ROW for Squirrels during the Construction Phase of the Project (2015 to 2018)

There is no significant relationship between track density and distance to the ROW for squirrel during the Construction phase (2015 to 2018) of the Project. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

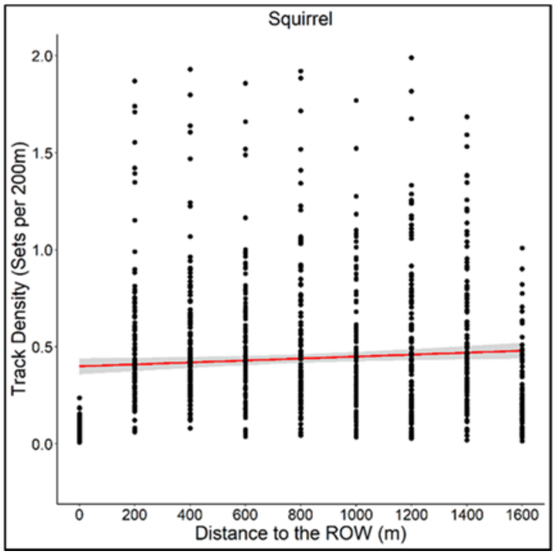

Figure 5-5-7c: Correlation between Track Density and Distance to the ROW for Squirrels for Total Pooled Observations across All Years (2015 to 2019)

There is no significant relationship between track density and distance to the ROW for squirrel during the Construction phase (2015 to 2019) of the Project. The plotted values are those predicted by the model. The shaded area represents the standard error for the predicted values.

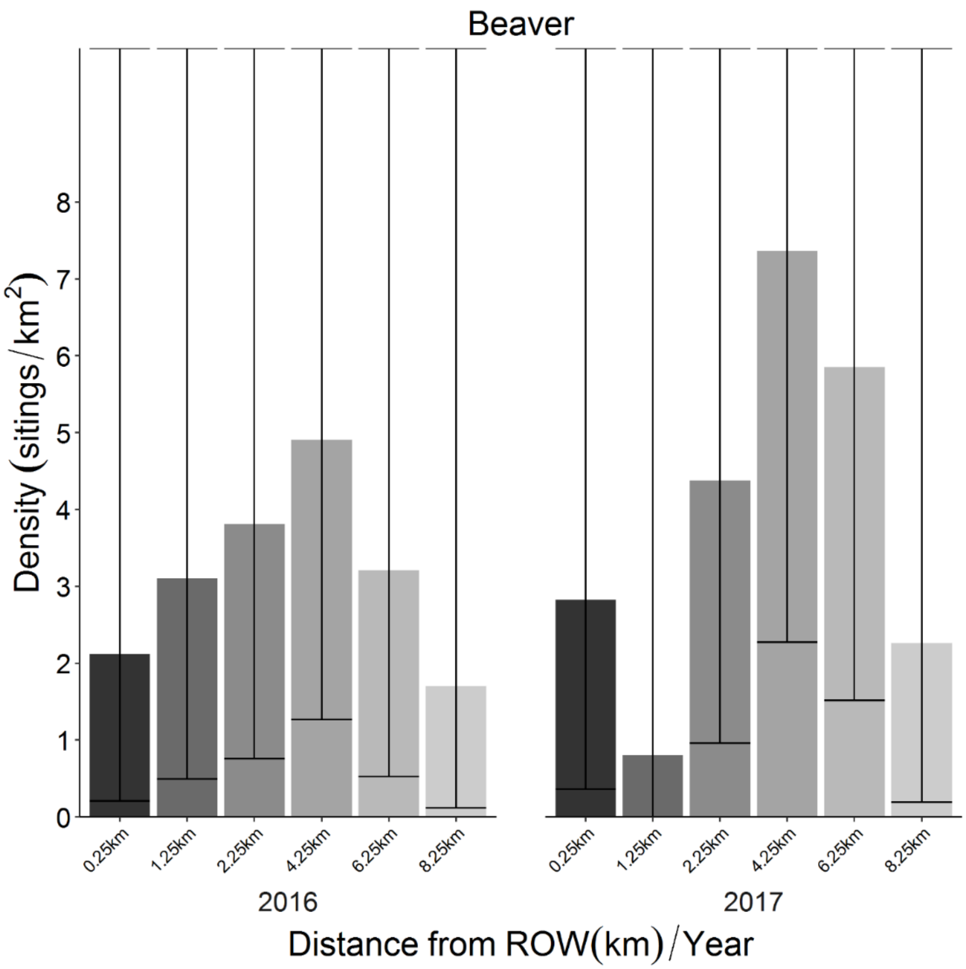

Figure 5-5-8: Density of Beaver Observations as a Function of the Distance to the Project ROW

Estimated density and Confidence Intervals (CI) of beaver observations from multi-species aerial survey as a function of distance from the ROW. Analysis of aerial survey data revealed that there was no significant relationship between density of beaver and distance to the ROW. Density of animals is estimated with a Horvitz-Thompson-like estimator and a detection function that models the probability of detection based on the distribution of counts with distance from the observer to correct for this bias. Twenty-five models per species are tested (Section 4.5.2.3) and include combination land cover type, the type of observation, observer and canopy height and the best model fit evaluated using AIC. Overlap in confidence limits for beaver densities in each distance bin from revealed that there is currently no significant relationship between density of beaver and distance to ROW for any year monitored.

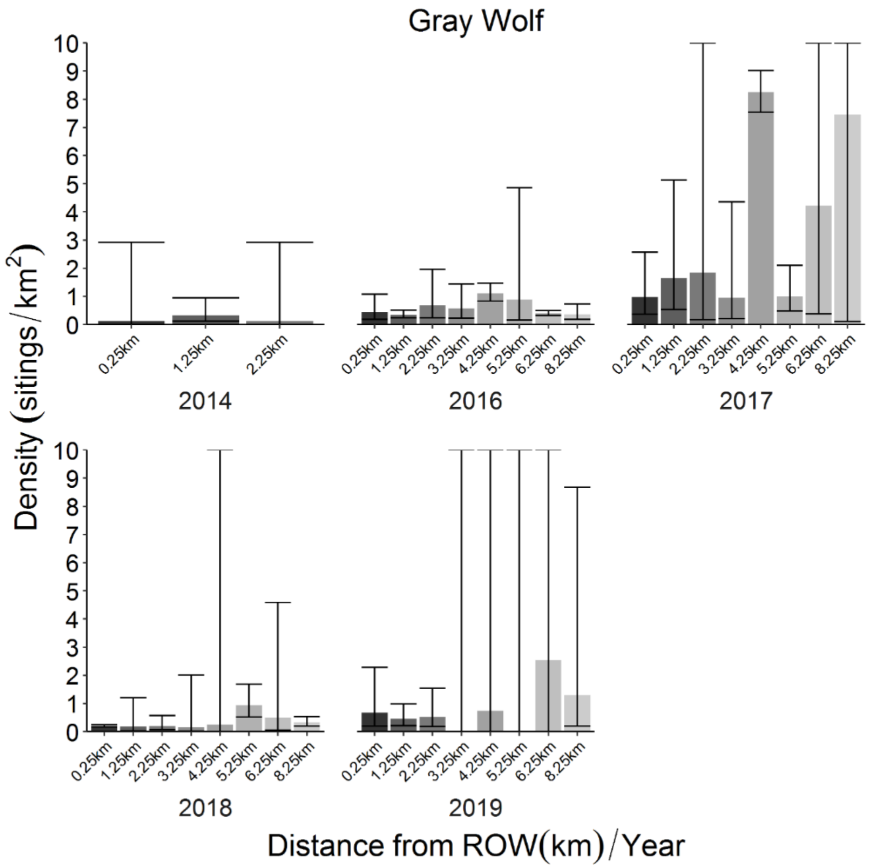

Figure 5-5-9: Density of Gray Wolf Observations as a Function of the Distance to the Project ROW

Estimated density and Confidence Intervals (CI) of wolf observations from multi-species aerial survey as a function of distance from the ROW. Analysis of aerial survey data revealed that there was no significant relationship between density of wolf and distance to the ROW. Density of animals is estimated with a Horvitz-Thompson-like estimator and a detection function that models the probability of detection based on the distribution of counts with distance from the observer to correct for this bias. Twenty-five models per species are tested (Section 4.5.2.3) and include combination land cover type, the type of observation, observer and canopy height and the best model fit evaluated using AIC. Overlap in confidence limits for wolf densities in each distance bin from revealed that there is currently no significant relationship between density of wolf and distance to ROW for any year monitored.

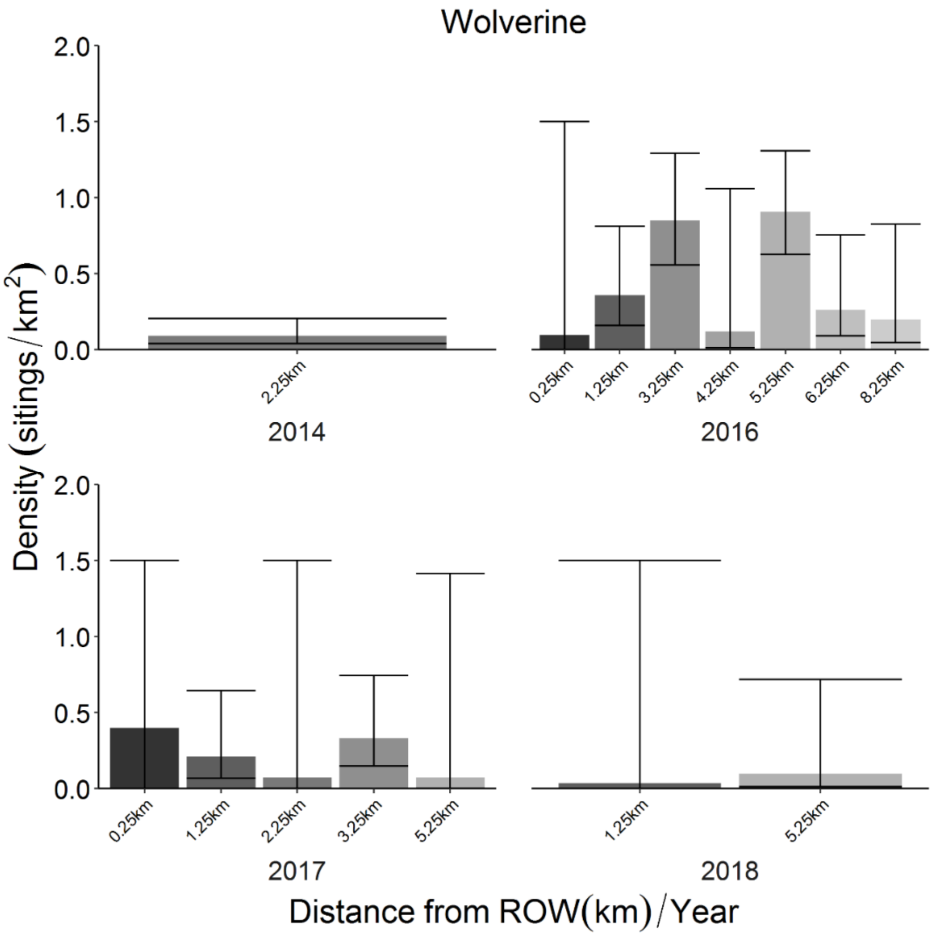

Figure 5-5-10: Density of Wolverine Observations as a Function of the Distance to the Project ROW

Estimated density and Confidence Intervals (CI) of wolverine observations from multi-species aerial survey as a function of distance from the ROW. Analysis of aerial survey data revealed that there was no significant relationship between density of wolverine and distance to the ROW. Density of animals is estimated with a Horvitz-Thompson-like estimator and a detection function that models the probability of detection based on the distribution of counts with distance from the observer to correct for this bias. Twenty-five models per species are tested (Section 4.5.2.3) and include combination land cover type, the type of observation, observer and canopy height and the best model fit evaluated using AIC. Overlap in confidence limits for wolverine densities in each distance bin from revealed that there is currently no significant relationship between density of wolverine and distance to ROW for any year monitored.

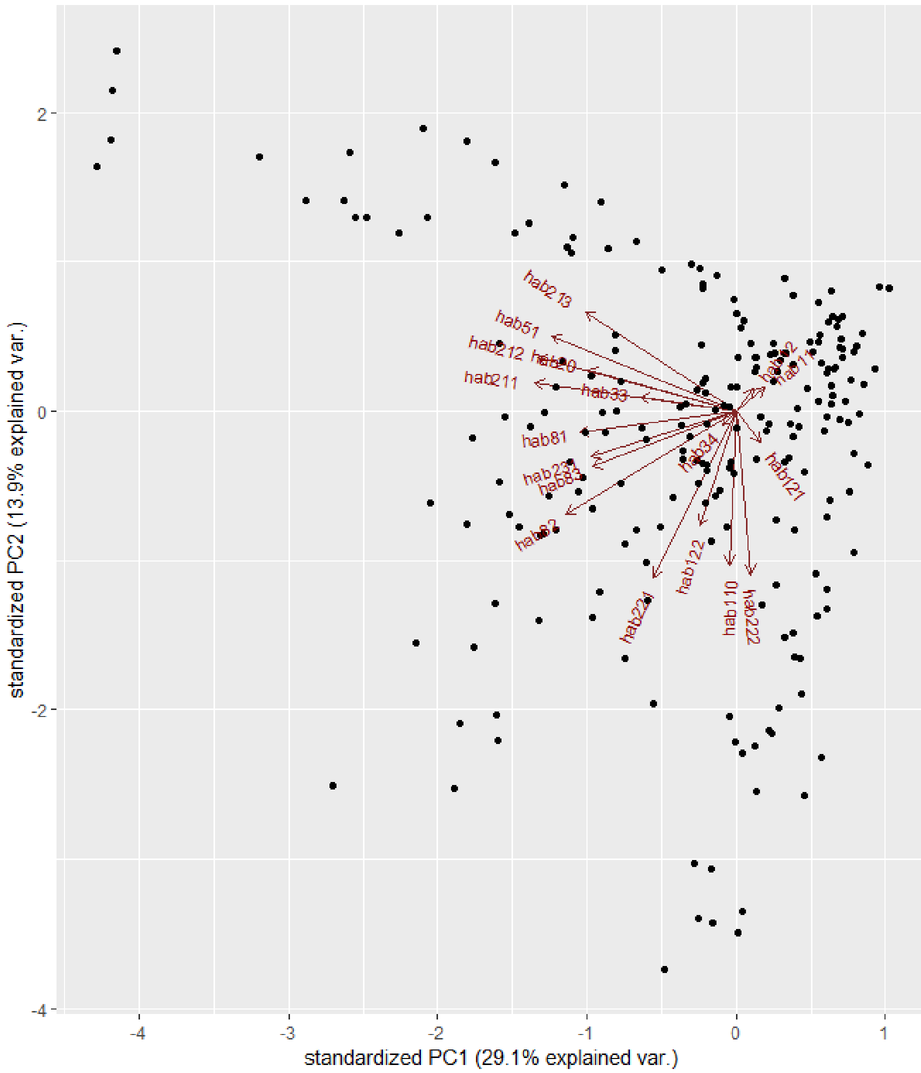

Figure 5-5-11: Mixed Model Results with Habitat Variation Accounted for using Multi-spp Aerial Survey Data

Mixed models result for three of the most abundant species (moose, grey wolf, woodland caribou) on the raw density counts. Even with the effect of habitat accounted for, there was no significant relationship between species density and distance to the ROW. Density of a given species at each transect was calculated as the number of observations of that species divided by the length of the transect. The observation data was summed across each transect for each species to obtain a value per transect per species. A principal component analysis (PCA) was used account for a large proportion of the variance in the land type data (which, combined, accounted for 43% of the variance in the land type data) in the density models.

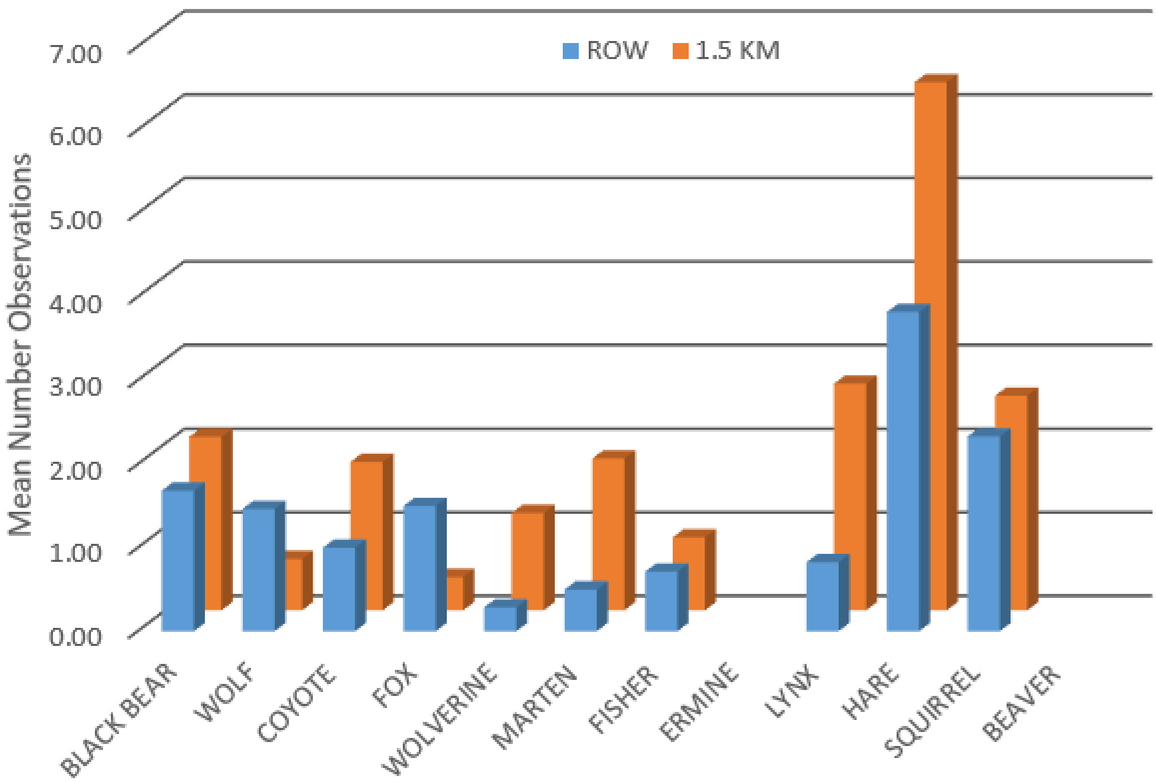

Figure 5-5-12: Comparison of Furbearer Detections at Camera Traps Positioned near versus Away from the ROW (N1 to N4), across Seasons during Construction phase and initial months of Operation phase (February 2015 to February 2019).

NOTE:
Ermine and beaver were data deficient; insufficient trail camera data are available to evaluate Operation phase separately from Construction phase.

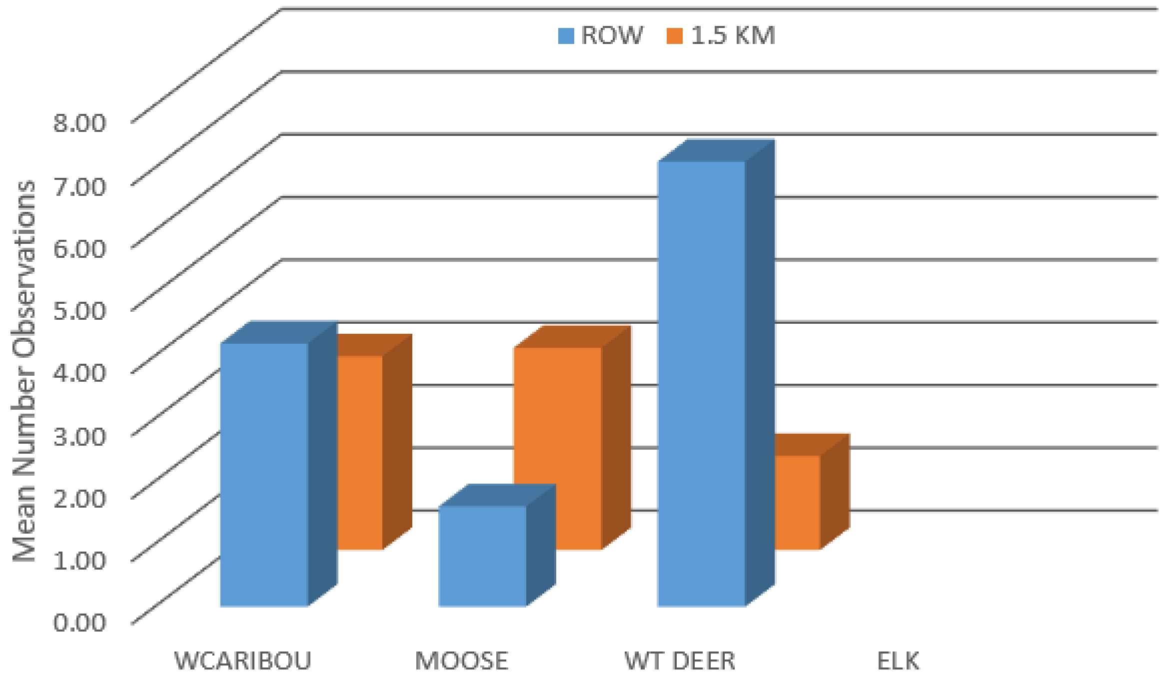

Figure 5-5-13: Comparison of Ungulate Detections at Trail Cameras Positioned Near versus Away from the ROW (N1 to N4), across Seasons during Construction Phase and initial months of Operation phase (February 2015 to February 2019).

NOTE:
Elk were data deficient; insufficient trail camera data are available to evaluate Operation phase separately from Construction phase.

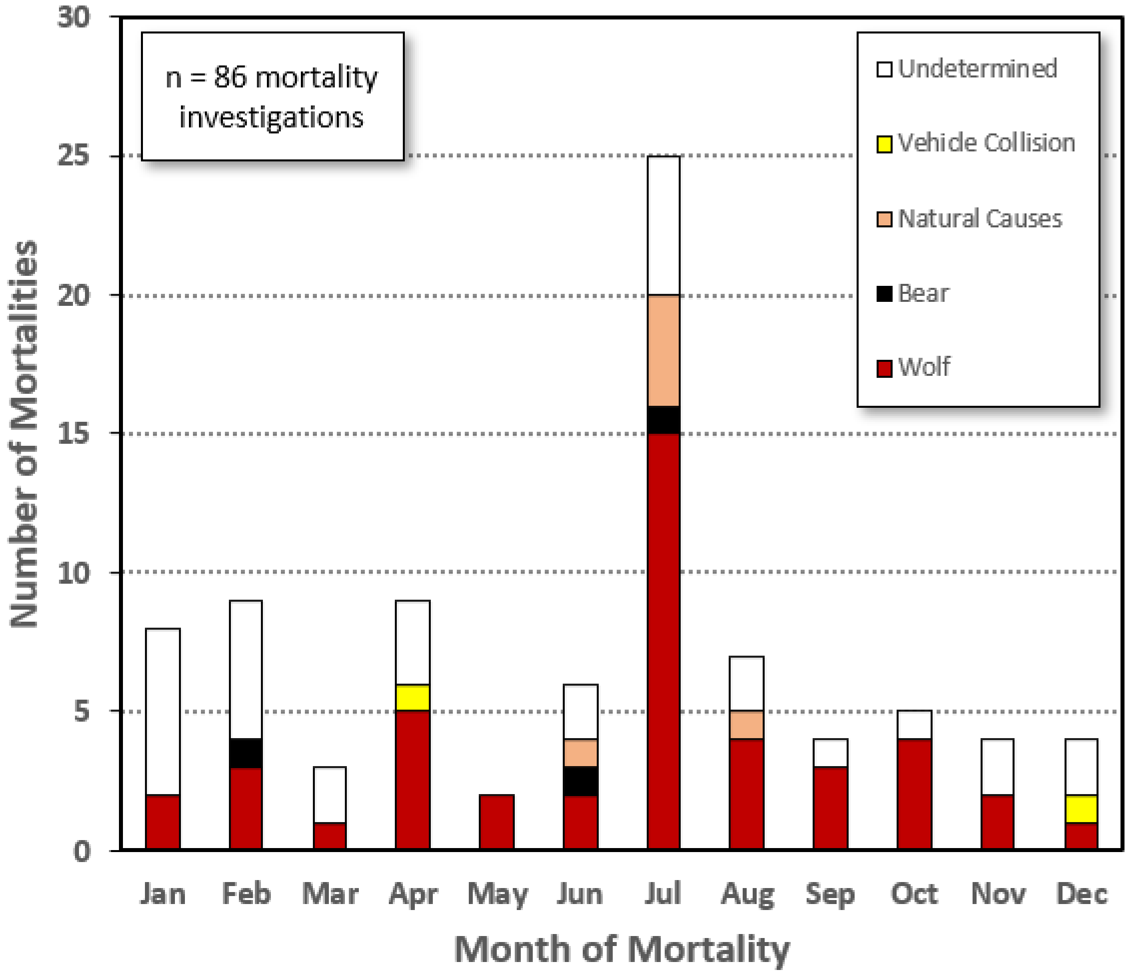

Figure 5-6-1: Mortality Source by Month for Collared Adult Female Caribou (January 2010 to August 2019 all Caribou Ranges Pooled

Redacted

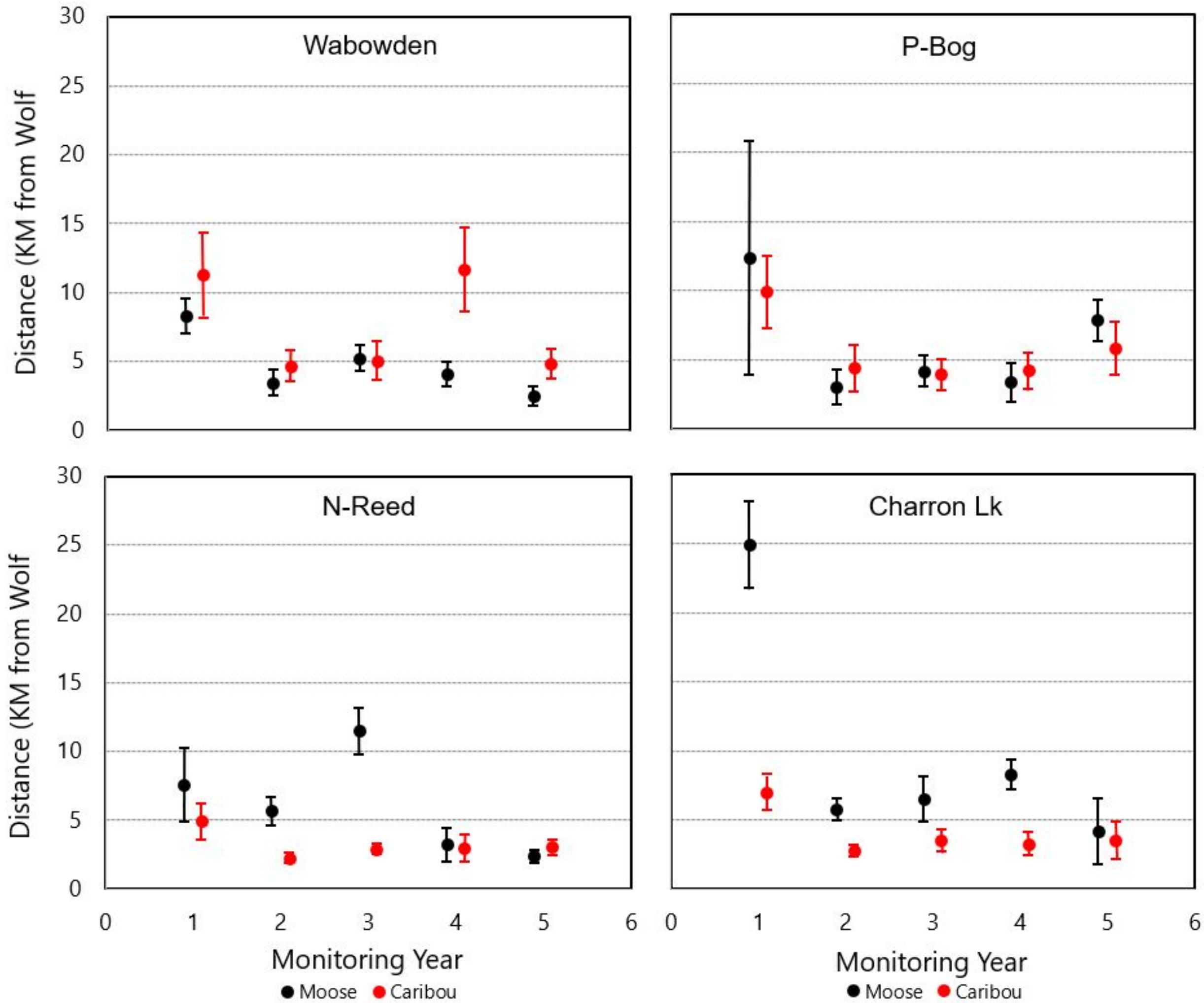

Figure 5-6-3: Annual Wolf Predation-risk to Boreal Woodland Caribou and Moose during Mid-winter within Monitored Boreal Caribou Ranges, during the Construction Phase (2014/15 to 2017/18; Monitoring Year 1 to 4), and First Year of Operation phase (2018/19; Monitoring Year 5)

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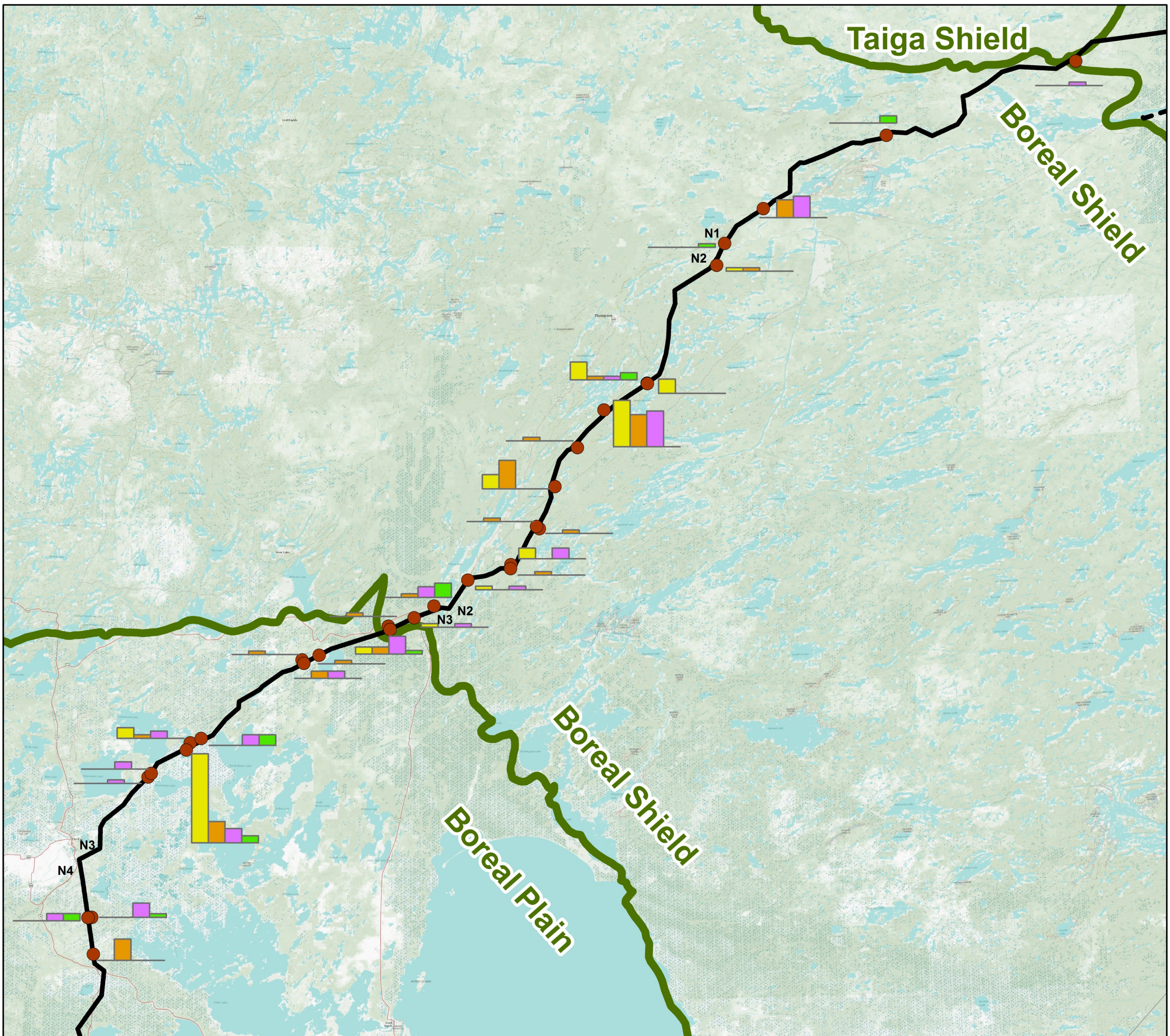


LEGEND

BPIII Transmission Line Route (labelled at segment divides)

Ecozone Boundaries

Black Bear Occurrences (Trail camera data, 2015-2018)*

2015 2016 2017 2018

*Bar charts shown on map (per occurrence location) represent occurrence count information. Different bars represent different years, see above.

0 50 100 150 200 250 Kilometres

NOTES:
- Background topographic map extracted from ESRI online basemap services
- Black Bear occurrence data is a combination of trail camera data, ground transect data.
- No 2019 occurrences in data.

Datum: NAD83
Projection: UTM Zone 14N

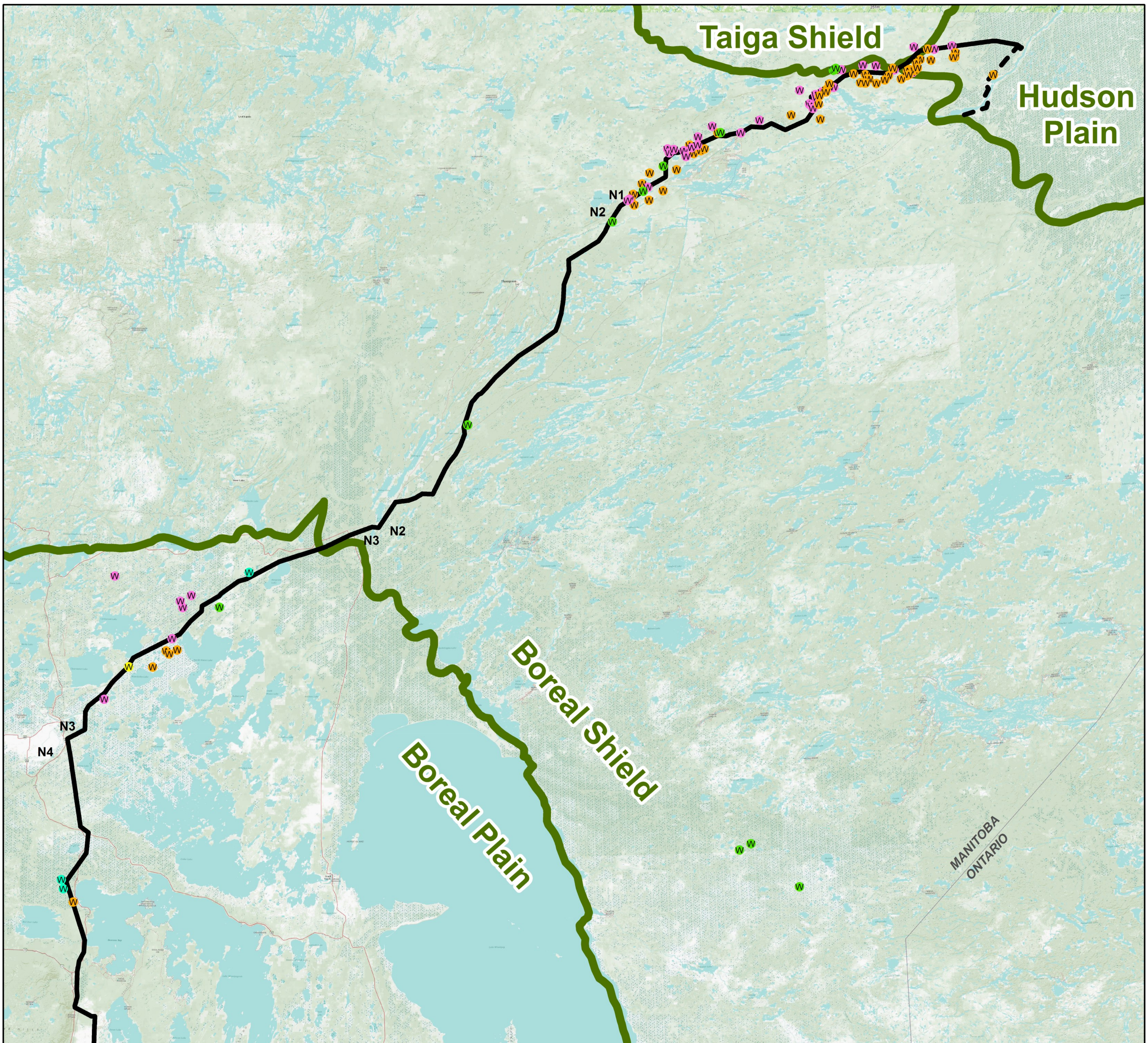
Manitoba Hydro

wood.

MANITOBA HYDRO BIPOLE III TRANSMISSION PROJECT

Black Bear Distribution in Relation to the Project ROW 2015 to 2019

PROJECT N°: WX17393	FIGURE: 5-8-1
SCALE:1:1,795,770	DATE: December 2019



G:\WX17393_Man_Hydro_Bipole\Mammal\Annual_Report_2019\MXD_Maps\Wolverine_Distribution_Map_2.mxd

LEGEND

- BPIII Transmission Line Route (labelled at segment divides)
- AC Collector Lines
- Ecozone Boundaries

Wolverine Occurrences, by year

- W 2014
- W 2015
- W 2016
- W 2017
- W 2018

NOTES:
- Background topographic map extracted from ESRI online basemap services
- Wolverine occurrence data is a combination of trail camera data, ground transect data, and aerial survey data.
- No 2019 occurrences in data

Datum: NAD83
Projection: UTM Zone 14N

0 60 120 180 240 300 Kilometres

N W E S

Manitoba Hydro

wood.

MANITOBA HYDRO BIPOLE III TRANSMISSION PROJECT

Wolverine Winter Distribution in Relation to the Project ROW 2014-2019

PROJECT N°: WX17393	**FIGURE: 5-8-2**
SCALE: 1:2,150,000	DATE: December 2019

6.0 Adaptive Management

Adaptive management is a core approach to implementation of the Bipole III Environmental Protection Plan (EPP) responsive to ongoing evaluation of predicted versus actual effects accessed through various long-term monitoring activities. Modifications to project activities are informed by assessment of mitigation effectiveness and/or detection of significant effects (after mitigation implementation) through each Project phase and are based on analysis of the monitoring program results.

The passive adaptive management approach is intended to identify where there may be data gaps and how to improve project mitigations (if warranted) and/or the monitoring program over time. This report is intended to provide such recommendations, as well as information for review by the regulatory authorities for informed input based on the monitoring program results.

6.1 Commitments Table

The Bipole III Transmission Project predicted effects and commitments relevant to mammals monitoring are summarized in Table 6-1-1, and were derived from the Bipole III Transmission Project EIS, EPP (MB Hydro 2013), Biophysical Monitoring Plan (MB Hydro 2015), revised Biophysical Monitoring Plan (MB Hydro 2018), CEC Review / Report (CEC 2013), mitigation plans (MB Hydro 2014), associated technical reports, and EA License conditions.

6.2 Monitoring Recommendations

Recommendations for Year 6 (2019/20) mammals monitoring based on results of analyses of mammal monitoring data sets from previous years are identified in Table 6-2-1.

Recent advances utilizing genetic capture-mark-recapture estimators for woodland caribou should include a spatial component applied to the existing datasets and future data sets to improve precision of abundance estimates.

As the ROW crossing mitigations currently in place appear to be effective, the habitat in their vicinity should be assessed with respect to reduced function if a wildfire event occurs in close proximity to the ROW within a particular woodland caribou range.

Not detecting an effect should not be confused with not having an effect with respect to survey method used. For example, the Trail Camera data (local fine scale across seasons) and Multi-species Aerial Survey (local coarse scale, winter) show some differences of ROW effect on mammal VECs which is likely a combination of temporal scale, differences in species response across season, and spatial scale (coarse vs fine scale). Therefore, it is recommended that the limitations of the Multi-species Aerial Survey be acknowledged, and (where appropriate and feasible) apply more than one method and weight of evidence considerations to evaluate project effects on mammal VECs of interest.

Table 6-1-1: Mammals Monitoring Commitments Registry – Bipole III Transmission Project

Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
General	Project	Prevent / minimize adverse environmental impacts and enhance positive impacts; continually improve EMS; meet / surpass regulatory, contractual and voluntary requirements; consider interests and utilize knowledge of affected stakeholders.	MB Hydro Environmental Management Policy - improve environmental performance through annual review of environmental objectives / targets; document / report activities and environmental performance.	All Project phases	Implemented, Ongoing
	Project	Provide framework for delivery, management and monitoring of environmental protection measures that satisfy corporate policies and commitments, regulatory requirements, environmental protection guidelines and BMPs and stakeholder input.	Environmental Protection Program.	All Project phases	Implemented, Ongoing
	Project	Environmental monitoring - Monitor the project in accordance with pre-defined plans within passive adaptive management framework, including verification of accuracy of EIS predictions, effectiveness of mitigation measures and compliance with project approval terms and conditions.	Biophysical Monitoring Plan (BMP) and Annual Monitoring Report.	All Project phases	BMP finalized July 2018 Annual Monitoring Reports completed for Year 1 (2014/15), Year 2 (2015/16), Year 3 (2016/17) and is ongoing

Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
Environmentally Sensitive Sites (ESS)	Bear / Wolf / Wolverine Dens; Ungulate Mineral Licks	Implement site specific environmental protection measures of any ESS potentially affected by Project construction.	Mitigated known sites during planned routing to avoid disturbance.	Construction	Completed
			Stakeholder consultation and ATK process to identify known sites.	Pre-construction and Construction	Completed
			Pre-construction surveys (MB Hydro Environmental Monitors and Environmental Consultants) to detect potential ESS conflicts.	Pre-construction	Completed
			Planned winter construction and minimized footprint to avoid sensitive denning periods (timing and buffer restrictions). Site-specific mitigation of any detected sites during construction.	Construction	Completed
Mammal VECs	Project (N1 – N4)	Avoid wildlife disturbance during sensitive periods (denning, calving) and/or sites (dens, mineral licks) using timing windows and disturbance buffers.	Monitor disturbance during Construction and Operation phases for effects on mammal VECs and ESSs at appropriate spatial scale for duration of the monitoring period as outlined in the Biophysical Monitoring Plan and associated annual work plans.	Construction, Operation	Construction phase completed Implemented, Operation phase ongoing
	Project	Mitigate mammal VEC-vehicle collisions during Construction phase using speed limits and access controls.	MB Hydro Environmental Monitors - Monitor occurrence to determine if reduced speed limits or access control required.	Construction,	Completed
	Project	Mitigate habituation of wildlife to humans.	No feeding of wildlife by project personnel, proper food storage and waste disposal to avoid attracting wildlife.	Construction	Completed
	Project (N1 - N4)	Monitor mammal VEC populations.	Monitor effects of project on mammal VECs within the project zone of influence for project-related change in population size and/or range occupancy.	All Project phases per BMP	Implemented, Ongoing
Ungulate VECs	Project	Prevent effects of potential increased disease / parasite transmission within and among ungulate species within project zone of influence.	Monitor disease / parasite (i.e., *P. tenuis*) occurrence prevalence for ungulate populations in the project area, including ingress of white-tailed deer along project ROW.	All Project phases per BMP	Sampling conducted February 2017; next sampling recommended for Feb 2022 (5 years post-construction)

Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
Boreal Woodland Caribou	Caribou ranges intersected by the project (P-Bog, N-Reed, Wabowden)	Mitigate sensory disturbance during calving and rearing in calving areas during construction.	Winter construction to avoid sensitive calving / rearing period.	Construction	Completed
		Access management during Construction phase – to mitigate sensory disturbance and functional habitat loss during construction.	Monitor human use of ROW on core summer and winter areas. Mitigate via access control methods (gates, slash-rollback, ditching, trenching, tree-planting, and accelerated revegetation) to limit recreational ATV / UTV / snowmobile use of the ROW in core winter areas and known / potential calving areas).	Construction	Completed
		Mitigate sensory disturbance, functional habitat loss, and temporary range fragmentation during construction.	Locate ancillary access and staging areas to avoid core use areas and accelerate natural habitat recovery (tree planting) to establish natural low-growing vegetation (security cover) to encourage movement across the ROW	Construction	Completed
		Maintain landscape function to facilitate caribou movement within core winter range.	Develop natural vegetation corridors at strategic locations on the ROW by maintaining naturally low tree cover (Black Spruce and Larch Tamarack) in core winter range affected by the project.	Construction, Operation	Implemented, success evaluated and presented in the annual mammals monitoring reports
		Long-term monitoring of populations (recruitment, mortality, disturbance effects, range fragmentation, occurrence and distribution).	Satellite telemetry study (occupancy, mortality investigation)	Construction, Operation (4 years post-construction)	Implemented, Ongoing – Collar deployments occurred in Feb 2019
			Aerial surveys (recruitment, occurrence and distribution), non-invasive genetic sampling (population estimation).	Construction, Operation ($\leq$25 years or until sufficient knowledge acquired)	Implemented, Ongoing
		Monitor project related changes in predation risk and/or altered predator-prey dynamics. Mitigate project-related predation risk from wolves and black bear.	Monitor predator (wolf, black bear) occurrence in caribou ranges to determine changes in predator use of the ROW and increased predation (winter aerial surveys, IR camera traps, winter track transects, telemetry collar mortality investigations). Mitigate during construction using minimal disturbance techniques to maintain natural low vegetation cover, winter construction to limit disturbance and accelerate vegetation regeneration, and snow trail compaction to discourage movement efficiency and line of sight.	Construction, Operation ($\geq$2 years post-construction pursuant to sufficient knowledge acquired)	Construction phase completed Operation phase ongoing (first year completed)

Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
			Conduct late winter annual inspection of project infrastructure to avoid creating packed snow trails to facilitate predator use.	Operation	Ongoing
		Hunting Mortality – minimize and mitigate.	Prohibit hunting and firearm use by project personnel during Construction.	Construction	Completed
			Access control in winter core areas (in collaboration with MB Gov) during Construction and Operation.	Construction, Operation	Implemented, Ongoing
Forest-tundra / Barren-ground Caribou	Cape Churchill, Pen Islands and Beverley-Qamanirjuaq Populations	Mitigate sensory disturbance / functional habitat loss.	Access control (cooperatively developed with MB Gov). Monitor proximity of populations during Construction phase using existing telemetry collars (Cape Churchill and Pen Islands populations), local knowledge (all populations) and/or aerial surveys to assess numbers, concentrations and proximity to construction.	Construction	Completed
		Hunter harvest – avoid excessive project related harvest during significant migration events.	MB Hydro work cooperatively with MB Gov to develop an Access Management Plan, hunting closures, hunter education. MB Hydro to prohibit hunting and use of firearms by project personnel in work camps to minimize caribou mortality.	Construction	Completed
Moose	ROW (N1-N4) including site access roads Keewatinoow Converter Station Sensitive moose ranges (Tom Lamb WMA / GHA8, Moose Meadows / portion of GHA14 and Pine River / GHA14A/19A)	Mitigate sensory disturbance during calving and rearing in calving areas during construction.	Winter construction to avoid sensitive calving period and sensitive areas / habitats.	Construction	Completed
		Access management during Construction phase – to mitigate sensory disturbance and functional habitat loss during construction.	Monitor human use of ROW on core summer and winter areas. Mitigate via access control methods (gates, slash-rollback, ditching, trenching, tree-planting and/or accelerated revegetation) to limit recreational ATV / UTV / snowmobile use of the ROW in sensitive moose ranges. Decommission temporary construction access upon completion.	Construction	Completed
		Pre-construction surveys to locate sensitive sites (i.e., mineral licks).	Concurrent with aerial wildlife surveys, baseline studies, ATK consultation and MB Hydro Environmental Monitor duties.	Pre-construction	Completed

Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
		Hunting Mortality – minimize project-related contribution to hunting mortality Vehicle collision mortality	Prohibit hunting and firearm use by project personnel during construction.	Construction, Operation (5 years post-construction pursuant to sufficient knowledge acquired)	Construction phase completed
			Monitor project access by hunters using remote IR cameras at major access points and along the ROW.		Operation phase ongoing
			Access control (in collaboration with MB Gov).	Construction, Operation	Implemented, Ongoing
		Predation Risk: - Monitor project related changes in predation risk and/or altered predator-prey dynamics. - Mitigate project-related predation risk from wolves and black bear.	Monitor predator (wolf, black bear) occurrence in caribou ranges to determine changes in predator use of the ROW and increased predation (winter aerial surveys, IR camera traps, winter track transects, telemetry collar mortality investigations).	Construction, Operation	Implemented, Ongoing during Operation phase
			Mitigate during construction using minimal disturbance techniques to maintain natural low vegetation cover, winter construction to limit disturbance and accelerate vegetation regeneration, and snow trail compaction to discourage movement efficiency and line of sight.		Construction phase completed
			Conduct late winter annual inspection of project infrastructure to avoid creating packed snow trails to facilitate predator use.	Operation	Implemented
	Sensitive Moose Ranges	Habitat loss and fragmentation – avoid / minimize.	Apply minimal disturbance techniques via winter clearing, selective cutting, avoidance of unrequired shear-blading, removal of danger trees (>17 m tall) to reduce line of sight, impair predator and hunter use of ROW as a travel corridor, and facilitate wildlife movement across the ROW.	Construction	Completed
		Long-term monitoring of populations (recruitment, mortality, disturbance effects, range fragmentation, occurrence and distribution).	Monitor sensitive moose ranges using a combination of, aerial surveys (recruitment, population structure, abundance, occurrence and distribution), remote IR camera studies and/or winter ground transects.	Construction, Operation ($\leq$25 years or until sufficient knowledge acquired)	Implemented, Ongoing

Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
Elk	C1, N4	Mitigate construction–related disturbance effects.	Monitor elk-vehicle collisions, excessive harvest and disease risk (related to potential encroachment of white-tailed deer spread of *P. tenuis*).	Construction	Completed
White-tailed Deer	C1, N4, N3, N2	Monitor white-tailed deer distributions and prevalence of brainworm *(P. tenuis)* along the Bipole III transmission line.	Pellet collection for *P. tenuis* detection / prevalence. White-tailed deer ingress along ROW via annual species distribution / recruitment surveys in woodland caribou ranges, winter ground transect surveys, trail camera traps, multi-species aerial survey and deer distribution survey of *P. tenuis* surveillance blocks.	Construction, Operation (4 years post-construction)	Implemented, Ongoing
Gray Wolf	C1, N4, N3, N2, N1	Monitor project-related changes in predator-prey dynamics (wolf use of the ROW).	Expand / enhance studies on wolf populations / distribution and predation of boreal caribou within the Project Study Area. Accomplished using occurrence / distribution surveys concurrent with caribou and moose aerial surveys, telemetry collar mortality investigations, as well as remote IR camera trap studies and winter ground transect survey conducted along the ROW.	Construction, Operation	Implemented, Ongoing
Black Bear	Project	Monitor incidents of human-bear encounters during construction, or from attractants (feeding, lack of proper food storage or waste disposal).	Document incidents and report annually; identify corrective actions.	Construction	Completed
		Monitor project-related changes in predator-prey dynamics (black bear use of the ROW).	Conduct studies on black bear population, distribution and predation on boreal caribou in affected caribou ranges within the Project study area; accomplished via trail camera traps, and caribou telemetry collar mortality signal investigation.	Construction, Operation	Implemented, Ongoing
Furbearers	45 Registered Traplines	Monitor change in trapping harvest resulting from increased access or sensory disturbance from the Project.	Monitor annual furbearer harvest statistics obtained from MB Gov for each trapline Initiate community trapline monitoring program.	Construction, Operation (3 years post-construction)	Construction phase completed Operation phase ongoing
	Beaver	Minimize sensory disturbance.	Mitigate local effects of sensory disturbance by use of riparian buffers at ROW crossings during clearing and maintenance activities.	Construction	Completed

Mammal VEC	Location	Commitment	Method Used to Meet Commitment	Project Phase / Duration	Status
			MB Hydro environmental monitors to monitor ROW at water crossings (within 200 m buffer of ROW) for beaver presence.		
	American Marten	Minimize sensory disturbance.	Clear ROW during winter months to lessen disturbance of female marten and their young. Access control (restrict recreational and public access during construction), including routing to minimize loss of forest cover in marten habitat.	Construction	Completed
		Minimize project-related harvest mortality.	Monitor trapper harvest.	Construction, Operation (3 years post-construction)	Construction phase completed Operation phase initiated
	Wolverine	Avoid disturbance of denning sites during Construction phase.	Mitigate by clearing in wolverine range (>53°N Lat.) during winter when dens not active Mitigate any denning sites (if found).	Construction	Completed
		Minimize project-related harvest mortality.	Monitor trapper harvest.	Construction, Operation (3 years post-construction)	Construction phase completed Operation phase initiated

NOTE: Table was updated for consistency with the revised (2018) Bipole III Transmission Project Biophysical Monitoring Plan (Manitoba Hydro 2018).

Table 6-2-1: Bipole III Transmission Project - Mammals Monitoring Program Recommendations

Wildlife VEC	Recommendation	Project Monitoring Commitment
Boreal Woodland Caribou	Continue **Capture-Mark-Recapture (CMR) Sampling** using Non-invasive Genetic Survey (NGS) methods. • Extend sampling frequency to 4-year intervals for populations that are stable or increasing; next survey is recommended to occur in Monitoring Year 9 (2022/23). • Sampling frequency should remain at 2-year intervals for population(s) for any population assessed to be in decline.	Monitor periodically up to 25 years or until suitable knowledge is acquired
	Continue annual winter **Woodland Caribou Recruitment Surveys** (aided by telemetry relocations) and concurrently conduct **Ungulate-Wolf Winter Distribution Surveys** in all four monitored woodland caribou study areas to monitor for changes in mortality risk, population demography (i.e., calf recruitment, population structure), white-tailed deer ingress (P-Bog Range), and altered predator-prey dynamics. • Final survey of recruitment and distribution is anticipated to occur in Monitoring Year 8 (2021/22). • Continue predator-prey dynamics monitoring annually for 4 years post-construction (Monitoring Year 8; 2021/22) to facilitate relative comparison to the 4 years of the Construction phase.	Monitor recruitment annually for 3-4 years post-construction Monitor predator-prey dynamics for a minimum of 2 years post construction
	Continue **Woodland Caribou Telemetry Study** - Continue to acquire boreal woodland caribou telemetry locations in each monitored caribou study area to evaluate behavioural responses to the Project, the effectiveness of mitigates areas (vegetation leave areas), and to monitor adult female boreal woodland caribou survival rates and mortality sources through telemetry collar mortality investigations. • No additional collar deployments are anticipated to be required after February 2019.	Monitor habitat effects continuously for 3-4 years post-construction
Forest-tundra and Barren-ground Caribou	Discontinue monitoring – The Project is in Operation phase; the monitoring commitment during Construction phase was complied with and is no longer required.	Monitor annually during construction
Moose	Continue to acquire moose **population survey data** from MB Gov, MB Hydro, and Riding Mountain National Park to track trends (population state and vital rates) of sensitive moose populations (i.e., Tom Lamb / GHA8, Moose Meadows, Pine River / GHA14A/19A) intersected by the ROW relative to adjacent reference populations and relative to past population performance.	Monitor up to 25 years or until sufficient knowledge is acquired
	Continue to collect **moose occurrence / range occupancy data** via **Ungulate-Wolf Distribution Survey** and **Multi-species Distribution Survey** to inform the predator-prey dynamics analysis, and to monitor for project-related changes in predation risk relative to the ROW. • Final year of Ungulate-Wolf Distribution surveys in woodland caribou survey areas and Multi-species Distribution Survey is anticipated to occur in Monitoring Year 8 (2021/22).	Monitor range occupancy up to 25 years post construction or until suitable knowledge is acquired. Monitor predator-prey dynamics and vital rates up to 4 years post-construction, or until suitable knowledge is acquired
	Continue to monitor functional habitat availability (effects of ROW on moose occurrence) from various survey data sets (**Multi-species Arial Survey**, **Ungulate-Wolf Distribution Survey**, **Remote Camera Trap Study**, **Winter Ground Track Transect Survey**, **MB Gov Moose Surveys of GHAs** intersected by the project).	Monitor annually up to 3 years post-construction

Wildlife VEC	Recommendation	Project Monitoring Commitment
	Discontinue monitoring for presence of **mineral licks** potentially affected by the ROW construction. No mineral licks were detected via systematic surveys or incidental detection during project construction or from local knowledge with respect to potential effects from the project.	Assess for conflicts pre-construction and during construction
Deer and Elk	Continue to collect white-tailed deer and elk occurrence data via various methods (**Ungulate-Wolf Distribution Surveys** in woodland caribou ranges, the **Multi-species Distribution Survey** of the Bipole III ROW, opportunistic surveys in *P. tenuis* surveillance blocks, **Winter Ground Track Transect Survey**, and **Remote Trail Camera Study**) to monitor for potential ingress of white-tailed deer into woodland caribou ranges and potential mortality-risk to elk from hunter harvest as a consequence of project-related access.	Monitor distribution during construction and for 4 years post-construction
	***P. tenuis* monitoring** to assess potential of change prevalence of spiney-tailed larvae shed by deer proximate to the ROW (N2 and N3 construction segments). • Repeat the community ground-based deer pellet collection in Monitoring Year 8 (2021/22) in both *P. tenuis* surveillance areas.	Assess during construction and repeat 2-5 years post-construction
Wolf and Black Bear	Continue to collect wolf winter occurrence data via the annual **Ungulate-Wolf Distribution Survey** to monitor for landscape scale changes in predation-risk to woodland caribou and moose. • Final survey is anticipated to occur in Monitoring Year 8 (2021/22).	Monitor predator-prey dynamics during construction and up to 4 years post-construction
	Continue use of the Remote Camera Trap Study and Winter Ground Track Transect Survey to monitor for local scale changes in use of the ROW by wolf and black bear. • Final sampling effort is anticipated to occur in Monitoring Year 8 (2021/22).	Monitor predator-prey dynamics during construction and up to 4 years post-construction
Furbearers	Continue **Winter Ground Track Transect** survey on camera transects only (n = 40 transects in N1-N4 construction segments). • Final sampling effort is anticipated to occur in Monitoring Year 8 (2021/22).	Monitor barrier effects of the ROW up to 3 years post-construction
	Continue sampling via **Remote Camera Trap Study** to collect occurrence data at local scale annually. • Remove cameras situated at 1.5 km from ROW in Monitoring Year 8 (2021/22); retain cameras situated near the ROW to continue monitoring human access along the ROW.	Monitor barrier effects of the ROW up to 3 years post-construction
	Continue collecting **Wolf and Wolverine** occurrence data for wide ranging / rare fur-bearers concurrent with the Woodland Caribou Recruitment Survey, Winter Ground Track Survey, Remote Trail Camera Study, and Multi-Species Aerial Survey, to inform evaluation of Project effects at local and landscape scales.	Monitor predator-prey dynamics during construction and up to 4 years post-construction
	Discontinue - Wolverine, Black Bear, Wolf ESS detection – Discontinue passive monitoring to detect dens and rendezvous sites; project is in Operation phase.	Mitigate any ESS detected during Construction
	Continue to obtain **Fur Harvest Statistics** from MB Gov annually to monitor for changes in furbearer harvest amounts and harvest rates in traplines interacting with the ROW.	Monitor changes in in trapping mortality up to 3 years post-construction
Human Access	Continue human access monitoring using the Remote Trail Cameras along the ROW and at major project access points to monitor seasonal use of the ROW by local resource users. • Remove all cameras in Monitoring Year 8 (2021/22).	Monitor during construction and up to 5 years post-construction

7.0 Closing

This report has been prepared for the exclusive use of Manitoba Hydro. The information provided herein should not be used for any other purpose, or by any other parties, without review and advice from a qualified professional biologist and/or permission of the proponent. The findings of this report were prepared in accordance with generally accepted professional scientific principles and practice. No other warranty, expressed or implied, is given. The findings of this report are based on data acquired from specific survey designs applied in the Bipole III Transmission Project Mammals Monitoring Program, information provided by the proponent, information provided by the Government of Manitoba, and from publicly available information sources.

Sincerely,
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