Keeyask Generation Project

Terrestrial Effects Monitoring Plan

Caribou Sensory Disturbance Monitoring Report

TEMP-2022-11

KEEYASK

Manitoba Environment, Climate and Parks Client File 5550.00
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KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2022-11

CARIBOU SENSORY DISTURBANCE MONITORING 2021

Prepared for

Manitoba Hydro

By

Wildlife Resource Consulting Services MB Inc.

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SUMMARY

Background

Construction of the Keeyask Generation Project (the Project) at Gull Rapids began in July 2014 and the reservoir was impounded in early September 2020. The Keeyask Hydropower Limited Partnership (KHLP) was required to prepare a plan to monitor the effects of construction and operation of the generating station on the terrestrial environment. Monitoring results will help the KHLP, government regulators, members of local First Nation communities, and the general public understand how construction and operation of the generating station will affect the environment, and whether more needs to be done to reduce harmful effects.

The ranges of three migratory caribou herds extend into the Keeyask region: the Qamanirjuaq herd (Barren-ground caribou) and the Southern Hudson Bay (formerly called Pen Islands) and Cape Churchill herds (both Eastern Migratory caribou; formerly called forest-tundra or coastal caribou). Groups from these herds occasionally overwinter in the Keeyask region and leave in spring to calve.

A small group of caribou occupies the Keeyask region in spring and summer (referred to as summer resident caribou) and is known to calve on the islands in Gull and Stephens lakes and in mainland habitat (raised treed patches surrounded by low, wet areas, which essentially act as islands). Summer resident caribou move within and likely beyond the Keeyask region in the winter months, but the extent of their core range is unknown. These caribou remain in the Keeyask region to calve, but it is unclear whether the same individuals calve in the area in consecutive years.

Predicted Project effects on summer resident caribou in the Keeyask region include the loss of physical habitat from clearing and development and the loss of effective habitat due to sensory disturbance (e.g., noise and light from construction activities). Caribou may temporarily avoid or less frequently use otherwise suitable habitat near construction sites due to the sounds, odours, and sights caused by construction activities. Caribou movement patterns in and through the Keeyask region could also be affected by the Project.

Why is the study being done?

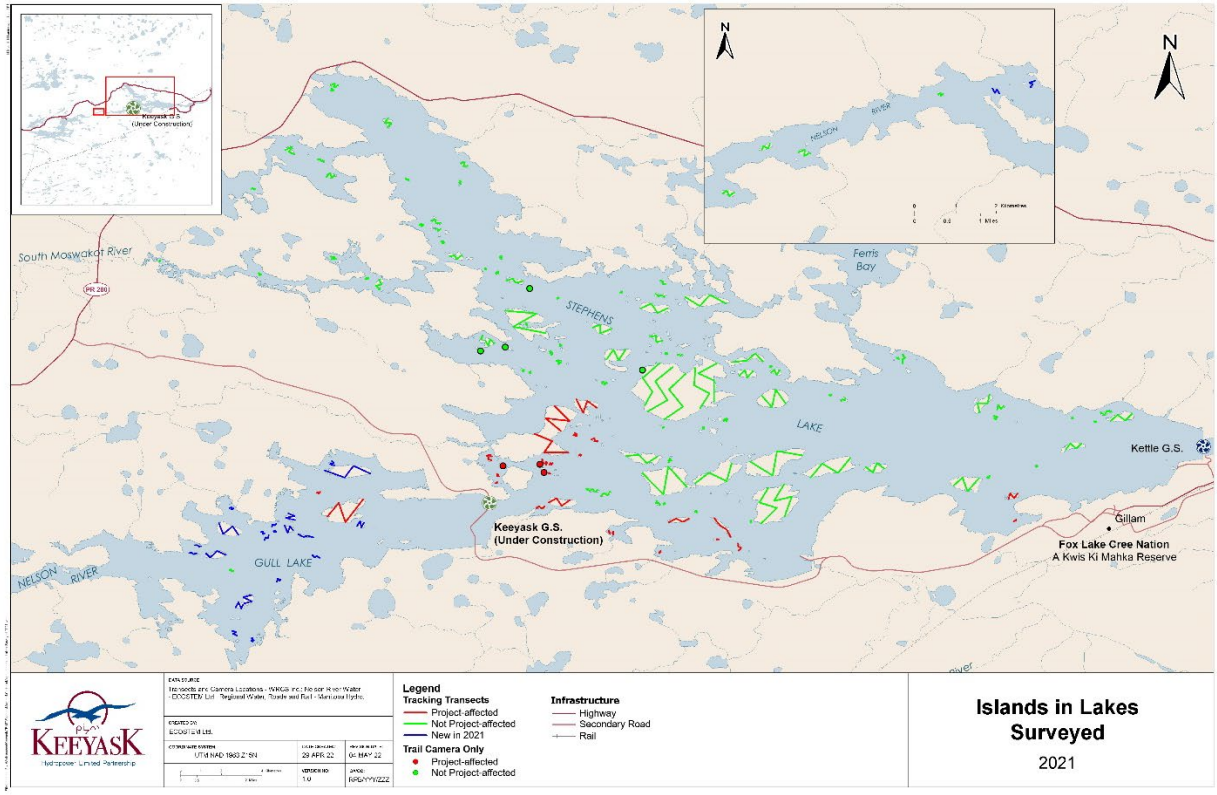
Caribou calving on islands in lakes and in mainland habitat near the Project may be affected by the loss of effective habitat due to noise and light disturbance. The goal of this study is to monitor the effect of these disturbances on caribou distribution and relative abundance near the Project during construction. At the same time, monitoring of other large mammals may provide an indication of the effects of potential changes in the distribution of alternative prey (moose) and predators (black bear and gray wolf) on the caribou population.

What was done?

Ground tracking transect and trail camera surveys were used to gather information on the use of islands in lakes, mainland habitat, and habitat near the North and South access roads by caribou and other large mammals. Islands in lakes and mainland areas were surveyed because these habitats are known to be used by caribou during the calving and calf-rearing period, when caribou are sensitive to disturbance. Habitat along the North and South access roads was surveyed to determine the effects of construction traffic disturbance on caribou and other large mammals.

Ground tracking transects were visited three times in 2021, timed to coincide with periods in the caribou calving and calf-rearing season. During each visit, signs (e.g., tracks and droppings) of caribou and other large mammals were recorded.

In April 2021, a trail camera was placed on most ground tracking transects on islands in lakes and within each mainland habitat surveyed. Trail cameras were placed where caribou activity was most likely to be detected (i.e., heavily used game trails, large openings). Photographs were reviewed following camera removal in September 2021, and the species, number, and sex (where possible) of photographed animals were noted. The timing of ice breakup on Gull and Stephens lakes was monitored using trail cameras deployed along the shorelines, to see how it corresponds with the use of the islands in the lakes by caribou.



What was found?

Caribou occupied 56% of the islands in lakes surveyed in 2021 and 12% were also occupied by calves. During the pre-construction period (2010 to 2014), the percentage of islands on which caribou and their calves were detected declined. The trend generally continued during Project construction. As predicted, many Project-affected islands (those within 4 km of the Project site) were unoccupied by caribou in 2021. However, there was also less caribou activity on unaffected islands in 2021 than during the pre-construction survey years, suggesting a general decline in caribou activity in the broader region. Caribou occupied 33% of the newly formed islands in the reservoir, and calves occupied 8%.

In 2021, the percentage of ice cover on Stephens Lake remained consistent from mid-April until mid- to late May and then decreased rapidly. Ice breakup was on June 6 and Stephens Lake was free of ice by June 12. Ice breakup on Gull Lake was May 28, with no ice remaining on May 30.

Caribou occupied 69% of all surveyed mainland habitat areas and 6% were also occupied by calves. Caribou activity was found in over half of Project-affected mainland habitats (those within 4 km of the Project site). Caribou occupied more unburned than burned habitats. Signs of calves were only found in unburned mainland habitats that were not affected by the Project.

On access road transects the density of caribou signs was marginally greater more than 2 km from the access roads than within 2 km. Very few calf signs were found along these transects in 2021.

Moose signs were abundant and widely distributed on islands in lakes and in peatland complexes. Signs of black bear and gray wolf presence were sparse in caribou calving habitat in the Keeyask region, and caribou and predators occupied relatively few of the same islands in lakes and peatland complexes in 2021.

What does it mean?

While the location of caribou in Gull and Stephens lakes during spring and summer can vary from year to year, the potentially unoccupied islands near the Project site may show avoidance of habitat by some caribou due to construction-related sensory disturbances. However, some Project-affected islands continued to be occupied by caribou. As caribou can eventually get used to human disturbance, some animals may have been less affected by ongoing construction activity than others. Caribou occupied fewer Project-affected islands in lakes during construction than during the pre-construction period, as expected. However, the difference in occupancy rates on Project-affected and unaffected islands before and during Project construction was small, suggesting that the effect was also small.

Some of the new islands formed in the reservoir following impoundment in late 2020 were predicted to become suitable for calving caribou in the future. It was not anticipated that caribou would occupy new islands in the reservoir and use them for calving in the year immediately after impoundment. Moose calving on the newly formed islands was also prevalent. Earlier than expected occupancy of primary and secondary calving habitat for caribou and moose in the

reservoir could enhance the recovery of caribou and moose in the region more quickly than expected during operations.

Caribou activity was found in fewer Project-affected mainland habitats than in unaffected habitats and in more unburned than burned habitats. Caribou tend to avoid forest that is less than 50 years old but may pass through regenerating forest to get from one patch of more suitable habitat to another. The absence of calf activity in burned mainland habitat suggests that cows avoid recently burned areas when calving. Because there were no large, consistent differences in caribou occupancy in Project-affected versus unaffected mainland habitats, construction-related Project effects on caribou appeared to be small.

It is unclear why there appeared to be more caribou activity near the access roads than further away in 2015 and 2017 but not in 2018, 2020, or 2021. Results in the last three survey years conformed to predictions as some, but not all, caribou were generally expected to avoid areas within 2 km of the access roads. As caribou can tolerate some human disturbance, some individual animals may be less affected by traffic noise than others, and the extent of the noise effect may have been greater in the spring and summer of 2018, 2020, and 2021 than in previous years. Potential differences in habitat quality closer to and farther from the road, possibly related to fire or other factors, could also have influenced caribou distribution. The difference in caribou activity near the access roads compared to farther away was small each year, and the effect of sensory disturbance on caribou also appeared to be small.

The abundance and distribution of moose signs in the Keeyask region suggest that enough habitat is available to sustain a moose population, which is likely an adequate source of primary prey for gray wolves. Because caribou and predators occupied relatively little of the same calving habitat in 2021, these areas appeared to provide calving caribou with protection from predators, as expected.

What will be done next?

Construction monitoring for caribou sensory disturbance has concluded. A multi-year analysis of all construction phase results may identify further trends in caribou activity closer to or farther from disturbance at the Project construction site and near the access roads. Monitoring will continue during operation.

STUDY TEAM

We would like to thank Sherrie Mason and Rachel Boone of Manitoba Hydro and Ron Bretecher of North/South Consultants Inc. for logistical assistance in the field. We would also like to thank James Ehnes of ECOSTEM Ltd. for GIS support and mapping. Biologists and other personnel who designed, participated in, and drafted the survey results included:

- Robert Berger, Wildlife Resource Consulting Services MB Inc. (WRCS) – Design, analysis, and reporting
- James Ehnes, ECOSTEM Ltd. – Design
- Andrea Ambrose, WRCS – Analysis and reporting
- Kevin McRae, WRCS – Field study lead, data collection
- Mark Baschuk, WRCS – Data collection
- Marissa Berard, WRCS – Data collection
- Maryse Gagné, WRCS – Data collection
- Timothy Kroeker, WRCS – Data collection
- Hannah Martin, WRCS – Data collection
- Colby Sobchuk, WRCS – Data collection
- Levi Warkentine, WRCS – Data collection
- Thomas Wood, WRCS – Data collection
- Corbin Anderson, Fox Lake Cree Nation (FLCN) – Data collection
- Vincent Anderson, FLCN – Data collection
- Drayden Jobb, FLCN – Data collection
- Benjamin Ouskun, FLCN – Data collection
- Hunter Prieston, FLCN – Data collection
- Issah Spence, FLCN – Data collection
- Payton Beardy, Tataskweyak Cree Nation (TCN) – Data collection
- Jamie Brightnose Jr., TCN – Data collection
- Robert Brightnose, TCN – Data collection
- Harry Flett, TCN – Data collection
- Leslie Flett, TCN – Data collection

- Geoffrey Keeper, TCN – Data collection
- Kerry Kirkness, TCN – Data collection
- Hunter Kitchekeesik, TCN – Data collection
- Keegan Neckoway, TCN – Data collection
- Calvin Spence Jr., TCN – Data collection
- Courtney Spence, TCN- Data collection
- Kenneth Ouskun, TCN – Data collection
- James Chornoby, War Lake First Nation (WLFN) – Data collection
- Justin Spence, WLFN – Data collection
- Nathanael Beardy, York Factory First Nation (YFFN) – Data collection
- Antonio Greeves, YFFN – Data collection
- Curtis Spence, YFFN – Data collection

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1.0 INTRODUCTION

Construction of the Keeyask Generation Project (the Project), a 695-megawatt hydroelectric generating station (GS) and associated facilities, began in July 2014. The Project is located at Gull Rapids on the lower Nelson River in northern Manitoba where Gull Lake flows into Stephens Lake, 35 km upstream of the existing Kettle GS. Reservoir impoundment began August 31, 2020 and was completed on September 5, 2020.

The *Keeyask Generation Project Response to EIS Guidelines* (the EIS), completed in June 2012, provides a summary of predicted effects and planned mitigation for the Project. Technical supporting information for the terrestrial environment, including a description of the environmental setting, effects and mitigation, and a summary of proposed monitoring and follow-up programs is provided in the *Keeyask Generation Project Environmental Impact Statement Terrestrial Supporting Volume* (TE SV). *The Terrestrial Effects Monitoring Plan* (TEMP) was developed as part of the licensing process for the Project. Monitoring activities for various components of the terrestrial environment were described, including the focus of this report, the use of calving and calf-rearing habitat in the Keeyask region by caribou (*Rangifer tarandus*) during Project construction.

As described in the EIS, the ranges of three migratory caribou herds extend into the Keeyask region: barren-ground caribou from the Qamanirjuaq herd and forest-tundra woodland caribou from the Pen Islands and Cape Churchill coastal caribou herds. Small groups of barren-ground caribou from the Qamanirjuaq herd will occasionally migrate from Nunavut into the Keeyask region in winter, although large numbers (10,000) have been recorded infrequently (Keeyask Hydropower Limited Partnership [KHLP] 2012). Caribou from the Cape Churchill and Pen Islands herds migrate from northern Manitoba and northern Ontario into parts of the Keeyask region in winter and return to the Hudson Bay coast in spring to calve. Larger groups of Pen Islands caribou, numbering in the hundreds, have been observed in the Keeyask region on occasion, but there are generally fewer than about 50 individuals in a typical winter (KHLP 2012).

Forest-tundra caribou have most recently been referred to as the Eastern Migratory population, and the Pen Islands herd is now called the Southern Hudson Bay subpopulation (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2017). In April 2017, the Eastern Migratory population, which includes the Southern Hudson Bay and Cape Churchill subpopulations, was designated as Endangered by COSEWIC, mainly due to the decline in two different subpopulations in Quebec and Labrador (COSEWIC 2017). The Barren-ground caribou population was designated as Threatened by COSEWIC in 2016, as many of its subpopulations are in decline, including the Qamanirjuaq (COSEWIC 2016). Neither population is currently protected under the federal *Species at Risk Act* or *The Endangered Species and Ecosystems Act* of Manitoba.

A small number of caribou occupy the Keeyask region in spring and summer (herein referred to as summer resident caribou). These caribou are known to calve on the islands in Gull and

Stephens lakes and in peatland complexes composed of treed islands—raised areas of mainland habitat—surrounded by expansive, treeless wetlands. These islands in lakes and in peatland complexes (collectively referred to as calving habitat hereafter) are provided a physical barrier by the surrounding habitat and offer some protection from predators such as gray wolf (*Canis lupus)* and black bear (*Ursus americanus*). Summer resident caribou move within and likely beyond the Keeyask region, but their herd association and the extent of their core range are uncertain. While these caribou remain in the Keeyask region to calve, it is unclear whether the same individuals calve in the area in consecutive years. Genetic analysis of fecal samples collected in the region during construction monitoring showed that at least one female occupied islands in Stephens Lake over two consecutive summers (Wildlife Resource Consulting Services MB Inc. [WRCS] 2018a); however, it is unknown if she calved. A cow, radio-collared for a program led by Manitoba Sustainable Development (now Manitoba Natural Resources and Northern Development), was photographed with a calf in the region over four summers beginning in 2016.

The Project may affect the distribution of caribou and their use of calving habitat due to habitat loss and alteration, sensory disturbance, and changes in the predator community. Predicted Project effects on caribou included the loss or alteration of winter and calving habitat and a reduction in habitat intactness (i.e., the degree to which habitat remains unaltered by fire and human disturbances) in the Keeyask region.

In addition to the loss of physical habitat, a Project-related loss of effective habitat due to sensory disturbance was anticipated. Caribou are particularly vulnerable to sensory disturbance during the calving period. Reproduction could be reduced if calving habitat, which comprises a relatively small proportion of the Keeyask region, becomes limited. Noise generated by construction activity, blasting, and vehicle traffic may result in caribou temporarily avoiding otherwise suitable habitat near these disturbances. This loss of effective habitat for summer resident caribou is predicted to occur within 4 km of the Project construction site and within 2 km of the North and South access roads (KHLP 2012). Because caribou in the Keeyask region tend to calve solitarily and in low densities on the landscape, the presence of undisturbed calving habitat is critical for successful reproduction (Leclerc et al. 2014).

Habitat alteration may also affect the vulnerability of caribou cows and calves to gray wolves and black bears. Habitat alteration, including land clearing for trails and roads, may change or facilitate predator movements and can increase predation risk (James and Stuart-Smith 2000). Habitat alteration may also result in increased populations of alternative prey such as moose (*Alces alces*), which could increase the predator population, potentially affecting caribou mortality and reproduction (James et al. 2004; Peters et al. 2012).

As part of the TEMP, ground tracking transect and trail camera surveys were conducted to monitor changes in the distribution and relative abundance of caribou near the Project due to sensory disturbance or to changes in the predator community. The distribution and relative abundance of moose, black bear, and gray wolf were also documented to estimate the amount of alternative prey and predator activity in the region. The timing of ice breakup on Gull and

Stephens lakes was monitored using trail cameras because of its potential to affect the use of islands in lakes by calving caribou.

2.0 METHODS

2.1 SURVEY METHODS

2.1.1 GROUND TRACKING TRANSECTS AND TRAIL CAMERAS

Ground tracking transect and trail camera surveys were conducted to gather information on the use of islands in lakes, peatland complexes, and habitat near the North and South access roads by caribou and three other large mammal species. Ground tracking surveys for construction phase monitoring began in 2015 and continued in 2017, 2018, 2020, and 2021. Trail camera surveys were conducted annually from 2015 to 2021. Moose were included in the surveys as they are a potential attractant for wolves, which could opportunistically prey on caribou. Black bears and gray wolves were included as they are common predators of adult caribou and calves and can influence their use of habitat. Islands in lakes and peatland complexes were surveyed as these habitats are known to support caribou during the sensitive calving and calf-rearing period. Habitat along the North and South access roads was also surveyed to determine the effects of traffic disturbance on caribou and other large mammals.

Transects on islands in lakes, in peatland complexes, and near the access roads were visited three times in 2021, from April 8 to 20, June 27 to July 14, and from September 10 to 20 (Table 1). The initial visit was prior to cow arrival, to ensure that animals were not disturbed during calving. The second visit coincided with the late calving and early calf-rearing period and the third visit was during the mid to late calf-rearing period.

Table 1: Start and End Dates of Survey Visits to Tracking Transects, 2021

Transect Type	Visit 1			Visit 2			Visit 3		
	Start Date	End Date	No. Days	Start Date	End Date	No. Days	Start Date	End Date	No. Days
Island in lakes	April 10	April 19	9	June 28	July 14	16	Sept. 10	Sept. 20	10
Peatland complex	April 8	April 19	11	June 27	July 14	17	Sept. 10	Sept. 20	10
Access road	April 12	April 20	8	July 1	July 12	11	Sept. 10	Sept. 20	10

During the initial 2021 visit, biodegradable thread was strung approximately 75 cm above ground level and anchored to trees or shrubs roughly every 20 m (Searing 1981; Demarchi and Searing 1997). Thread was used to ensure that surveying consistently occurred along the same line and to increase sign detectability. Breaks in the thread helped identify animal movements. All signs visible up to 1 m on either side of the transect were recorded, including tracks, trails,

droppings, beds, browse or feeding sites, and visual observations. The specific locations of signs were recorded using hand-held Global Positioning System (GPS) units.

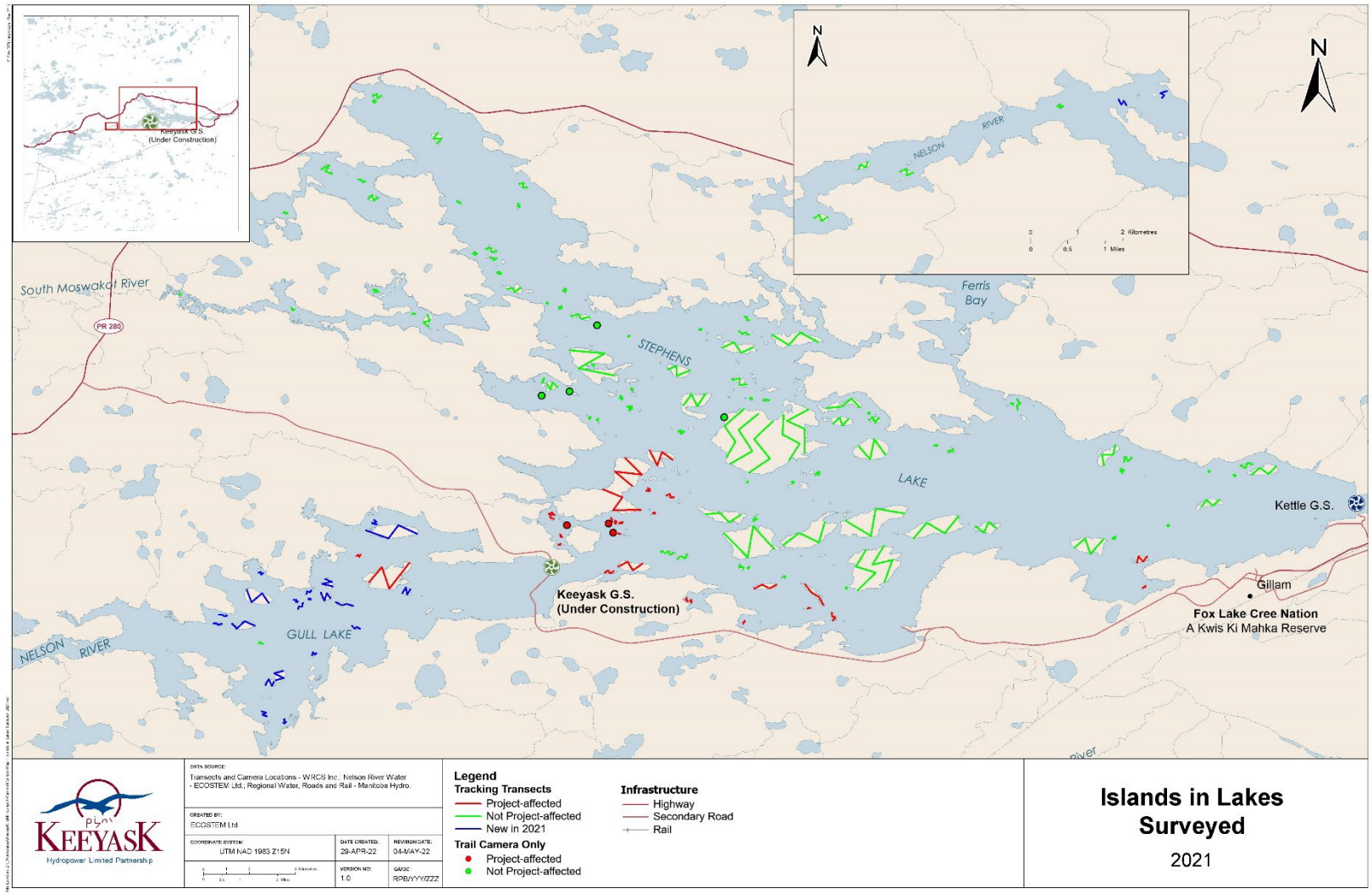
During the second and third visits, large mammal activity was identified at breaks in the thread along each transect, where possible. The locations of all thread breaks were recorded with a GPS unit. Signs such as tracks and scat were used to identify the species responsible for each thread break, where possible.

2.1.1.1 ISLANDS IN LAKES

For the tracking transect study, islands greater than 0.5 ha in size in Stephens and Gull lakes and upstream in the Nelson River with more than 5% tree cover were selected ("islands in lakes"). These islands were classified by their distance to Project-related disturbance, where those within 2 km of borrow areas or Project infrastructure or within 4 km of the generating station were designated as "Project-affected" and those beyond were designated as "unaffected" (KHLP 2015). Islands formed in the reservoir after impoundment in late 2020 were designated as "new," including a small island formed from a larger pre-existing one.

A total of 145 transects were surveyed on 137 islands in Stephens and Gull lakes in 2021, 121 of which were surveyed in previous years and 24 of which were on new islands created after reservoir impoundment (Appendix 1, Table A-1). Twenty-three transects totalling 24.2 km in length were surveyed on 22 Project-affected islands, 98 transects totalling 106.4 km in length were surveyed on 91 unaffected islands, and the 24 transects on new islands in the reservoir totalled 18.4 km in length. Transect length was proportional to island size. One transect was typically established on each island. However, five of the largest islands (>300 ha) were divided into 150-ha units, with one transect surveyed in each (Map 1). In general, "Z"-shaped transects were established across islands to maximize the detection of mammal signs (e.g., tracks and droppings).

One or more Reconyx™ PM35C31 trail cameras were placed on all but four islands during the first visit to tracking transects in April 2021. Most were on the same islands as in 2015, 2016, 2017, 2018, 2019, and/or 2021, the previous trail camera monitoring years for caribou (Appendix 1, Table A-2). Cameras were placed on the 24 new islands in the reservoir. Seven cameras were placed at locations independent of transects. In all, 148 cameras were deployed on 138 islands, each where caribou activity would likely be detected (i.e., heavily used game trails, large openings). Batteries and memory cards were exchanged during the second visit to tracking transects in July, and the cameras were removed during the third visit in September. Photographs were reviewed following removal of memory cards and the species, number, and sex of photographed animals was determined, where possible.



Map 1: Islands in Lakes Surveyed in 2021

2.1.1.2 PEATLAND COMPLEXES

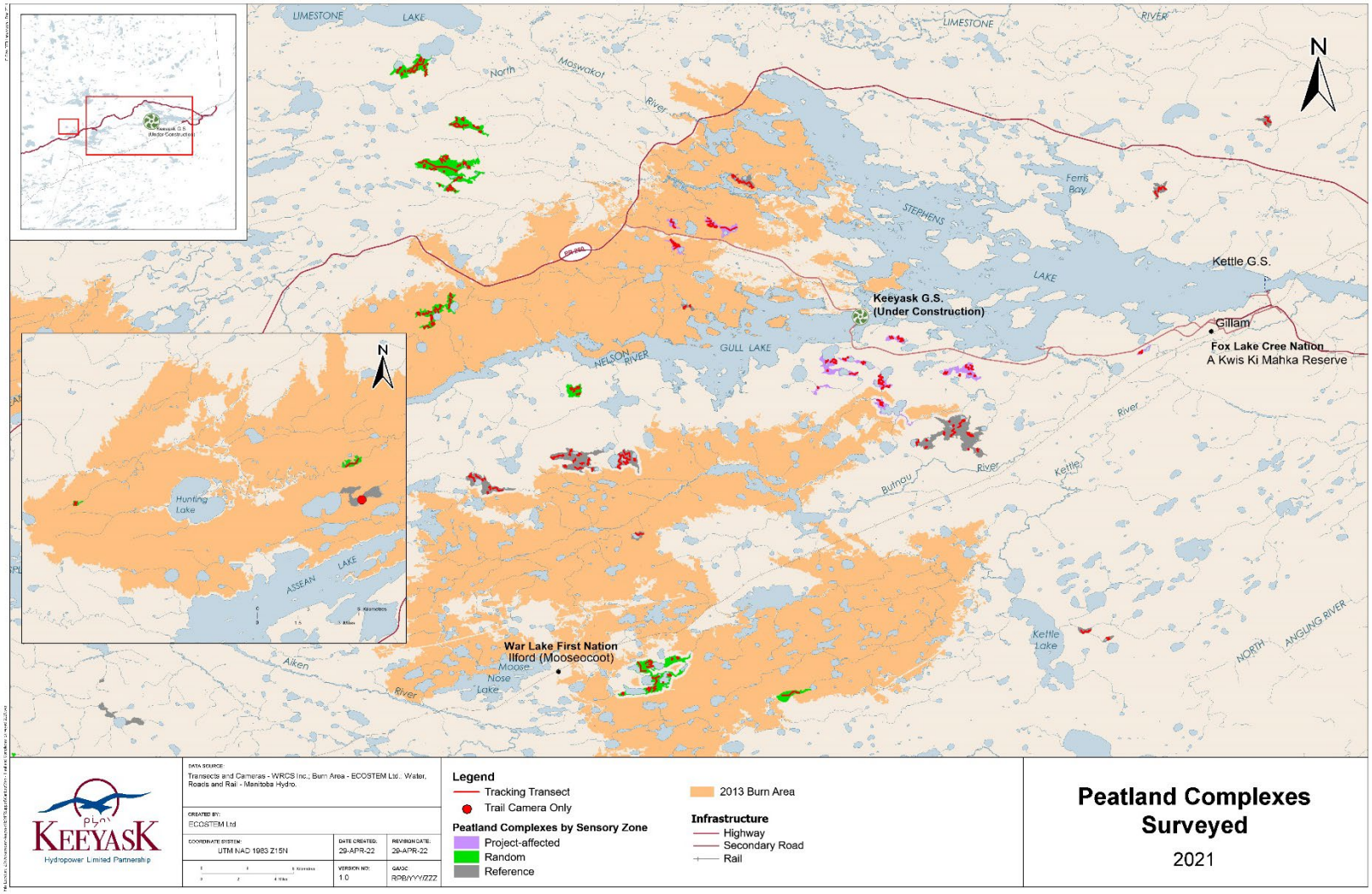
Peatland complex tracking transects were established on raised mainland habitat "islands" within a wet bog matrix. Peatland complexes were selected and categorized based on their distance to a disturbance source. Project-affected peatland complexes were within 4 km of the generating station or within 2 km of the North or South access roads, and where disturbance was generated only from these features. For each Project-affected peatland complex, a reference peatland complex similar in size and with comparable habitat characteristics but not affected by sensory disturbance (i.e., more than 4 km from the generating station and more than 2 km from the access roads) was selected. Random peatland complexes were selected randomly from undisturbed areas to act as a reference for natural variability. The state of Project-affected, reference, and random peatland complexes relative to the forest fires in 2013 (burned or unburned) was also identified.

Like the islands in lakes, tracking transects in peatland complexes were "Z" shaped and varied in length depending on habitat island size. One hundred and eighty-eight transects totalling 116.9 km in length were surveyed in 31 peatland complexes (Table 2, Map 2). The number of transects in each peatland complex ranged from 1 to 20, and the length of transects in complexes ranged from 176 m to 3.0 km. All transects had been surveyed in 2015, 2017, 2018, and 2020 (Appendix 1, Table A-3).

A Reconyx™ PM35C31 trail camera was placed on one transect within each of 30 peatland complexes in April 2021, all at locations surveyed in previous years (Appendix 1, Table A-4). A trail camera was placed in one complex that was not surveyed by tracking transect (Map 2). In all, 31 trail cameras were deployed where caribou activity would likely be detected (i.e., heavily used game trails, large openings). Batteries and memory cards were exchanged during the second visit to tracking transects in July, and the cameras were removed during the third visit in September. Photographs were reviewed following removal of memory cards and the species, number, and sex of photographed animals was determined, where possible.

Table 2: Peatland Complex Transects Surveyed in 2021

Complex Type	Number of Complexes	Number of Transects	Length of Transects (km)
Project-affected, burned in 2013	3	15	8.4
Project-affected, not burned in 2013	8	27	19.0
Reference, burned in 2013	3	9	5.3
Reference, not burned in 2013	8	53	32.1
Random, burned in 2013	4	20	12.2
Random, not burned in 2013	5	64	39.9
Total	31	188	116.9



Map 2: Peatland Complexes Surveyed in 2021

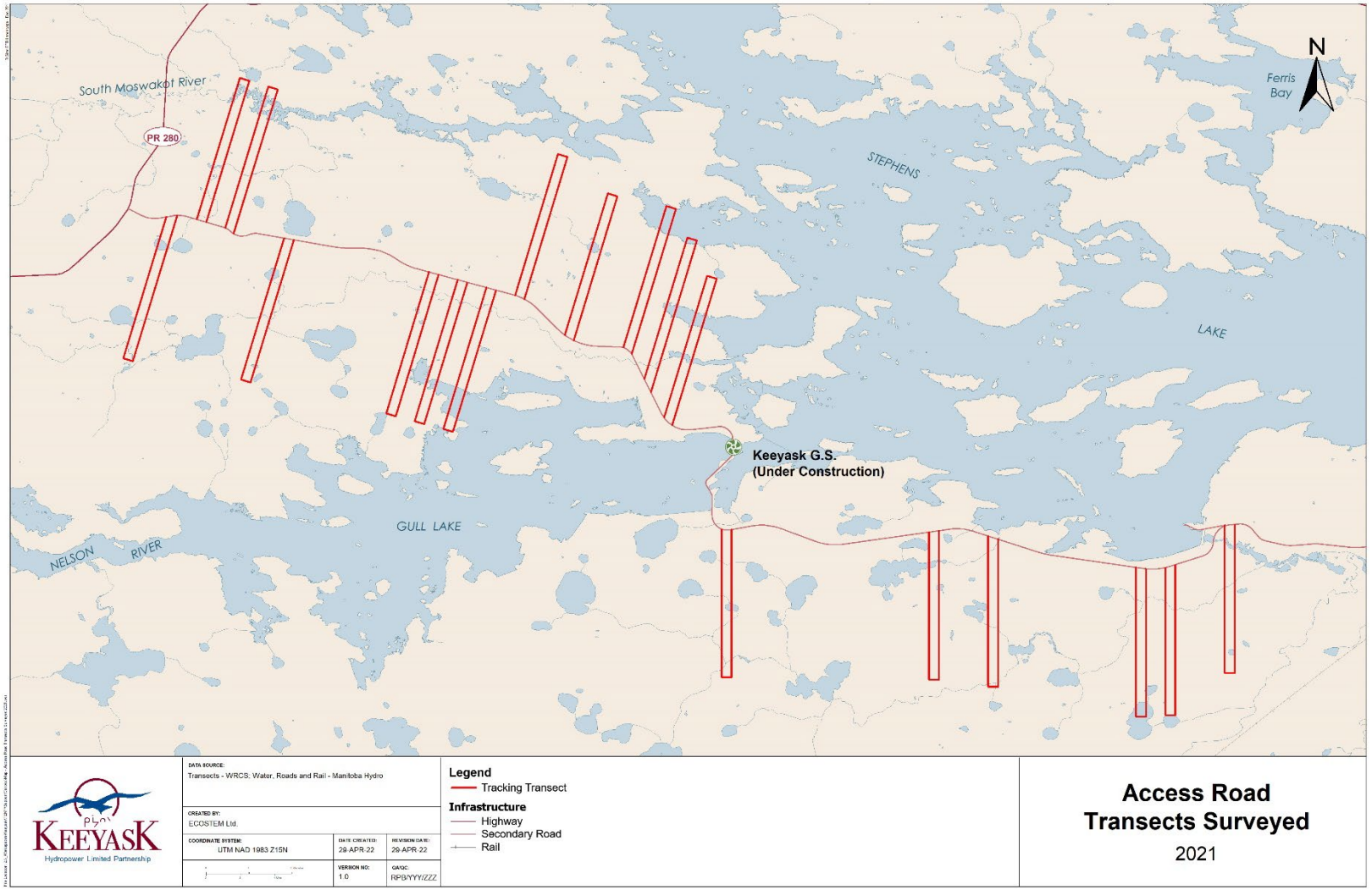
2.1.1.3 ACCESS ROAD TRANSECTS

Access road tracking transects were placed at random locations along and perpendicular to the North and South access roads. Transects were developed to be 10.3 km long, consisting of two 5-km long portions separated by 333 m. Actual transect lengths varied due to terrain and obstacles such as water bodies or construction zones (Table 3).

Eighteen access road transects were surveyed, all of which were also surveyed in 2015, 2017, 2018, and 2020. Seven transects totalling 76.3 km in length were north of the North Access Road, five totalling 55.1 km were south of the North Access Road, and six totalling 66.2 km were south of the South Access Road (Map 3). Of the 197.6 km surveyed, approximately 72.0 km were within 2 km of an access road, where effects of sensory disturbance on caribou were anticipated, and approximately 125.6 km were beyond 2 km, where no sensory disturbance effects were expected.

Table 3: Access Road Transects Surveyed in 2021

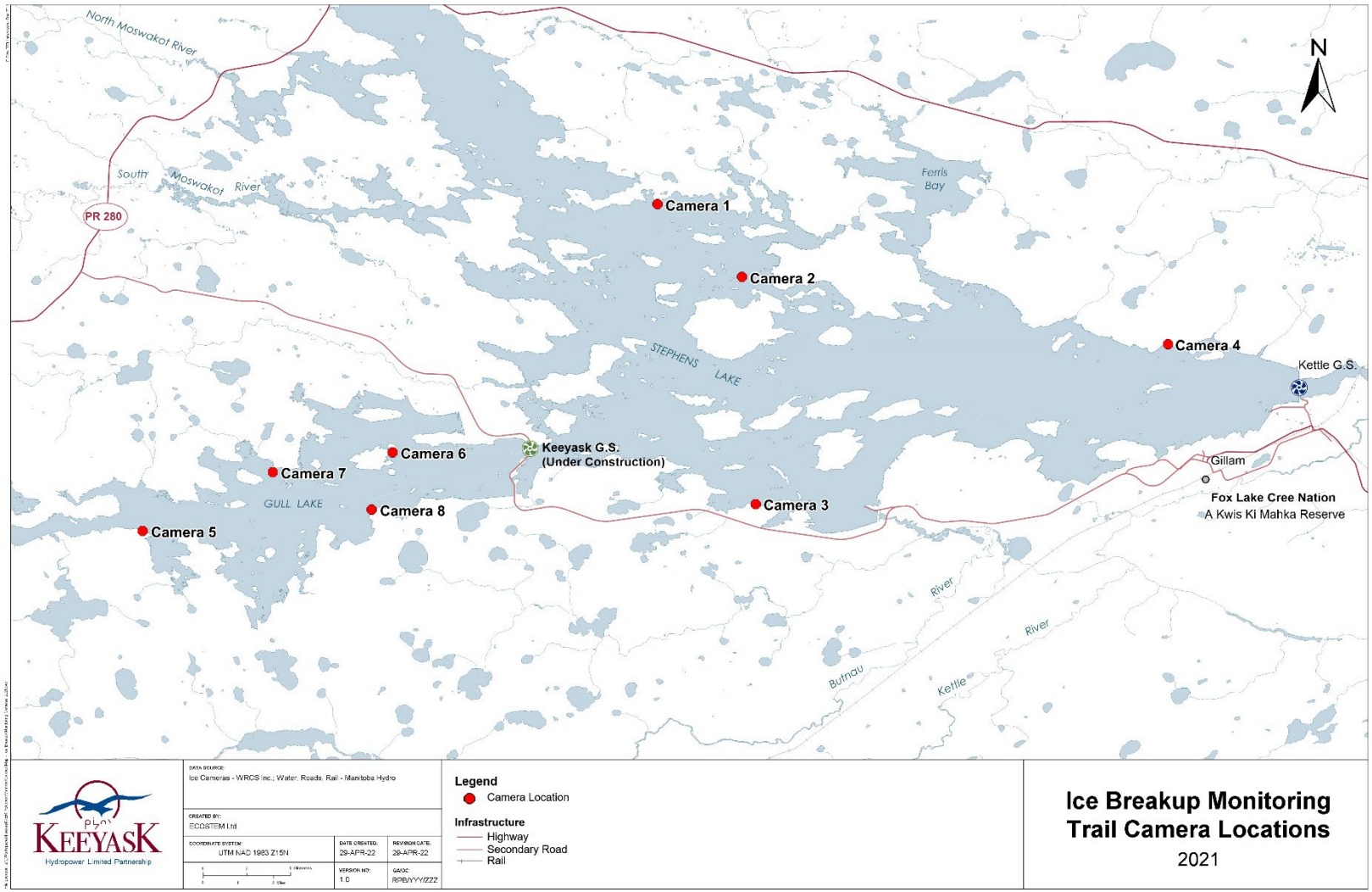
North Access Road		South Access Road	
Transect	**Length (km)**	**Transect**	**Length (km)**
N23	11.5	S1	11.1
N24	11.1	S10	10.8
N34	12.2	S15	10.1
N36	11.2	S16	12.2
N38	9.7	S18	11.2
N39	11.6	S8	10.7
N40	8.9		
S42	11.0		
S46	10.8		
S51	10.5		
S52	11.4		
S53	11.5		



Map 3: Access Road Tracking Transects Surveyed in 2021

2.1.2 TIMING OF ICE BREAKUP

Four trail cameras were placed on the shores of Stephens Lake and four were placed on the shores of Gull Lake on April 10 and 20, 2021 to monitor the timing of ice breakup (Map 4). The trail cameras, which were set to take a picture of the lake every four hours during daylight hours, were removed in late June or early July 2021. Ice coverage was estimated at 25% increments in each photograph from each camera. Ice breakup was defined as the date when all cameras on a lake indicated 25% or less ice coverage in view.



Map 4: Trail Camera Locations to Monitor Ice Breakup on Gull and Stephens Lakes, 2021

2.2 DATA ANALYSIS

Trail camera data for 72 islands in lakes and 23 peatland complexes that were surveyed each year from 2015 to 2021 were analyzed by averaging the percentage of camera days (total number of days each camera was deployed and functional) during which caribou were photographed each year for an indication of the relative amount of caribou activity. A Mann-Whitney test was used to compare the percentage of camera days caribou were photographed on Project-affected and unaffected islands in lakes each year and a Kruskall-Wallis test was performed to compare the percentage of camera days caribou were photographed in Project-affected, reference, and random peatland complexes each year (McDonald 2014), with significance determined at the $\alpha = 0.05$ level. Where a significant difference was found among peatland complexes, a Dwass-Steel-Critchlow-Fligner test for pairwise comparisons (Systat Software Inc. 2009) was performed, also with significance determined at the $\alpha = 0.05$ level. Statistical tests were performed with SYSTAT 13.2.

Ground tracking transect and trail camera data were summarized separately and then combined for a broader indication of large mammal distribution on islands in lakes and in peatland complexes in the region. Only tracking data from July and September were included in the combined data because signs observed in April were of varying ages (dependent on time since last snowfall) and because the first visit was prior to the caribou calving season.

Using the combined tracking transect and trail camera data, the presence and general distribution of caribou, caribou calves, moose, and moose calves was examined for islands and peatland complexes and compared with previous survey years. A total of 119 Project-affected and unaffected islands in lakes and 32 peatland complexes were surveyed in 2021. Combined tracking transect and trail camera data were also used to identify islands in lakes and peatland complexes occupied by caribou and by moose and/or predators during the survey period, as the presence of moose, black bears, or gray wolves on islands or in peatland complexes occupied by caribou can provide an indication of the influence of predators and alternative prey (moose) on the selection of calving and calf-rearing habitat by caribou. Large mammals were considered present on an island or in a peatland complex when their sign was observed on one or more tracking transects and/or when they were photographed by at least one trail camera. A Fisher's exact test (McDonald 2014) was performed to compare the occupancy rates of caribou (percentage of islands where caribou were observed) on Project-affected and unaffected islands in lakes before (2010–2014) and during (2015, 2017, 2018, 2020, and 2021) Project construction. Significance was determined at the $\alpha = 0.05$ level. A two-proportion z test (Statology 2019; Glen 2021) was performed in Excel to compare the occupancy rates of caribou on Project-affected and unaffected islands in lakes each year, with significance determined at the $\alpha = 0.05$ level. The same test was performed to compare the occupancy rates of caribou on Project-affected, reference, and random peatland complexes during Project construction (2015, 2017, 2018, 2020, and 2021), with significance determined at the $\alpha = 0.05$ level.

Primary calving habitat was described in the EIS as islands greater than 10 hectares (ha) in size in lakes or peatland complexes greater than 200 ha in area. Secondary calving habitat was considered islands between 0.5 and 10 ha in size in lakes and peatland complexes between 30 and 200 ha in area. Using the combined tracking and trail camera data, the mean percentage of survey years in which caribou and caribou calves occupied islands in lakes and peatland complexes identified as primary, secondary, or unsuitable during Project construction was calculated. In Gull Lake, only islands in existence before the reservoir was impounded were included. Islands that were not surveyed all five years over the construction period (n = 11) were excluded. Overall, 34 primary and 74 secondary calving islands were included in the analysis. Twenty-six peatland complexes that were surveyed all five years over the construction period were categorized by size; 5 primary, 13 secondary, and 8 small “non-habitat” complexes were included in the analysis.

For access road tracking transects, sign density (signs/km) was calculated using the distance surveyed during the initial visit in April to describe large mammal activity. The activity of caribou and other large mammals within 2 km of the North and South access roads and subject to sensory disturbance was compared with activity in areas further away and not subject to sensory disturbance (KHLP 2015). A Mann-Whitney test (McDonald 2014) was performed in SYSTAT 13.2 to compare the density of caribou signs within 2 km of and more than 2 km from the access roads during the combined second and third visits. Significance was determined at the $\alpha = 0.05$ level.

3.0 RESULTS

3.1 GROUND TRACKING TRANSECTS AND TRAIL CAMERAS

3.1.1 ISLANDS IN LAKES

Caribou signs were observed on 76 of the 137 islands on which ground tracking transects were surveyed (Table 4; Appendix 1, Table A-5), including six of the 24 new islands in the reservoir. Moose were somewhat more widely distributed, and their signs were found on 22 of the new islands in the reservoir. No caribou calf signs were detected on the new islands and moose calf signs were observed on three. All caribou and moose calf signs were recorded on islands where adult signs were also found. Black bear and gray wolf signs were observed on fewer islands than either caribou or moose.

Table 4: Number of Islands in Lakes on Which Large Mammal Signs Were Observed, 2021

Species	Visit 1 (April 10–19)	Visit 2 (June 28–July 14)	Visit 3 (Sept. 10–20)	Visits 2 & 3	All Visits
Caribou	8	50	53	74	76
Caribou calf	0	8	4	12	12
Moose	9	59	62	88	90
Moose calf	0	14	5	17	17
Black bear	0	3	5	8	8
Gray wolf	2	1	2	3	5

Caribou were photographed on 35 islands, including three of the new islands in the reservoir. Caribou calves were photographed on eight islands, two of which were formed after reservoir impoundment. Two calves and two females were photographed on an island in Stephens Lake (Photo 1). Two females and two calves were also photographed on a nearby island in 2018. Caribou were first photographed on the islands on April 22, 2021 and the first female was photographed May 14. In previous years, the first adult was photographed between April 9 and June 28 and the first female was photographed between May 22 and June 7. The first caribou calf was photographed on June 20, 2021. In previous years caribou calves were first photographed on May 25, 2015; June 19, 2016; June 6, 2017; May 21, 2018; June 20, 2019, and June 18, 2020.

Moose were photographed on 45 islands, including six of the new islands in the reservoir. Moose calves were photographed on 20 islands, three of which were formed after reservoir impoundment. Two moose calves were photographed together on two islands, one in Stephens Lake and one formed after reservoir impoundment. The first moose calf (see Photo 2 for a

moose cow and calf) was photographed on June 13, 2021. In previous survey years, moose calves were first photographed on June 3, 2015; May 29, 2016; May 31, 2017; June 12, 2018; June 9, 2019, and June 13, 2020.

The number of islands occupied by caribou and moose appeared to peak in August and June, respectively, and then declined in September (Table 5). Few predators (black bear and gray wolf) were captured on trail cameras. Caribou were photographed on three of the same islands as black bears or gray wolves (see Photo 3 for a gray wolf), including one island where all three were present (Table 6). There were six instances where moose and black bear (see Photo 4 for a black bear), were photographed on the same island. A single day separated observations of caribou and black bear on one island and moose and black bear on another. A minimum of 48 days separated observations of caribou and predators on the island where caribou, black bear, and gray wolf were photographed.

Table 5: Number of Islands in Lakes Occupied by Large Mammals Monthly from Trail Camera Data, 2021

Species	April	May	June	July	August	September	All
Caribou	2	6	12	15	16	9	35
Caribou calf	0	0	1	3	5	1	8
Moose	0	2	24	19	19	6	45
Moose calf	0	0	10	8	4	1	20
Black bear	1	4	4	1	4	2	13
Gray wolf	0	0	3	2	1	0	3

Table 6: Nearest Dates on Which Caribou or Moose and Predators Were Photographed on the Same Islands in Lakes, 2021

Island	Caribou	Moose	Black Bear	Gray Wolf
KI124029	May 28	July 22	May 29	–
KI124044	–	August 1	August 2	–
KI124065	–	August 17	June 16	–
KI124092	–	June 2	June 6	–
KI124124	–	June 26	May 27	–
KI124133	August 14	June 27	June 13	–
KI124164	May 14	–	July 13	June 30

Trail cameras were set up on 15 or 16 Project-affected islands in lakes and between 54 and 56 unaffected islands from 2015 to 2021. No caribou were photographed on Project-affected islands in 2018 (Table 7). Caribou were photographed on 6 to 25% of Project-affected islands in other survey years. No caribou calves were photographed on Project-affected islands from 2016 to 2018 or in 2020 and 2021. Calves were photographed on the same single Project-affected island in 2015 and 2019. Caribou and calves were photographed on unaffected islands in lakes

each year. Caribou were photographed on 21 to 43% and calves were photographed on 9 to 13% of unaffected islands over the survey period.

Table 7: Number and Percentage of Project-affected and Unaffected Islands in Lakes on Which Caribou and Calves Were Photographed, 2015–2021

Year	Project-affected				Unaffected			
	Number with Caribou	Percentage with Caribou	Number with Calves	Percentage with Calves	Number with Caribou	Percentage with Caribou	Number with Calves	Percentage with Calves
2015	1	6	1	<1	13	24	5	9
2016	3	19	0	0	12	21	6	11
2017	2	13	0	0	13	23	6	11
2018	0	0	0	0	19	35	7	13
2019	4	25	1	<1	18	32	5	9
2020	3	19	0	0	21	39	5	9
2021	3	20	0	0	24	43	6	11

Photo 1: Two Caribou Cows and Two Calves on an Island in Stephens Lake on June 20, 2021

Photo 2: Moose Cow and Calf on an Island in Stephens Lake on June 24, 2021

Photo 3: Gray Wolf on an Island in Stephens Lake on June 16, 2021

Photo 4: Black Bear on an Island in Stephens Lake on April 26, 2021

Trail cameras were placed on 16 Project-affected and 56 unaffected islands in lakes every year from 2015 to 2021 (Appendix 1, Table A-6). Caribou were photographed on seven (44%) Project-affected and 36 (64%) unaffected islands in at least one year over the survey period. No caribou were ever photographed on 29 of the islands, nine of which were Project-affected and 20 of which were unaffected. There was no significant difference in the percentage of camera days caribou were photographed on Project-affected versus unaffected islands every year except for 2018, when no caribou were photographed on Project-affected islands (Table 8). Caribou were photographed every year on five of the islands, all of which were unaffected by the Project (Appendix 1,Table A-7).

Table 8: Mean Percentage of Camera Days Caribou Were Photographed on Project-affected and Unaffected Islands in Lakes, 2015–2021

	Project-affected			Unaffected				
Year	**Mean**	**SD**	**Rank Sum**	**Mean**	**SD**	**Rank Sum**	***U***	***p***
2015	0.07	0.29	507.0	0.43	1.17	2,121.0	371.00	0.13
2016	0.16	0.37	564.0	0.48	1.15	2,064.0	428.00	0.70
2017	0.14	0.49	531.5	0.53	1.38	2,096.5	395.50	0.32
2018	0	0	432.0	0.72	1.41	2,196.0	296.00	0.01
2019	0.17	0.35	531.5	0.58	1.15	2,096.5	395.50	0.38
2020	0.20	0.52	495.5	0.64	1.23	2,132.5	359.50	0.15
2021	0.13	0.27	461.0	0.90	1.52	2,167.0	325.00	0.06

When results from tracking transect and trail camera surveys were combined, large mammal activity was detected on 120 of the 143 islands surveyed in 2021. Caribou and moose occupied 65 of the same islands, 10 of which were also occupied by black bear or gray wolf (Map 5). One island was occupied by caribou and black bear and three islands were occupied by moose and black bear. Fourteen islands were occupied by only caribou and 29 islands were occupied only by moose.

Caribou activity was widely distributed on the islands in Stephens Lake and upstream of the Keeyask site (Map 6). Caribou occupied 56% of the islands surveyed in 2021, including 33% of newly formed islands surveyed in the reservoir (Table 9). Caribou occupied a smaller percentage of Project-affected than unaffected islands and no calves were detected on Project-affected islands. Caribou calves were observed on two of the new islands in the reservoir. Moose were also observed on a greater percentage of unaffected islands than Project-affected islands. Moose calves were observed on a greater percentage of unaffected than Project-affected islands and were detected on 21% of the new islands surveyed in the reservoir (Map 7). Black bear and gray wolf activity was observed on few islands relative to caribou and moose (Table 9; Map 8).

Table 9: Project-affected and Unaffected Islands Occupied by Large Mammals from Combined Tracking Transect and Trail Camera Data, 2021

Species	Project-affected		Unaffected		New		All	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
Caribou	9	38	63	66	8	33	80	56
Caribou calf	0	0	15	16	2	8	17	12
Moose	9	38	67	71	23	96	99	69
Moose calf	1	4	25	26	5	21	31	22
Black bear	8	33	10	11	1	4	19	13
Gray wolf	4	17	2	2	0	0	6	4

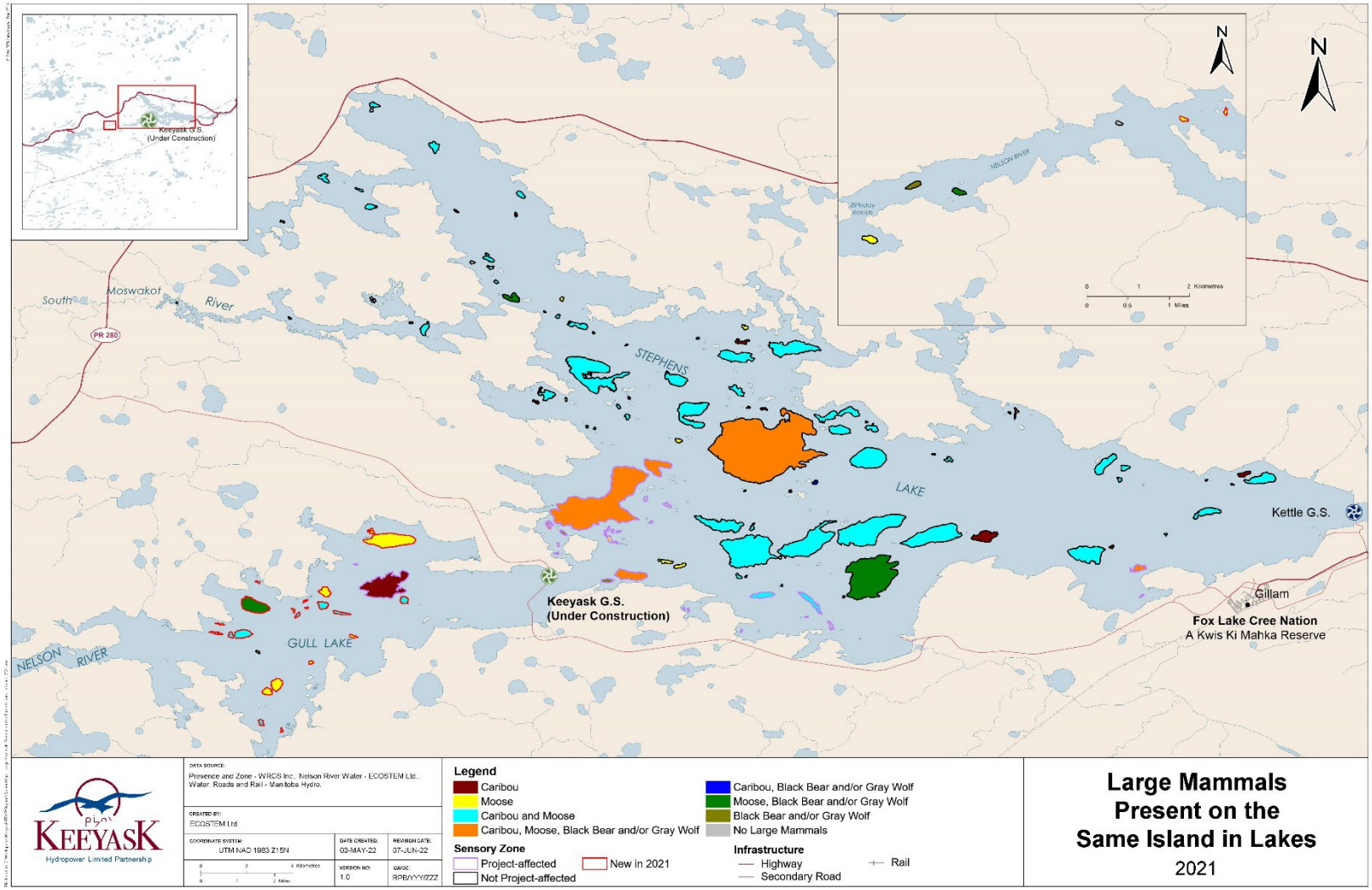
Both tracking transect and trail camera surveys were conducted in 2015, 2017, 2018, 2020, and 2021 during Project construction. When tracking transect data from July and September and all trail camera data were combined each year, the percentage of Project-affected islands on which caribou were detected ranged from 28% in 2015 to 65% in 2017 and remained the same from 2020 to 2021 (Table 10). The percentage of unaffected islands on which caribou were detected ranged from 58% in 2018 to 70% in 2017 and increased 8% from 2020 to 2021. Caribou calves were detected on a smaller percentage of Project-affected than unaffected islands in all five survey years; no calves were detected on Project-affected islands after 2017 in years when tracking transect and trail camera surveys were both conducted.

The percentage of Project-affected islands on which moose were observed was similar but declining in 2015, 2017, and 2018 and then declined 39% in 2020 and 38% from 2020 to 2021 (Table 10). The percentage of unaffected islands on which moose were observed declined from 2015 to 2020 and then increased 16% in 2021. Moose calves were detected on 4% more

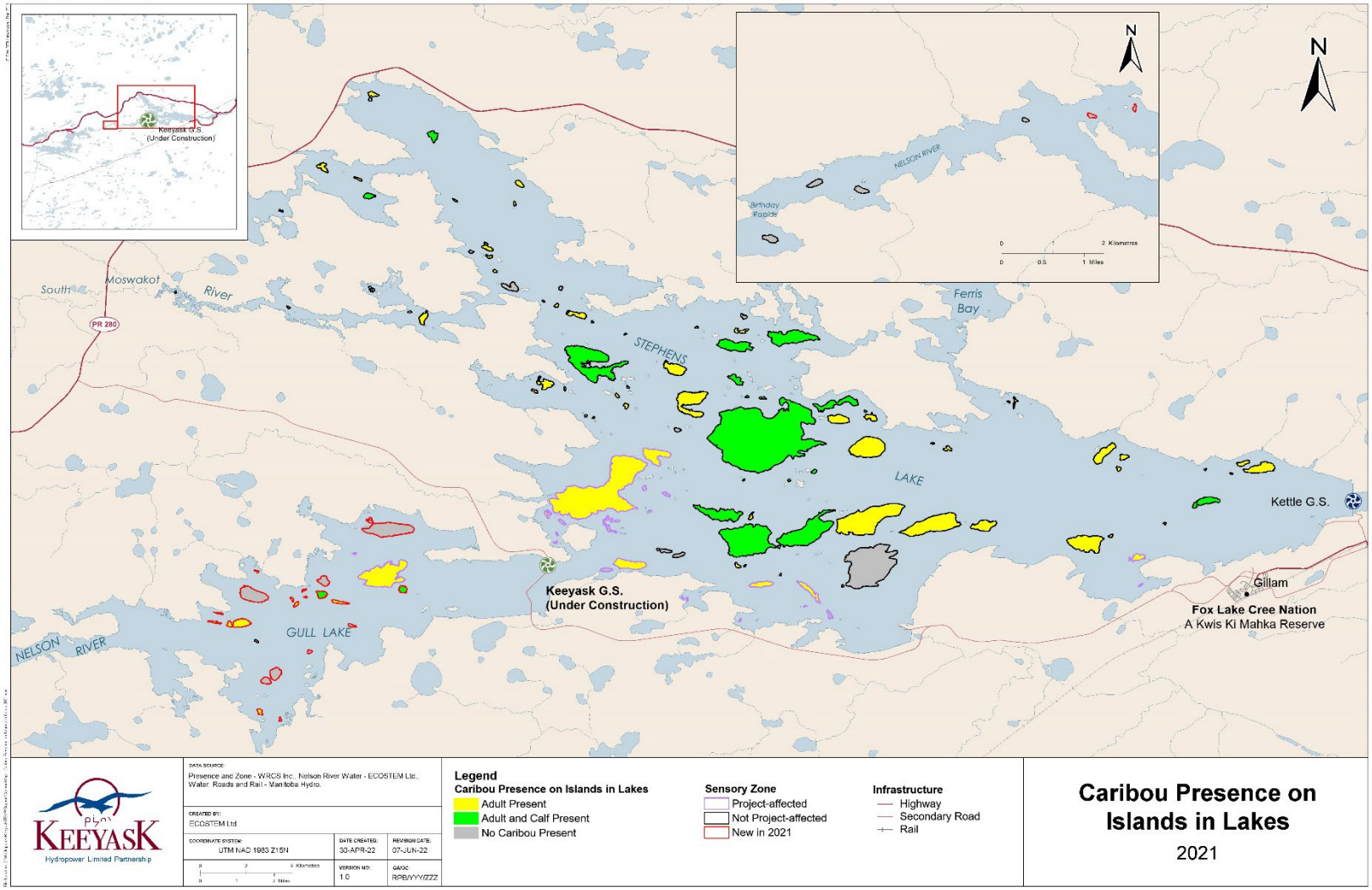
Project-affected islands in 2021 than in 2020. There was an 8% increase in the percentage of unaffected islands on which moose calves were detected over the same period.

Table 10: Percentage of Project-affected and Unaffected Islands in Lakes on Which Caribou and Moose Presence Was Detected during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

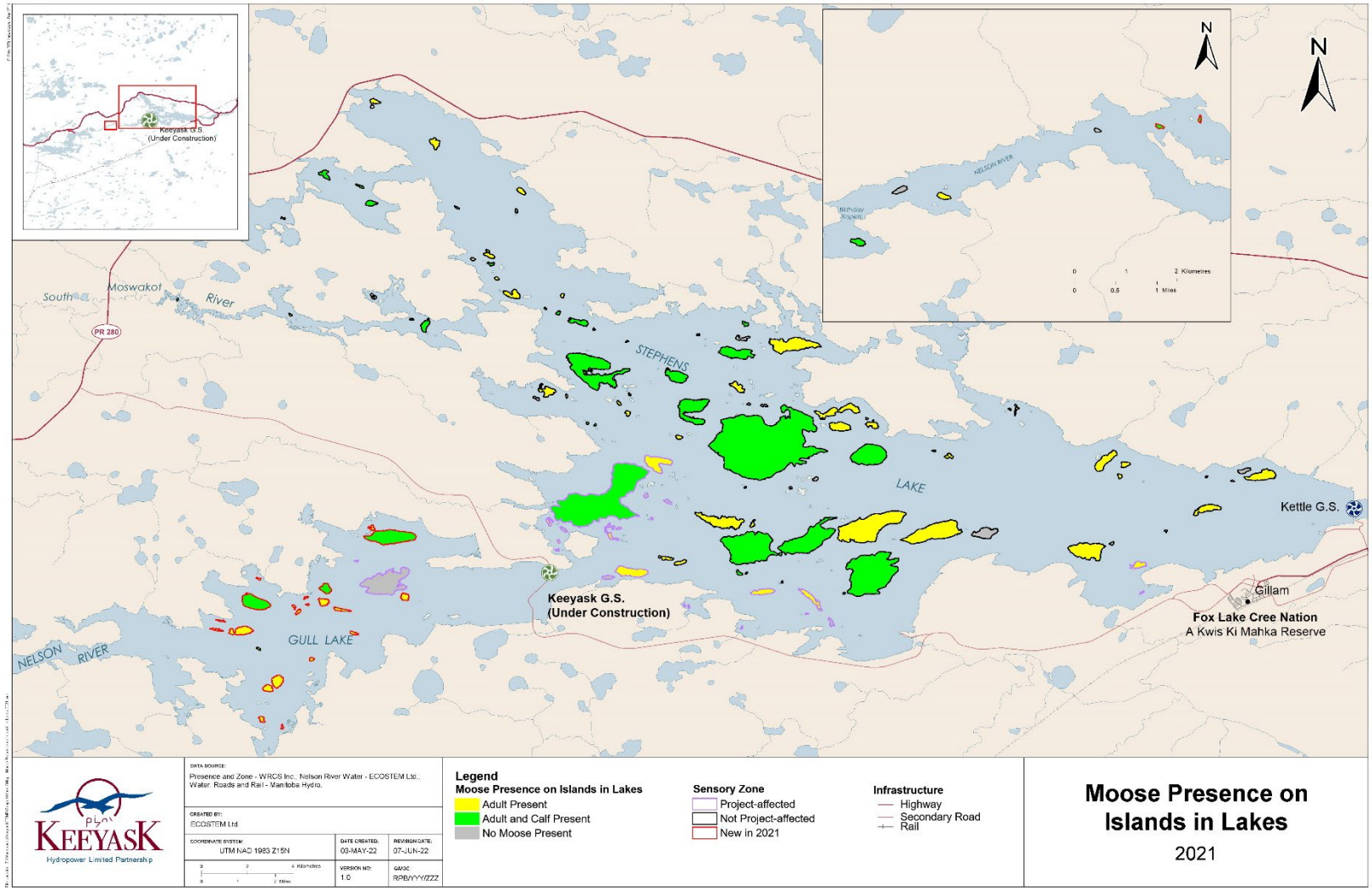
	Project-affected						Unaffected					
Species	2015	2017	2018	2020	2021	% Change 2020–2021	2015	2017	2018	2020	2021	% Change 2020–2021
Caribou	28	65	40	38	38	0	67	70	58	61	66	+8
Caribou calf	7	8	0	0	0	0	19	25	11	10	16	+60
Moose	79	77	76	46	38	-17	91	72	66	61	71	+16
Moose calf	31	39	20	21	4	-81	41	22	26	24	26	+8



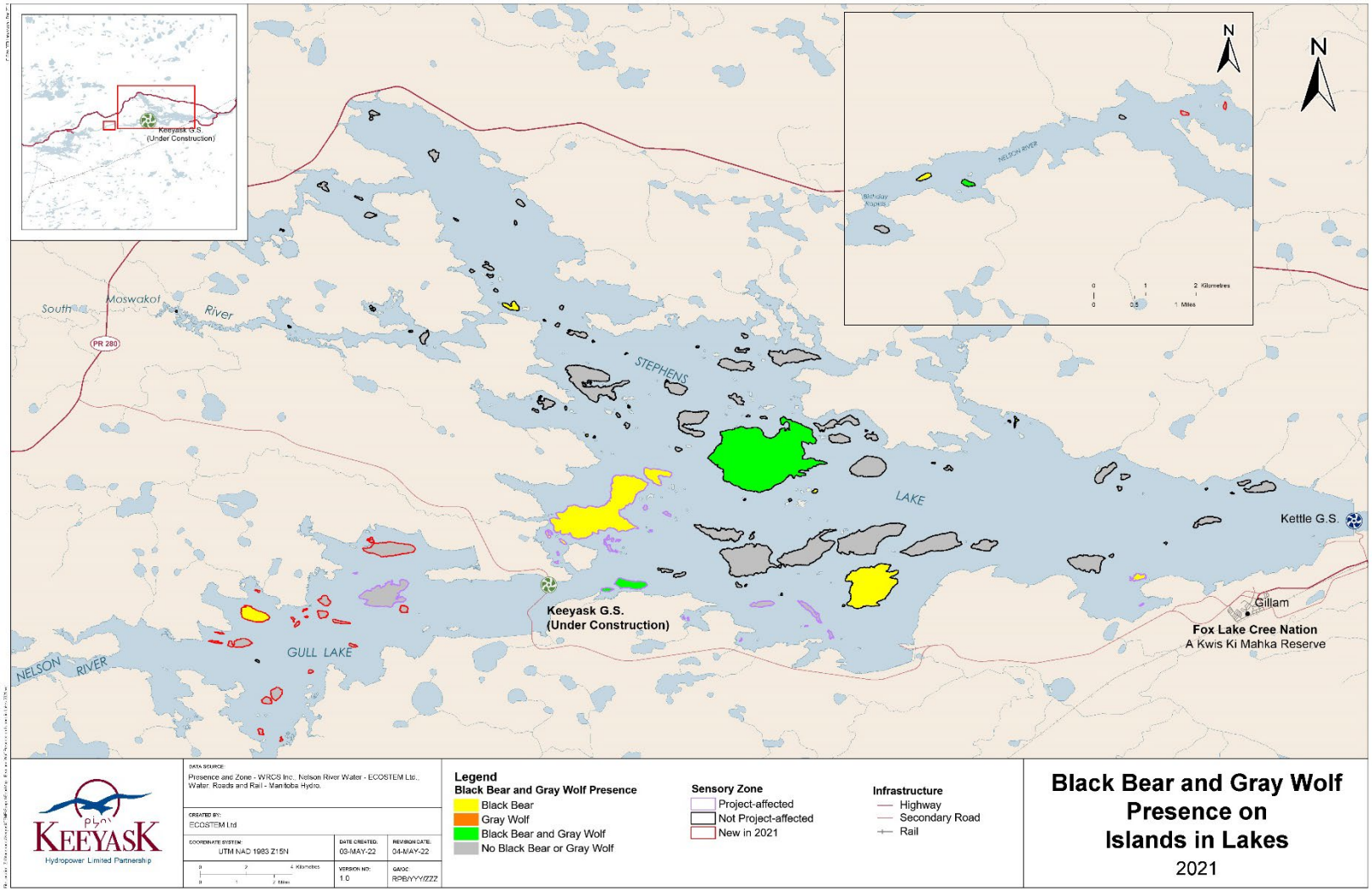
Map 5: Large Mammals Present on the Same Island in Lakes, 2021



Map 6: Caribou Presence on Islands in Lakes, 2021

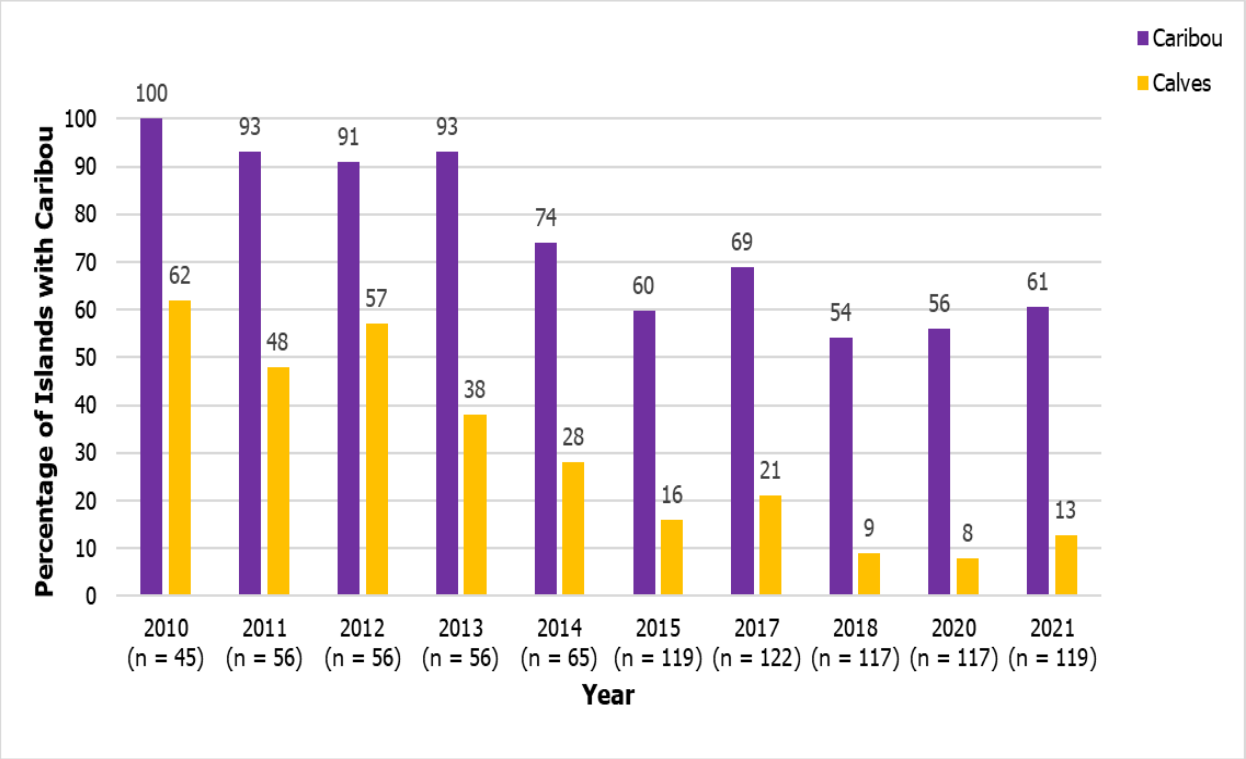


Map 7: Moose Presence on Islands in Lakes, 2021



Map 8: Black Bear and Gray Wolf Presence on Islands in Lakes, 2021

The percentage of islands in lakes on which caribou and calves were observed from combined trail camera and ground tracking data in July and September declined from the pre-construction (2010–2014) to construction (2015–2021) periods (Figure 1). Before construction, the percentage of surveyed islands in lakes on which they were detected decreased from 100% in 2010 to 74% in 2014 for caribou and from 62% in 2010 to 28% in 2014 for calves (KHLP 2012; WRCS unpubl. data). The declining trend continued during construction in 2015, when caribou were detected on 60% of islands and calves on 16% (WRCS 2016). The percentage of islands on which caribou and calf activity was observed increased to 69% for caribou and 21% for calves in 2017 (WRCS 2018b), then declined again in 2018 and 2019, to just over 50% for caribou and just under 10% for calves. While there was a small increase in the percentage of islands with caribou and calf activity in 2020 (to 56% and 8%, respectively) and 2021 (to 61% and 13%, respectively), there was an overall decrease from 2015.

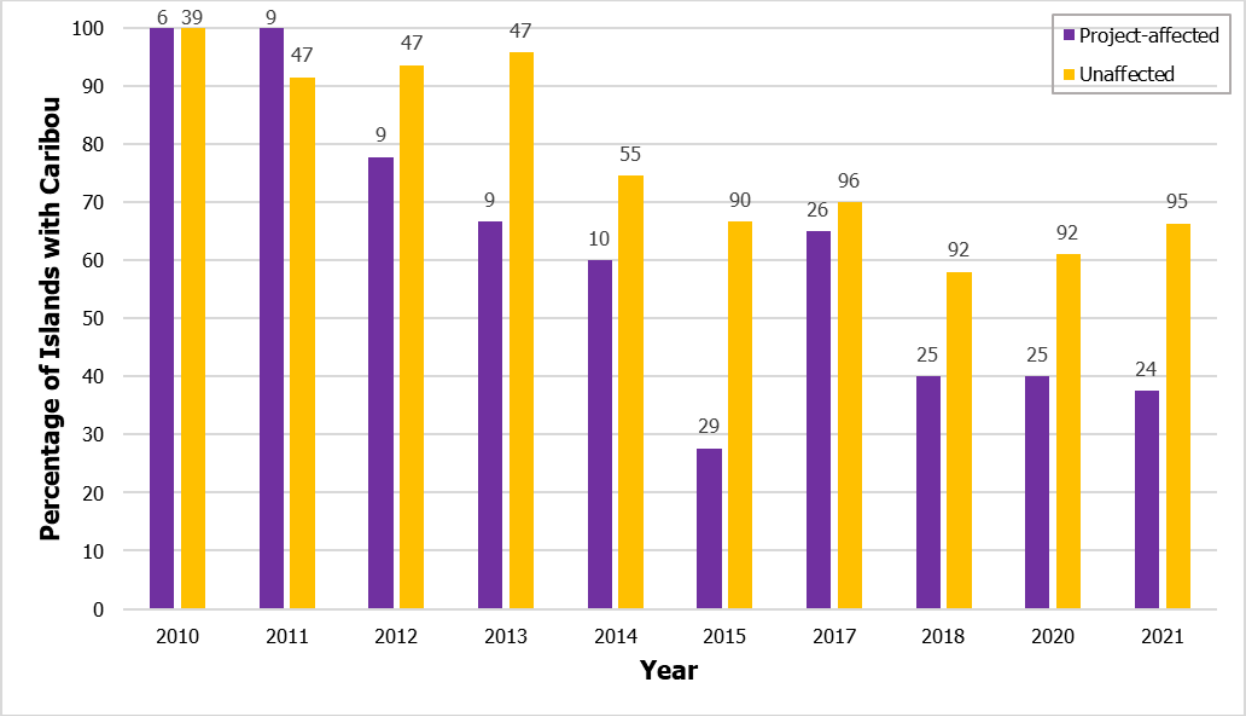


NOTE: "n" indicates the number of islands surveyed each study year.

Figure 1: Percentage of Islands in Lakes on Which Caribou Activity Was Observed from Combined Trail Camera and Tracking Transect Data, before (2010–2014) and during (2015–2021) Project Construction

During the 2010 to 2014 pre-construction period, six to 10 Project-affected and 39 to 55 unaffected islands were surveyed, most of which were also surveyed from 2015 to 2021. The percentage of Project-affected islands on which caribou activity was detected declined steadily before construction began, from 100% in 2010 and 2011 to 60% in 2014 (Figure 2). During construction, caribou activity continued to decline on Project-affected islands in 2015, increased

in 2017, declined in 2018, and then was similar in 2020 and 2021. On unaffected islands, caribou activity was similar to or greater than activity on Project-affected islands during the pre-construction and construction periods. A decline in caribou activity from the pre-construction to construction periods was also observed on unaffected islands but was less pronounced than the decline on Project-affected islands. Before construction, caribou activity was detected on 91 to 100% of unaffected islands from 2010 to 2013, and on a smaller percentage (75%) in 2014. During construction, caribou activity was observed on 58 to 70% of unaffected islands.



NOTE: Data labels indicate the number of Project-affected and unaffected islands surveyed each study year.

Figure 2: Percentage of Project-affected and Unaffected Islands on Which Caribou Activity Was Observed from Combined Trail Camera and Tracking Transect Data, before (2010–2014) and during (2015–2021) Project Construction

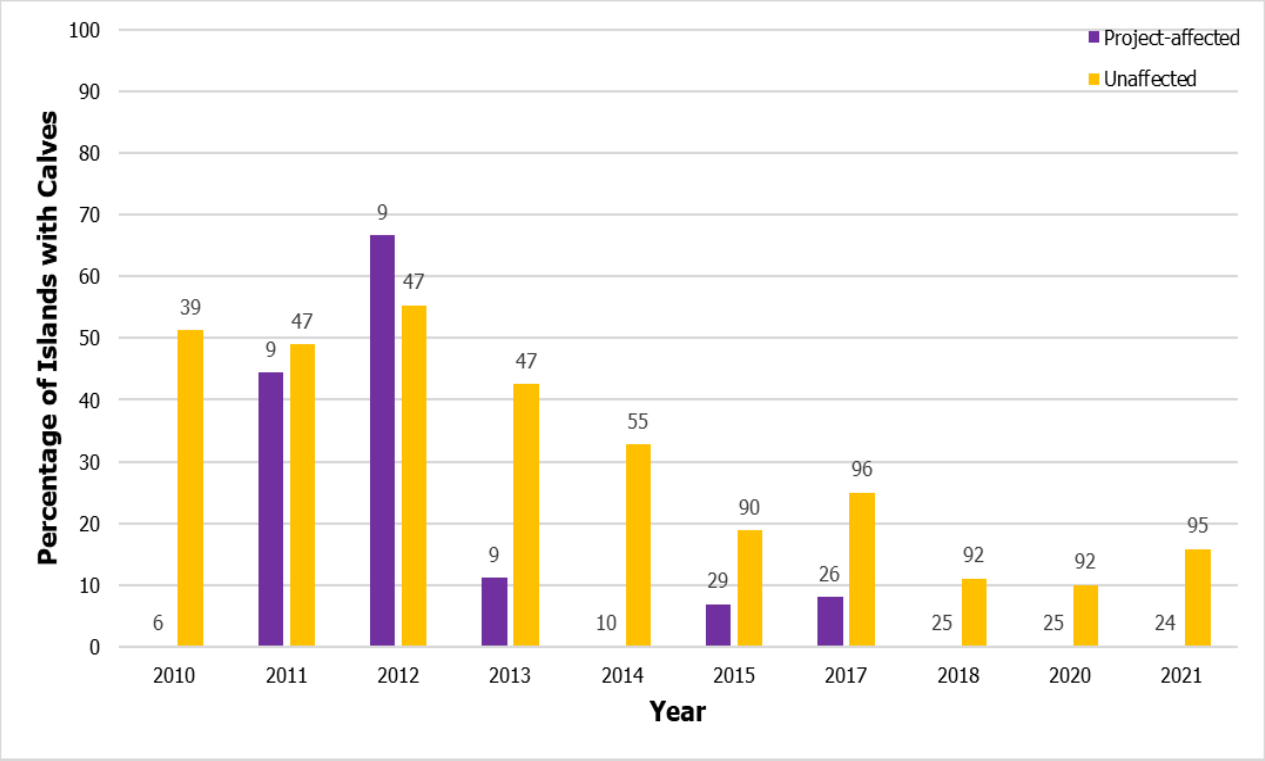
Caribou occupied an average of 79% of Project-affected islands before Project construction and 41% during construction, and an average of 90% of unaffected islands before Project construction and 65% during construction. A Fisher's exact test indicated that there was no significant difference in occupancy rates on Project-affected and unaffected islands before or during Project construction (p = 0.26). When occupancy was compared between Project-affected and unaffected islands each survey year, caribou occupied a significantly greater proportion of unaffected islands in 2013, before Project construction (z = 2.80, p = 0.01) and in 2015 (z = 3.70, p = <0.01), 2020 (z = 2.32, p = 0.02), and 2021 (z = 2.58, p = 0.01), during Project construction. There were no significant differences for other survey years (Table 11).

Table 11: Statistical Comparison of Caribou Occupancy on Project-affected and Unaffected Islands in Lakes before (2010–2014) and during (2015–2021) Project Construction

Year	Project-affected		Unaffected		Pooled Sample Proportion	*z*	*p*
	Proportion of Islands Occupied	Number of Islands Surveyed	Proportion of Islands Occupied	Number of Islands Surveyed			
2010	1.00	6	1.00	36	1.00	–	–
2011	1.00	9	0.91	47	0.93	0.91	0.36
2012	0.78	9	0.94	47	0.91	1.53	0.13
2013	0.67	9	0.96	47	0.91	2.80	0.01
2014	0.60	10	0.75	55	0.72	0.95	0.34
2015	0.28	29	0.67	90	0.57	3.70	<0.01
2017	0.65	26	0.70	96	0.69	0.43	0.67
2018	0.40	25	0.58	92	0.54	1.57	0.12
2020	0.36	25	0.62	92	0.56	2.32	0.02
2021	0.38	24	0.66	95	0.61	2.58	0.01

Caribou calves were detected on a greater percentage of unaffected than Project-affected islands in all years before and during construction except for 2012 (Figure 3). No calves were observed on Project-affected islands in 2010, 2014, 2018, 2020, or 2021. The percentage of Project-affected and unaffected islands on which calves were detected declined from the pre-construction to construction periods.

Caribou calves occupied an average of 26% of Project-affected islands before Project construction and 3% during construction, and an average of 46% of unaffected islands before Project construction and 16% during construction. A Fisher's exact test indicated that there was no significant difference in occupancy rates on Project-affected and unaffected islands before or during Project construction (p = 0.16). When occupancy was compared between Project-affected and unaffected islands each survey year, calves occupied a significantly greater proportion of unaffected islands in 2010 (z = 2.35, p = 0.02) and 2014 (z = 2.13, p = 0.03), before Project construction and in 2021 (z = 2.08, p = 0.04), during Project construction. There were no significant differences for other survey years (Table 12).



NOTE: Data labels indicate the number of Project-affected and unaffected islands surveyed each study year.

Figure 3: Percentage of Project-affected and Unaffected Islands on Which Caribou Calf Activity Was Observed from Combined Trail Camera and Tracking Transect Data, before (2010–2014) and during (2015–2021) Project Construction

Table 12: Statistical Comparison of Caribou Calf Occupancy on Project-affected and Unaffected Islands in Lakes before (2010–2014) and during (2015–2021) Project Construction

Year	Project-affected		Unaffected		Pooled Sample Proportion	*z*	*p*
	Proportion of Islands Occupied	Number of Islands Surveyed	Proportion of Islands Occupied	Number of Islands Surveyed			
2010	0	6	0.51	39	0.44	2.35	0.02
2011	0.44	9	0.49	47	0.48	0.25	0.80
2012	0.67	9	0.55	47	0.57	0.63	0.53
2013	0.11	9	0.43	47	0.38	1.78	0.07
2014	0	10	0.33	55	0.28	2.13	0.03
2015	0.07	29	0.19	90	0.16	1.53	0.13
2017	0.08	26	0.25	96	0.21	1.91	0.06
2018	0	25	0.11	92	0.09	1.72	0.08
2020	0	25	0.10	92	0.08	1.63	0.10
2021	0	24	0.16	95	0.13	2.08	0.04

All 34 primary calving islands were occupied by caribou during at least one year over the five-year survey period (Table 13). Thirty-one percent of the 74 secondary islands were unoccupied by caribou and 35% were occupied only one year. Fifty-six percent of primary calving islands and 86% of secondary islands were unoccupied by caribou calves over the survey period. Three percent of primary islands were occupied by calves over four and five years. No secondary islands were occupied for more than three years.

Table 13: Percentage of Primary and Secondary Calving Islands in Lakes Occupied by Caribou and Calves between Zero and Five Years during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

Number of Years Occupied	Caribou		Caribou Calves	
	Primary Islands	Secondary Islands	Primary Islands	Secondary Islands
0	0	31	56	86
1	15	35	21	8
2	41	12	12	3
3	18	11	6	3
4	12	9	3	0
5	15	1	3	0

3.1.2 PEATLAND COMPLEXES

Large mammal signs were found in 29 of the 31 peatland complexes in which ground tracking transects were surveyed (Appendix 1, Table A-8). Caribou signs were observed in 22 complexes (Table 14). Moose were somewhat more widely distributed. Gray wolf and black bear signs were observed in fewer complexes than either caribou or moose.

Table 14: Number of Peatland Complexes Occupied by Large Mammals from Tracking Transect Data, 2021

Species	Visit 1 (April 8–19)	Visit 2 (June 27–July 14)	Visit 3 (Sept. 10–20)	Visits 2 & 3	All Visits
Caribou	4	15	16	22	22
Caribou calf	0	2	0	2	2
Moose	9	23	23	29	29
Moose calf	0	7	4	11	11
Black bear	0	4	3	7	7
Gray wolf	1	1	2	2	3

Large mammals were photographed in 15 of the 31 peatland complexes in which trail cameras were placed. Caribou (Photo 5), moose (Photo 6) and black bears (Photo 7) were each photographed in five peatland complexes (Table 15). Gray wolves were photographed in two complexes (Photo 8). One moose calf and no caribou calves were photographed. No caribou

were photographed in the same complex as predators. A moose was photographed in one complex (KV047000) with a black bear, 19 days apart.

Table 15: Number of Peatland Complexes Occupied Monthly by Large Mammals from Trail Camera Data, 2021

Species	April	May	June	July	August	September	All
Caribou	2	2	1	1	0	1	5
Caribou calf	0	0	0	0	0	0	0
Moose	0	2	2	2	0	1	5
Moose calf	0	0	1	0	0	0	1
Black bear	0	1	3	1	0	0	5
Gray wolf	0	0	0	1	1	0	2

Trail cameras were placed in 30 to 34 peatland complexes from 2015 to 2021. Caribou were photographed in few Project-affected peatland complexes over the survey period (Table 16). They were photographed in 9 to 36% of reference complexes and 0 to 50% of random complexes from 2015 to 2021.

Table 16: Number and Percentage of Peatland Complexes in Which Caribou Were Photographed, 2015–2021

	Project-affected		Reference		Random	
Year	Number	Percentage	Number	Percentage	Number	Percentage
2015	1	17	1	9	2	33
2016	1	17	1	9	1	17
2017	1	17	1	9	0	0
2018	0	0	4	36	2	33
2019	0	0	1	9	3	50
2020	1	17	3	27	2	33
2021	0	0	2	18	2	33

No caribou calves were photographed in Project-affected peatland complexes from 2015 to 2021 (Table 17). They were photographed in a single reference complex in each of 2017 and 2018. Calves were photographed in a greater percentage of random complexes, ranging from 0 to 33%. No calves were photographed in any complex in 2019 and 2021.

Table 17: Number and Percentage of Peatland Complexes in Which Caribou Calves Were Photographed, 2015–2021

	Project-affected		Reference		Random	
Year	Number	Percentage	Number	Percentage	Number	Percentage
2015	0	0	0	0	1	17
2016	0	0	0	0	1	17
2017	0	0	1	9	0	0
2018	0	0	1	9	2	33
2019	0	0	0	0	0	0
2020	0	0	0	0	1	17
2021	0	0	0	0	0	0

Photo 5: Three Caribou in a Peatland Complex on May 1, 2021

Photo 6: Bull Moose in a Peatland Complex on May 11, 2021

Photo 7: Black Bear and Two Cubs in a Peatland Complex on June 3, 2021

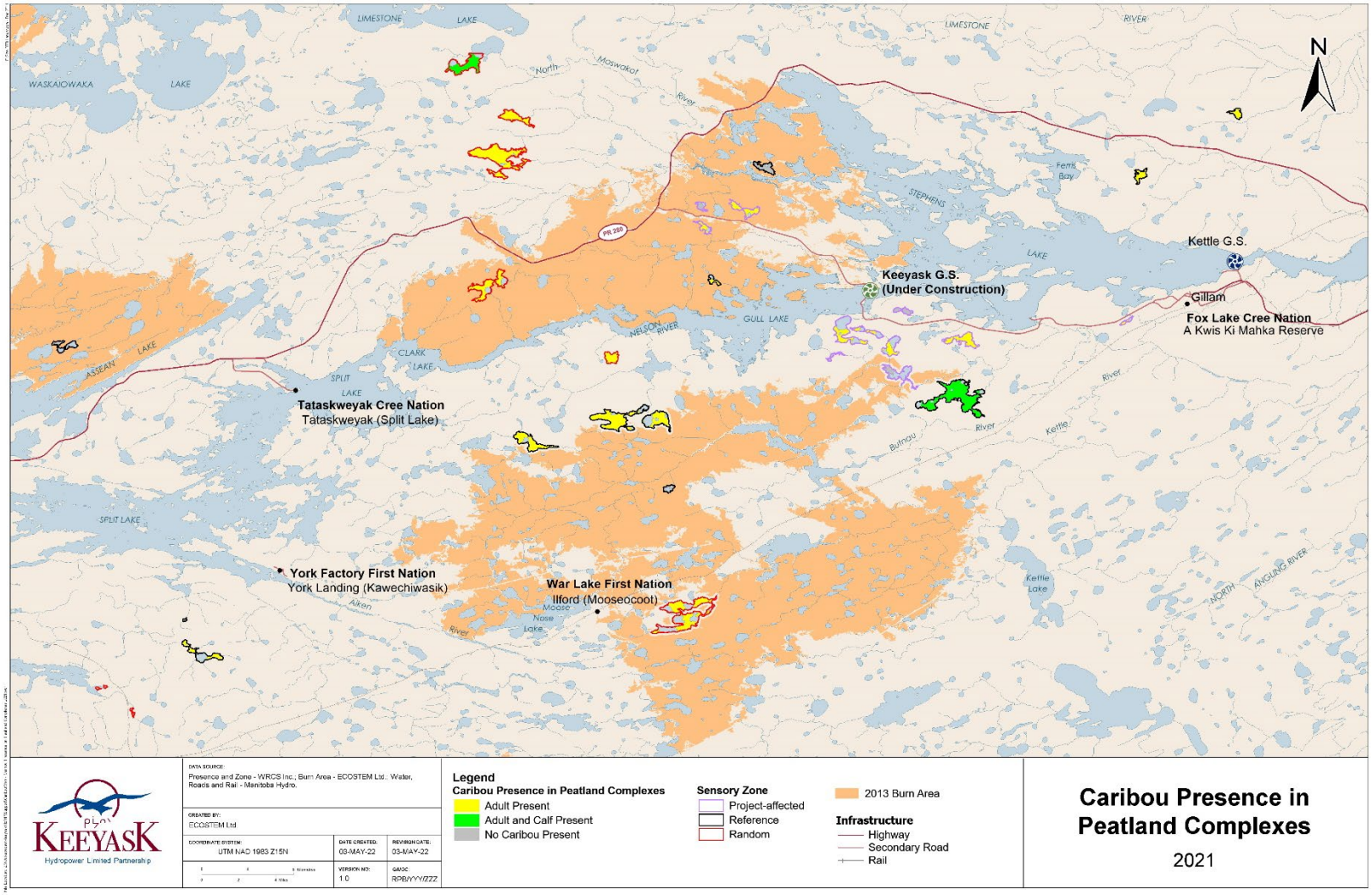
Photo 8: Gray Wolf in a Peatland Complex on August 4, 2021

Trail cameras were placed in six Project-affected, 11 reference, and six random peatland complexes every year from 2015 to 2021 (Appendix 1, Table A-9). Caribou were photographed in two (33%) Project-affected, five (45%) reference, and four (67%) random complexes at least one year over the survey period. No caribou were ever photographed in 12 complexes, four of which were Project-affected, six of which were reference, and two of which were random. There was no significant difference in the number of camera days caribou were recorded among Project-affected, reference, and random peatland complexes in any year except 2020 (H = 8.23, p = 0.02; Table 23), when the difference between Project-affected and reference complexes (W = 10.48, p = <0.01) and reference and random complexes (W = -10.48, p = <0.01) was significant. Caribou were not photographed consistently in any peatland complex from 2015 to 2021 (Appendix 1, Table A-10). They were photographed in one unburned random complex each year except 2017.

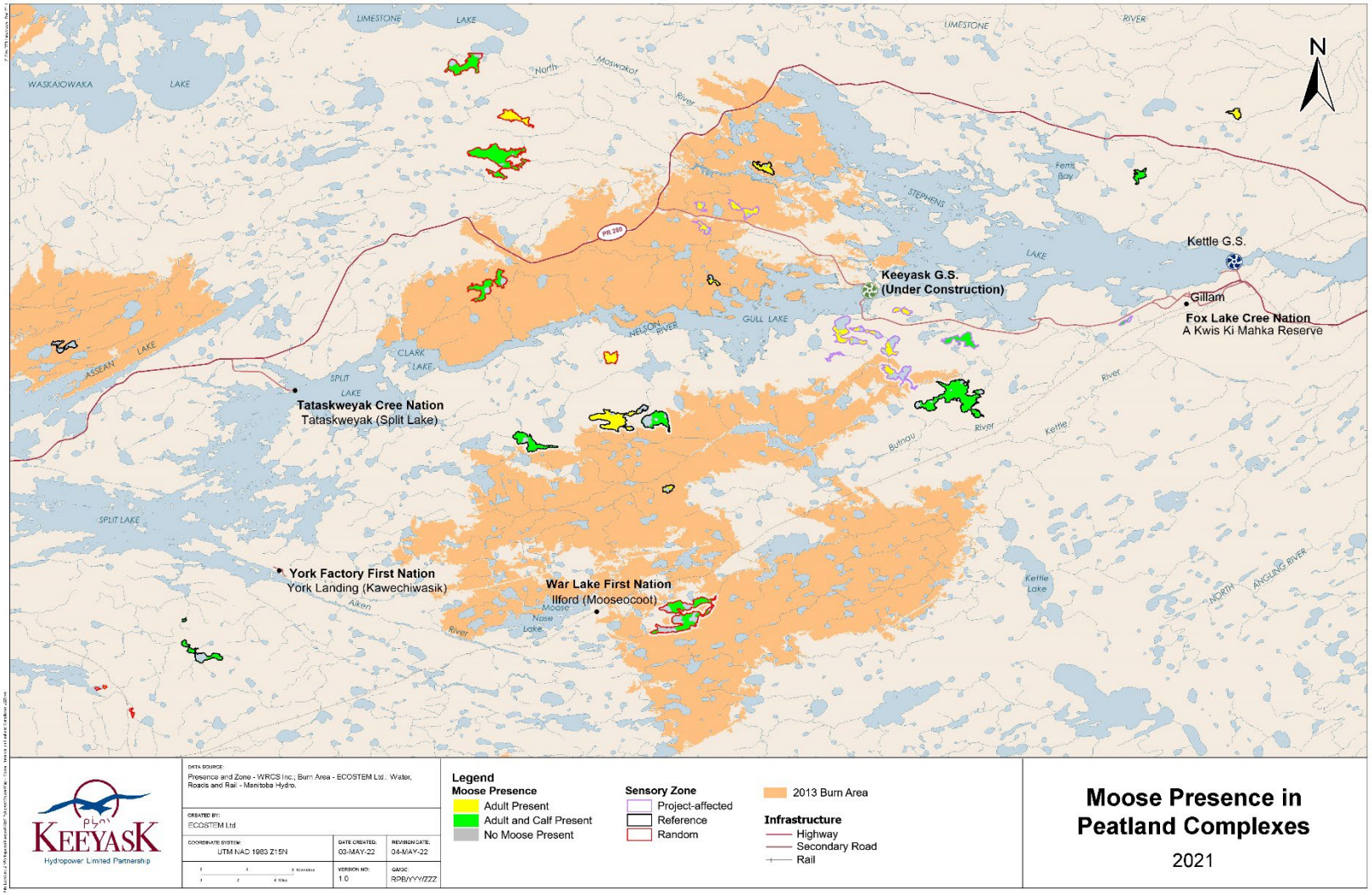
Table 18: Mean Percentage of Camera Days Caribou Were Photographed in Project-affected, Reference, and Random Peatland Complexes, 2015–2021

	Project-affected			Reference			Random				
Year	Mean	SD	Rank Sum	Mean	SD	Rank Sum	Mean	SD	Rank Sum	*H*	*p*
2015	0	0	60.0	0.90	1.47	156.0	0	0	60.0	5.00	0.08
2016	0.11	0.28	73.5	0.24	0.60	139.5	0	0	63.0	1.20	0.55
2017	0.11	0.28	77.0	0.13	0.42	133.0	0	0	66.0	0.93	0.63
2018	0.22	0.34	77.0	0.35	0.67	136.0	0.10	0.24	63.0	0.70	0.71
2019	0	0	60.0	0.82	1.42	146.0	0.30	0.73	70.0	2.12	0.35
2020	0	0	54.0	0.83	1.37	168.0	0	0	54.0	8.23	0.02
2021	0.11	0.27	70.0	0.41	0.72	146.0	0	0	60.0	2.12	0.35

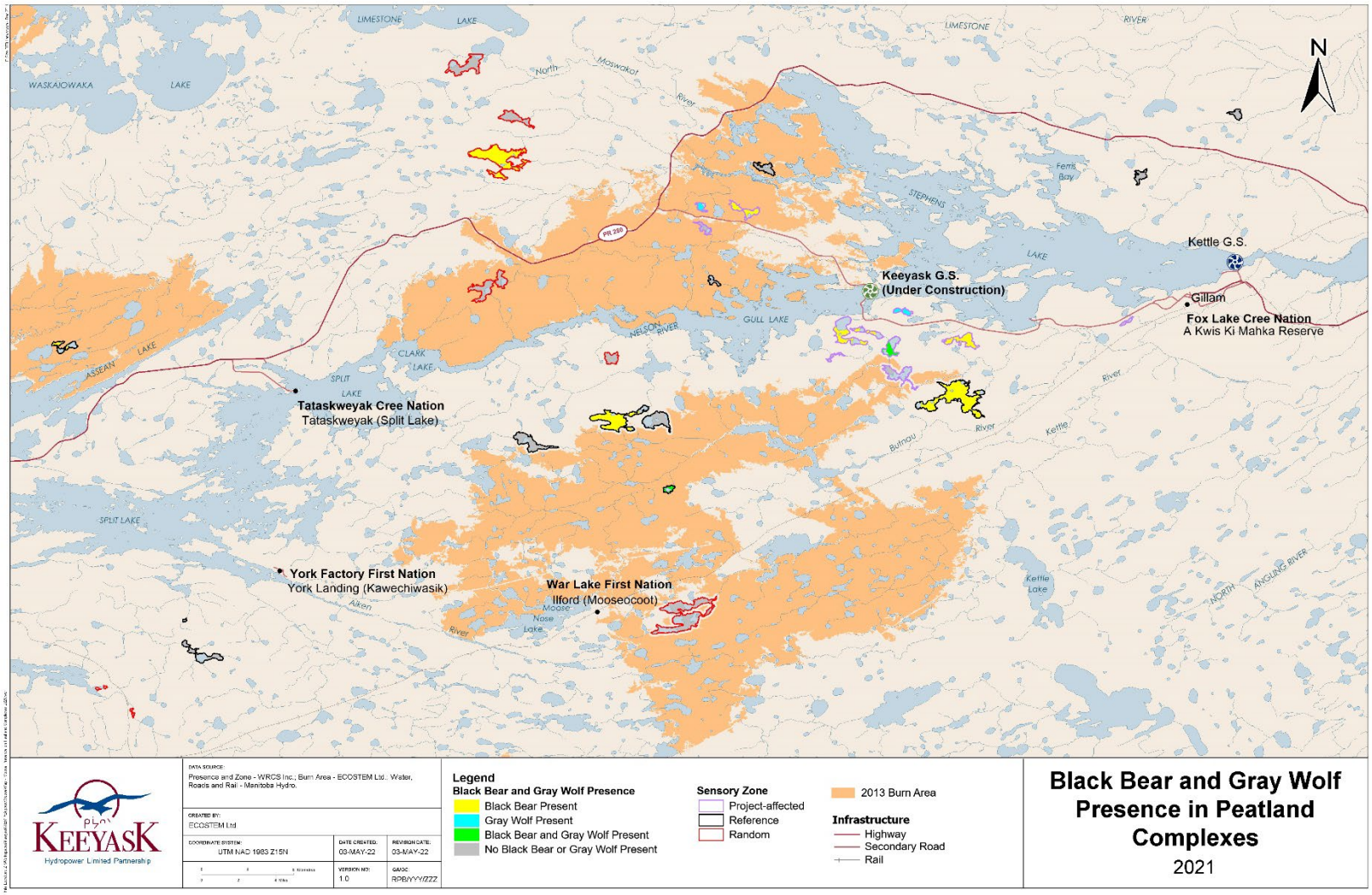
When results from tracking transect and trail camera surveys were combined, large mammal activity was detected in 30 of the 32 peatland complexes surveyed in 2021. Caribou activity was widely distributed in peatland complexes (Map 9). All 22 complexes occupied by caribou were also occupied by moose, which were detected in a total of 29 complexes (Map 10). Gray wolves and/or black bears (Map 11) were detected in eight of the complexes occupied by both caribou and moose and in three of the seven complexes occupied only by moose (Map 12). One complex was occupied by black bear only.



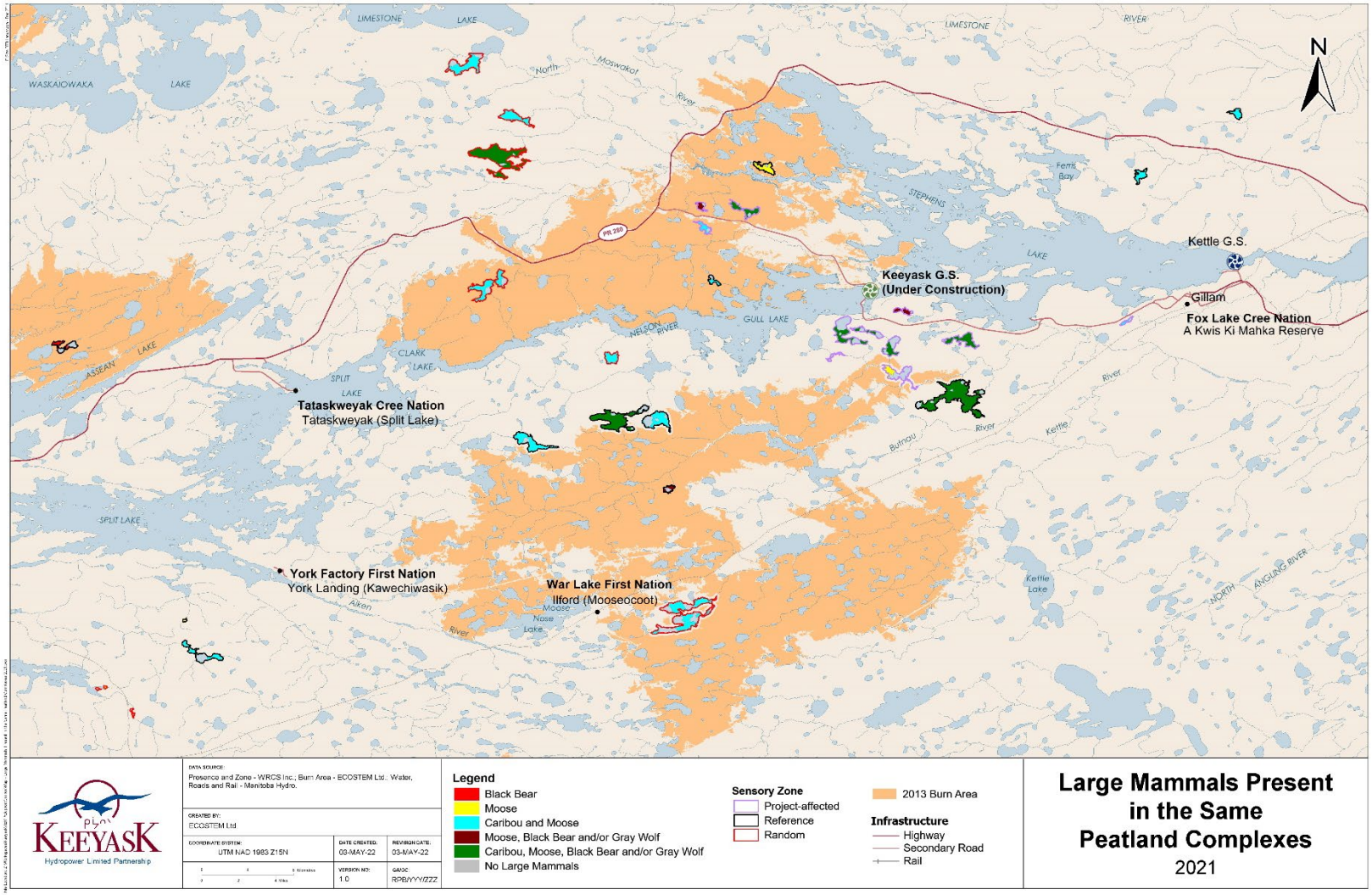
Map 9: Caribou Presence in Peatland Complexes, 2021



Map 10: Moose Presence in Peatland Complexes, 2021



Map 11: Black Bear and Gray Wolf Presence in Peatland Complexes, 2021



Map 12: Large Mammals Present in the Same Peatland Complexes, 2021

When tracking transect and trail camera data were combined, caribou were detected in the greatest percentage of random peatland complexes and the smallest percentage of Project-affected complexes in 2021 (Table 19). Caribou were detected in a greater percentage of unburned than burned reference and random complexes. Overall, there was a 57% difference in the total percentage of burned and unburned peatland complexes occupied by caribou, where they were detected in 45% and 81% of complexes, respectively. Caribou calves were detected in the largest percentage of random complexes and were not found in Project-affected complexes (Table 19). No signs of calf presence were found in burned complexes.

Table 19: Peatland Complexes Occupied by Caribou by Disturbance Source and Forest Fire Influence from Combined Tracking Transect and Trail Camera Data, 2021

Complex Type	Burned in 2013	Caribou		Caribou Calf	
		Number Occupied	Percentage Occupied	Number Occupied	Percentage Occupied
Project-affected	Yes	2	67	0	0
	No	5	63	0	0
	Total	7	64	0	0
Reference	Yes	1	25	0	0
	No	7	88	1	13
	Total	8	67	1	8
Random	Yes	2	50	0	0
	No	5	100	1	20
	Total	7	78	1	11
All		22	69	2	6

Moose were detected in similar percentages of Project-affected, reference, and random peatland complexes (Table 20). Overall, moose were detected in 82% of burned complexes and in 95% of unburned complexes, a difference of 15%. Moose calves were observed in the greatest percentage of reference complexes and in the smallest percentage of Project-affected complexes (Table 20).

Table 20: Peatland Complexes Occupied by Moose by Disturbance Source and Forest Fire Influence from Combined Tracking Transect and Trail Camera Data, 2021

Complex Type	Burned in 2013	Moose		Moose Calf	
		Number Occupied	Percentage Occupied	Number Occupied	Percentage Occupied
Project-affected	Yes	3	100	0	0
	No	7	88	2	25
	Total	10	91	2	18
Reference	Yes	3	75	0	0
	No	8	100	6	75
	Total	11	92	6	50
Random	Yes	3	75	1	25
	No	5	100	3	60
	Total	8	89	4	44
All		29	91	12	38

Black bears were detected the greatest percentage of Project-affected peatland complexes and in the smallest percentage of random complexes (Table 21). Overall, black bears were detected in 27% of burned complexes and in 33% of unburned complexes. Gray wolves were observed in the greatest percentage of Project-affected complexes and were not detected in random complexes (Table 21). Overall, gray wolves were detected in 18% of burned complexes and in 10% of unburned complexes.

Table 21: Peatland Complexes Occupied by Black Bear and Gray Wolf by Disturbance Source and Forest Fire Influence from Combined Tracking Transect and Trail Camera Data, 2021

Complex Type	Burned in 2013	Black Bear		Gray Wolf	
		Number Occupied	Percentage Occupied	Number Occupied	Percentage Occupied
Project-affected	Yes	1	33	1	33
	No	4	50	2	25
	Total	5	45	3	27
Reference	Yes	2	50	1	25
	No	2	25	0	0
	Total	4	33	1	8
Random	Yes	0	0	0	0
	No	1	20	0	0
	Total	1	11	0	0
All		10	31	4	13

Both tracking transect and trail camera surveys were conducted in 2015, 2017, 2018, 2020, and 2021 during Project construction. When tracking transect data from July and September and all trail camera data were combined each year, the percentage of burned Project-affected peatland complexes in which caribou were detected fluctuated over the survey period, ranging from 0% in

2018 to 100% in 2017 (Table 22). There was a general decline in the percentage of unburned Project-affected complexes in which caribou were detected from 2015 to 2020, followed by an increase in 2021. There was no change in caribou calf detection in burned Project-affected complexes from 2015 to 2021 because none were observed in any survey year. Calves were detected in 13% (n = 1) of unburned complexes in 2015, 2017, and 2020 and in none in 2018 or 2021. As moose were detected in all burned Project-affected complexes from 2015 to 2021, there was no change in their distribution. Moose detections in unburned complexes fluctuated between 75% and 100% over the survey period. The percentage of burned Project-affected complexes in which moose calves were observed ranged from 0 in 2021 to 100% in 2015 and 2020. The percentage of unburned complexes in which moose calves were detected increased from 2018 and 2020 to 2021.

Table 22: Percentage of Project-affected Peatland Complexes in Which Caribou and Moose Presence Was Detected during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

	Burned						Unburned					
Species	2015	2017	2018	2020	2021	% Change 2020–2021	2015	2017	2018	2020	2021	% Change 2020–2021
Caribou	33	100	0	33	67	+103	75	63	50	50	63	+26
Caribou calf	0	0	0	0	0	0	13	13	0	13	0	-100
Moose	100	100	100	100	100	0	100	88	75	100	88	-12
Moose calf	100	67	67	100	0	-100	38	63	13	13	25	+92

When tracking transect and trail camera data were combined, caribou were detected in 25% to 67% of burned reference peatland complexes over the survey period, with a decline of 50% from 2020 to 2021 (Table 23). The percentage of unburned reference complexes in which caribou were detected declined after 2017. No caribou calves were detected in burned complexes over the five-year survey period. There was no change in the percentage of unburned reference complexes in which caribou calves were detected from 2015 to 2020 and then a 66% decline was observed in 2021. The percentage of burned reference complexes in which moose were detected was between 75% and 100% over the survey period. Moose were observed in all unburned complexes each year except 2020. The percentage of burned reference complexes in which moose calves were observed declined over the survey period, from 75% in 2015 to 0 in 2021. Moose calves were detected in 200% more unburned reference complexes in 2021 than in 2020.

Table 23: Percentage of Reference Peatland Complexes in Which Caribou and Moose Presence Was Detected during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

	Burned						Unburned					
Species	2015	2017	2018	2020	2021	% Change 2020–2021	2015	2017	2018	2020	2021	% Change 2020–2021
Caribou	50	50	67	50	25	-50	100	100	88	75	88	+17
Caribou calf	0	0	0	0	0	0	38	38	38	38	13	-66
Moose	100	75	100	75	75	0	100	100	100	88	100	+14
Moose calf	75	50	33	25	0	-100	50	75	38	25	75	+200

When tracking transect and trail camera data were combined, the percentage of burned random peatland complexes in which caribou were detected fluctuated between 25% and 75% over the survey period (Table 24). Caribou were detected in all unburned random complexes each year but 2020. Caribou calves were only detected in burned random complexes in 2018. Moose were detected in all burned random complexes in 2015, 2017, and 2020, and in 75% in 2018 and 2021. The percentage of burned random peatland complexes in which moose calves were detected declined from 2017 to 2020, when none were observed. Moose calves were found in 25% of burned complexes in 2021. The percentage of unburned random complexes in which moose calves were detected fluctuated over the survey period and was greatest in 2015.

Table 24: Percentage of Random Peatland Complexes in Which Caribou and Moose Presence Was Detected during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

	Burned						Unburned					
Species	2015	2017	2018	2020	2021	% Change 2020–2021	2015	2017	2018	2020	2021	% Change 2020–2021
Caribou	75	25	75	25	50	+100	100	100	100	80	100	+25
Caribou calf	0	0	25	0	0	0	60	40	40	60	20	-67
Moose	100	100	75	100	75	-25	100	100	40	100	100	0
Moose calf	75	75	40	0	25	–	80	40	50	20	60	+200

There was no significant difference between caribou occupancy rates in Project-affected and reference peatland complexes in 2015, 2017, 2018, 2020, or 2021 (Table 25). There was no significant difference between caribou occupancy rates in Project-affected and random complexes in 2015, 2017, 2020, or 2021 (Table 26). In 2018, caribou occupied a significantly greater proportion of random complexes than Project-affected complexes ($z = 2.41$, $p = 0.02$).

Table 25: Statistical Comparison of Caribou Occupancy in Project-affected and Reference Peatland Complexes during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

Year	Project-affected		Reference		Pooled Sample Proportion	*z*	*p*
	Proportion of Complexes Occupied	Number of Complexes Surveyed	Proportion of Complexes Occupied	Number of Complexes Surveyed			
2015	0.64	11	0.83	12	0.74	1.04	0.30
2017	0.73	11	0.83	12	0.78	0.58	0.56
2018	0.36	11	0.75	12	0.56	1.88	0.06
2020	0.45	11	0.67	12	0.56	1.06	0.29
2021	0.64	11	0.67	12	0.66	0.15	0.88

Table 26: Statistical Comparison of Caribou Occupancy in Project-affected and Random Peatland Complexes during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

Year	Project-affected		Random		Pooled Sample Proportion	*z*	*p*
	Proportion of Complexes Occupied	Number of Complexes Surveyed	Proportion of Complexes Occupied	Number of Complexes Surveyed			
2015	0.64	11	0.89	9	0.75	1.29	0.20
2017	0.73	11	0.67	9	0.70	0.29	0.77
2018	0.36	11	0.89	9	0.60	2.41	0.02
2020	0.45	11	0.56	9	0.50	0.49	0.62
2021	0.64	11	0.78	9	0.70	0.68	0.50

There was no significant difference in caribou calf occupancy rates in Project-affected and reference peatland complexes in 2015, 2017, 2018, 2020, or 2021 (Table 27). There was no significant difference in calf occupancy rates in Project-affected and random complexes in 2015, 2017, 2020, or 2021 (Table 28). In 2018, caribou calves occupied a significantly greater proportion of random complexes than Project-affected complexes ($z = 2.06$, $p = 0.04$).

Table 27: Statistical Comparison of Caribou Calf Occupancy in Project-affected and Reference Peatland Complexes during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

Year	Project-affected		Reference		Pooled Sample Proportion	*z*	*p*
	Proportion of Complexes Occupied	Number of Complexes Surveyed	Proportion of Complexes Occupied	Number of Complexes Surveyed			
2015	0.09	11	0.25	12	0.17	1.01	0.31
2017	0.09	11	0.25	12	0.17	1.01	0.31
2018	0	11	0.25	12	0.13	1.78	0.08
2020	0.09	11	0.25	12	0.17	1.01	0.31
2021	0	11	0.08	12	0.04	0.96	0.34

Table 28: Statistical Comparison of Caribou Calf Occupancy in Project-affected and Random Peatland Complexes during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

Year	Project-affected		Random		Pooled Sample Proportion	*z*	*p*
	Proportion of Complexes Occupied	Number of Complexes Surveyed	Proportion of Complexes Occupied	Number of Complexes Surveyed			
2015	0.09	11	0.33	9	0.20	1.34	0.18
2017	0.09	11	0.22	9	0.16	0.79	0.43
2018	0	11	0.33	9	0.15	2.06	0.04
2020	0.09	11	0.33	9	0.20	1.34	0.18
2021	0	11	0.11	9	0.05	1.13	0.26

All five of the primary caribou calving complexes were occupied by caribou for between two and four years over the five-year survey period (Table 29). The 13 secondary complexes were occupied for between one and four years. None of the eight non-habitat complexes were occupied by caribou for more than two years and half were unoccupied. Twenty percent of primary complexes were unoccupied by caribou calves and 80% were occupied for one or two years. Most secondary complexes (62%) and all non-habitat complexes were unoccupied by calves.

Table 29: Percentage of Primary and Secondary Peatland Complexes Occupied by Caribou and Calves between Zero and Five Years during Ground Tracking and/or Trail Camera Surveys, 2015, 2017, 2018, 2020, and 2021

Number of Years Occupied	Caribou			Caribou Calves		
	Primary Complexes	Secondary Complexes	Non-habitat	Primary Complexes	Secondary Complexes	Non-Habitat
0	0	0	50	20	62	100
1	0	23	13	40	31	0
2	60	38	38	40	8	0
3	20	23	0	0	0	0
4	20	15	0	0	0	0
5	0	0	0	0	0	0

3.1.3 ACCESS ROAD TRANSECTS

Caribou signs were observed on 14 of the 18 access road transects surveyed in 2021 (Table 30; Appendix 1, Table A-11). Caribou calf signs were observed on four transects. Moose signs were detected on all access road transects and moose calf signs were observed on 10 transects. Predator signs were observed on fewer transects than caribou and moose signs.

Table 30: Number of Access Road Tracking Transects on Which Large Mammals Were Detected, 2021

Species	Visit 1 (April 12–20)	Visit 2 (July 1–12)	Visit 3 (Sep. 10–20)	Visits 2 & 3	All Visits
Caribou	4	12	6	14	14
Caribou calf	0	3	1	4	4
Moose	15	18	18	18	18
Moose calf	0	8	5	10	10
Black bear	2	6	7	11	11
Gray wolf	3	4	1	5	8

The density of caribou signs was greatest during the second visit to access road transects in 2021 (Table 31). Moose sign density was considerably greater than that of all other large mammal species over all visits and was greater during the second and third visits than during the first. Caribou calf, moose calf, black bear, and gray wolf signs were sparse during all visits.

Table 31: Mammal Sign Density along Access Road Transects, 2021

Species	Visit 1		Visit 2		Visit 3		Visits 2 and 3	
	Number of Signs	Signs per km	Number of Signs	Signs per km	Number of Signs	Signs per km	Number of Signs	Signs per km
Caribou	6	0.03	50	0.25	33	0.17	83	0.21
Caribou calf	0	0	5	0.03	1	0.01	6	0.02
Moose	139	0.70	501	2.54	540	2.73	1,041	2.63
Moose calf	0	0	21	0.11	8	0.04	29	0.07
Black bear	3	0.02	7	0.04	18	0.09	25	0.06
Gray wolf	6	0.03	5	0.03	1	0.01	6	0.02

During the combined second and third visits, the density of caribou signs was greater further than 2 km from the access roads than within 2 km in 2021 (Table 32). The density of caribou calf signs was low during all visits. The density of moose and moose calf signs was greater within 2 km of the access roads than further away, with a bigger difference for adult moose.

Table 32: Mammal Sign Density Within 2 km of and More Than 2 km from the North and South Access Roads[1], 2021

Species	Visit 1 (signs per km)		Visit 2 (signs per km)		Visit 3 (signs per km)		Visits 2 and 3 (signs per km)	
	≤ 2 km	> 2 km	≤ 2 km	> 2 km	≤ 2 km	> 2 km	≤ 2 km	> 2 km
Caribou	0.01	0.04	0.28	0.24	0.10	0.19	0.19	0.21
Caribou calf	0	0	0.03	0.02	0	0	0.01	0.01
Moose	1.19	0.42	3.13	2.20	2.93	2.43	3.03	2.31
Moose calf	0	0	0.19	0.06	0.06	0.03	0.13	0.04
Black bear	0.03	0.01	0.06	0.02	0.19	0.02	0.13	0.02
Gray wolf	0.07	0.01	0.04	0.02	0.01	0	0.02	0.01

1. Where distance was determined.

Tracking transect surveys were conducted in 2015, 2017, 2018, 2020, and 2021 during Project construction. The density of caribou signs during the combined second and third visits to tracking transects was greater within 2 km of the access roads than farther away in 2015 and 2017, but the difference was not significant (Table 33). Sign density was greater farther from the access roads in 2018, 2020, and 2021, but the difference was not significant.

Table 33: Density of Caribou Signs Within 2 km of and More Than 2 km from the North and South Access Roads, 2015, 2017, 2018, 2020, and 2021

	≤ 2 km			> 2 km				
Year	**Mean**	**SD**	**Rank Sum**	**Mean**	**SD**	**Rank Sum**	***U***	***p***
2015	1.67	1.97	342.0	1.13	1.20	324.0	171.00	0.78
2017	2.38	3.47	302.0	1.83	1.73	364.0	131.00	0.33
2018	0.17	0.28	289.5	0.36	0.45	376.5	118.50	0.14
2020	0.29	0.76	302.5	0.42	0.60	363.5	131.50	0.29
2021	0.38	0.52	347.0	0.49	1.03	319.0	176.00	0.64

3.1.4 INCIDENTAL OBSERVATIONS

In 2021, mammal and bird species incidentally detected on islands, in peatland complexes, and along access road transects during ground tracking and trail camera surveys included: American beaver, American crow, American marten, American robin, bald eagle, Canada goose, Canada jay, Canada lynx, common raven, mallard, northern flicker, North American river otter, red fox, red squirrel, sandhill crane, snowshoe hare, spruce grouse, sharp-tailed grouse, and wolverine.

3.2 TIMING OF ICE BREAKUP

Four cameras were placed at Stephens Lake and four cameras were placed at Gull Lake to monitor the timing of ice breakup in 2021. On Stephens Lake, the percentage of ice cover remained consistent from installation in mid-April until mid- to late May and then decreased rapidly (Table 34). Ice breakup was on June 6 and Stephens Lake was free of ice by June 12 (Photo 9 to Photo 13). Ice breakup was May 28 on Gull Lake, with no ice remaining on May 30.

In previous survey years ice breakup on Stephens Lake was observed by June 2, 2015; May 20, 2016; June 2, 2017; May 27, 2018; May 23, 2019; and May 26, 2020. Stephens Lake was free of ice by June 3, 2015; May 22, 2016; June 3, 2017; June 4, 2018; May 25, 2019; and June 1, 2020 (Table 35).

Table 34: Timing of Ice Breakup on Stephens and Gull Lakes, 2021

Percent Ice Cover	Stephens Lake Cameras				Gull Lake Cameras			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
100	April 15	April 12	April 14	April 17	April 19	April 20	April 19	April 20
75	May 30	May 29	May 24	May 16	May 12	May 23	May 11	May 10
50	June 3	May 30	May 26	May 30	May 15	May 27	May 22	May 14
25	June 6	June 3	May 27	May 31	May 20	May 28	May 24	May 22
0	June 12	June 6	May 31	June 2	May 30	May 29	May 30	May 29

Table 35: Timing of Ice Breakup on Stephens Lake, 2015–2020

Percent Ice Cover	2015	2016	2017	2018	2019	2020
100	May 9–12	April 27–29	April 11–16	April 7–11	April 6–7	March 25–28
75	May 20–27	May 8–17	May 20–31	May 20–24	April 20–28	April 29–30
50	May 23–June 1	May 10–19	May 27–June 1	May 22–24	May 18–20	May 20–26
25	May 25–June 2	May 14–20	May 27–June 2	May 23–27	May 19–23	May 25–26
0	May 26–June 3	May 18–22	May 28–June 3	May 28–June 4	May 21–25	May 28–June 1

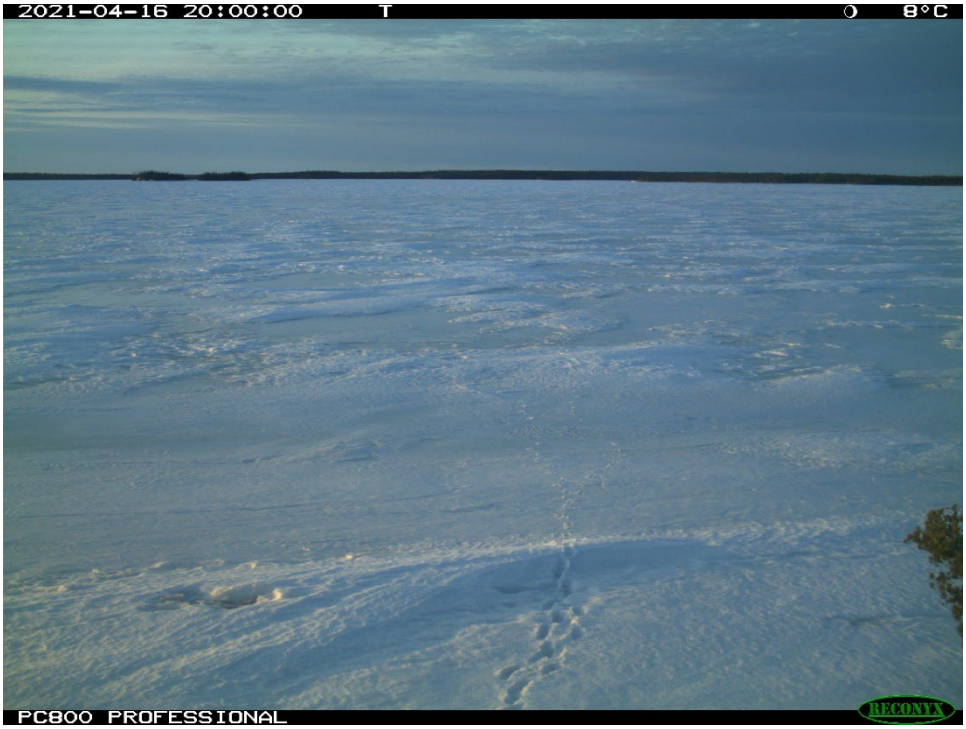


Photo 9: Ice Cover at 100% on Stephens Lake on April 16, 2021

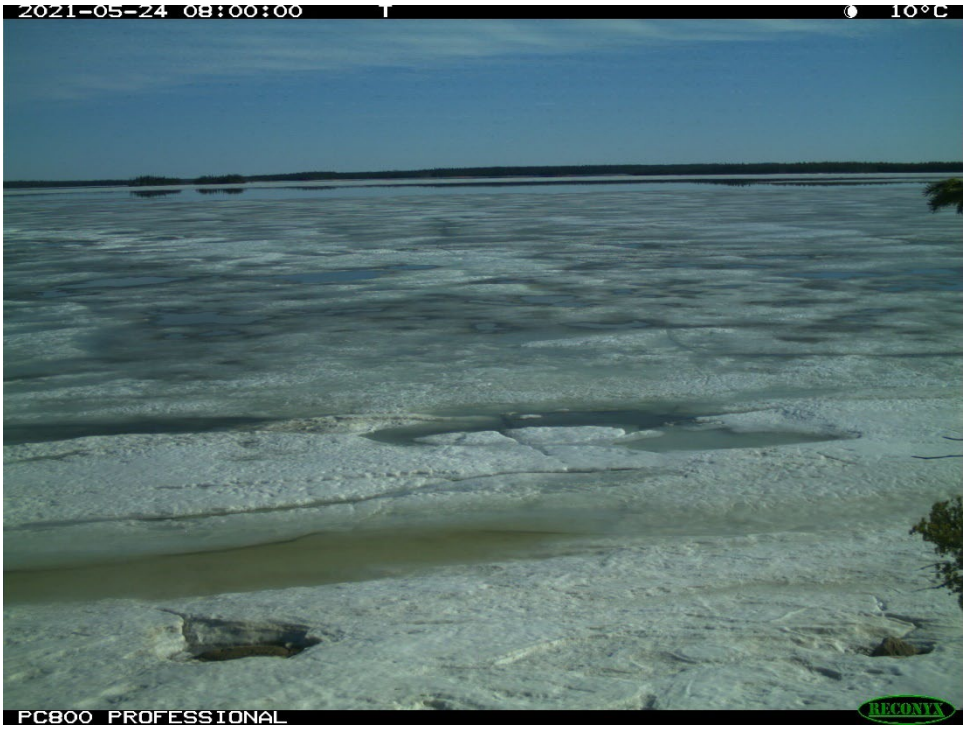


Photo 10: Ice Cover at 75% on Stephens Lake on May 24, 2021

Photo 11: Ice Cover at 50% on Stephens Lake on May 26, 2021

Photo 12: Ice Cover at 25% on Stephens Lake on May 27, 2021

Photo 13: Ice Cover at 0% on Stephens Lake on May 31, 2021

3.3 MORTALITY

No accidental caribou mortality was reported during Project construction. A moose mortality was reported in June 2019; its cause was unknown. A black bear-vehicle collision was reported in August 2018. A black bear was relocated by Manitoba Conservation and Climate (now Manitoba Natural Resources and Northern Development) in each year of 2018/19, 2019/20, and 2020/21. A gray wolf that was injured and had become habituated to humans was dispatched by the local Conservation Officer in March 2015.

Resource use by the workforce was monitored during Project construction. A portion of workers (7 to 23%) completed surveys over a five-year period (Assuah and Eaton 2020). In the 2019 study year (November 2018 to October 2019), workers reported harvesting seven caribou; six were harvested by Keeyask Cree Nations (KCNs or partner First Nations) participants and one by a non-Indigenous respondent. The demand for caribou licenses in the area remained high and was unchanged over the construction period. An increase in hunting pressure from licensed and rights-based resource users was observed around the South Access Road. A total of 19 caribou were harvested in the previous four survey years, 18 by local Indigenous resource users and one by a non-Indigenous respondent. In all, 27 caribou were harvested, compared to none in 2014, five in 2015, one in 2016, 13 in 2018, and eight in 2019 (no survey was conducted in 2017; Assuah and Eaton 2020).

In the 2019 resource use monitoring study year (November 2018 to October 2019), workers reported harvesting seven moose; all were harvested by partner First Nations participants. There was no change in demand for moose licences locally or in Manitoba over the construction period, but there was a small increase in hunting by licensed non-resident hunters in the region. An increase in hunting pressure from licensed and rights-based resource users was observed around the South Access Road. A total of 19 moose were harvested in the previous four survey years, 14 by local Indigenous resource users. Non-local Indigenous and Métis participants harvested three moose and non-Indigenous respondents harvested two. In all, 26 moose were harvested, three in 2014, four in 2015, two in 2016, 10 in 2018, and seven in 2019 (no survey was conducted in 2017; Assuah and Eaton 2020).

4.0 DISCUSSION

As predicted in the EIS, several Project-affected islands were unoccupied by caribou in 2021. Of the 72 islands in lakes (not including those formed by reservoir impoundment) occupied by caribou, only nine (13%) were Project-affected. As in 2018 and 2020, no signs of caribou calves were observed on Project-affected islands during ground tracking transect or trail camera surveys. The apparent absence of caribou activity on most Project-affected islands could indicate that caribou were generally avoiding construction-related sensory disturbance. However, there was adult caribou activity on several Project-affected islands, and a cow and calf were observed on Caribou Island during pre-impoundment monitoring surveys (WRCS 2021). As caribou can habituate to human disturbance, some individuals may be less affected by ongoing construction activity than others (Haskell et al. 2006), or the extent of the disturbance effect (i.e., 4 km from the Project construction site) may be less than predicted in the EIS. It should be noted that these field studies can document animals' presence in an area but cannot confirm their absence; as such, it cannot be known for certain that there were no caribou on some of the surveyed islands.

Caribou occupied fewer Project-affected islands in lakes during construction than during the pre-construction period, as predicted in the EIS. However, the difference in occupancy rates on Project-affected and unaffected islands before and during Project construction was not statistically significant, suggesting that the effect was small. The amount of caribou activity as estimated by the percentage of camera days caribou were photographed on islands surveyed every year during Project construction was generally not significantly different on Project-affected and unaffected islands. The exception was in 2018, when no caribou were photographed on Project-affected islands (caribou signs were observed on 40% of these islands that year, however).

As predicted in the EIS, caribou and caribou calves occupied primary calving islands in lakes (islands more than 10 ha in size) more often than secondary calving islands (0.5 to 10 ha in size). All primary calving islands were occupied by caribou for at least one of five survey years, and 15% were occupied every year. When the EIS predictions were made, there was tree cover on all islands larger than 0.5 ha, and habitat was not a factor in the designation of primary and secondary calving habitat. However, some islands were burned in a 2013 forest fire and may no longer be suitable for calving and calf-rearing.

The specific timing of caribou calving in the area is uncertain but likely occurs from May 1 to June 30, based on data collected on calving caribou in Stephens Lake from 2010 to 2014 and from studies on boreal woodland caribou at roughly the same latitude (Rettie and Messier 2001; Ferguson and Elkie 2004). Caribou cows may avoid islands if there is ice on the lakes during the early calving period. In 2021, ice breakup on Gull and Stephens lakes was in late May/early June, in the middle of the general calving period and two to three weeks earlier than the first caribou calf was photographed (June 20).

Moose were slightly more widely distributed than caribou on islands in lakes in 2021. Most (82%) of the islands occupied by caribou were also occupied by moose. Predators were more likely to occupy islands on which only moose were found than those on which only caribou were found.

The EIS anticipated a 65% increase in the area of islands in lakes between 0.5 and 10 ha after reservoir impoundment, some of which was expected to be suitable for calving caribou and moose. It was not expected that caribou and moose would occupy the new islands in the reservoir so quickly and use them to calve only one year after impoundment. Earlier than expected occupancy of primary and secondary calving habitat for caribou and moose in the reservoir could enhance the increase of caribou and moose numbers in the region more quickly than expected during operations.

Caribou occupied the smallest percentage of Project-affected peatland complexes in 2021. There was no calf activity in Project-affected complexes, possibly indicating avoidance of construction-related sensory disturbances by calving females. Caribou occupied 57% more unburned than burned complexes. Caribou tend to avoid forest that is less than 50 years old (Schaefer and Pruitt 1991) but may pass through regenerating forest to get from one patch of more suitable habitat to another. The percentage of Project-affected and random peatland complexes in which caribou activity was observed increased from 2020 to 2021. A small decrease in caribou activity was observed in reference complexes over the same period. Except for burned reference peatland complexes, the percentage of each type of complex occupied by caribou in 2021 was within the range of previous survey years, suggesting that there was relatively little change during Project construction. The occupancy rate of caribou in Project-affected peatland complexes was lower than in reference complexes each survey year, but the differences were not statistically significant. Caribou generally occupied a smaller percentage of Project-affected than random complexes over the survey period, except for 2017. In 2018, the occupancy rate was significantly lower in Project-affected than random complexes; there were no other significant differences. Because there were no large, consistent differences in caribou occupancy in Project-affected versus reference or random peatland complexes, construction-related Project effects on caribou appeared to be small.

Caribou occupied primary (larger than 200 ha) and secondary (30 to 200 ha) peatland complexes more often than smaller complexes. Caribou activity was observed in half of the smaller, non-habitat complexes over one or two years of the five-year survey period. The remaining half of smaller complexes was unoccupied by caribou. No caribou calves occupied any of the smaller complexes, suggesting that caribou may have passed through but not calved within. The most calf activity was observed in primary calving complexes, as predicted in the EIS.

Moose and moose calves occupied more peatland complexes than caribou. Moose calves were detected in more burned complexes than caribou calves over the construction monitoring period, suggesting that moose select a wider range of habitats for calving than caribou.

On access road transects, the density of caribou signs in 2018, 2020, and 2021 was somewhat lower within 2 km of the access roads than beyond 2 km, as predicted in the EIS. In 2015 and 2017, the reverse was observed- there was more caribou activity closer to the roads than farther away. There was no significant difference in the density of caribou signs within 2 km of and beyond 2 km from the access roads during Project construction. As caribou can habituate to human disturbance, some individuals may be less affected by traffic noise than others, or the extent of the disturbance effect (i.e., 2 km from the access roads) may be less than predicted in the EIS. There was more moose and moose calf activity within 2 km of the access roads than further away in 2021. Moose are as widely distributed in the Keeyask region as caribou. However, substantially more moose signs were found closer to the access roads than caribou signs, suggesting that moose may be more tolerant of sensory disturbances or may habituate more readily to human disturbance than caribou.

The abundance and distribution of moose signs in the Keeyask region suggests that enough habitat is available to sustain a moose population, which is likely an adequate source of primary prey for gray wolves. Signs of black bear and gray wolf presence were sparse in caribou calving habitat in the Keeyask region, and caribou and predators occupied relatively few of the same islands in lakes and peatland complexes in 2021. These areas appeared to provide calving caribou with protection from predators, as expected.

5.0 SUMMARY AND CONCLUSIONS

In 2021, caribou were present on over half of the islands in lakes and peatland complexes surveyed in the Keeyask region. Caribou did not avoid all islands or peatland complexes within 4 km of the Project construction site, or all areas within 2 km of the access roads. As predicted in the EIS, sensory disturbance from construction and traffic may have caused some individual caribou to avoid areas closer to the Project construction site or access roads, but some areas within the predicted disturbance zones were occupied by caribou and calves. These caribou may have habituated to the construction disturbance, or the zone of disturbance may be smaller than predicted in the EIS.

Construction monitoring for caribou sensory disturbance has concluded. A multi-year analysis of all construction phase results may identify further trends in caribou activity closer to or farther from disturbance at the Project construction site and near the access roads. Monitoring will continue during operation.

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APPENDIX 1:
TABLES

Table A-1: Number of Times Transects Were Surveyed on Islands in Lakes, 2015, 2017, 2018, 2020, and 2021

Island	Transect	2021	2020	2018	2017	2015
KI122001	KI122001	3	2	3	3	3
KI122003	KI122003	3	2	3	3	3
KI122005	KI122005	3	2	3	3	3
KI122006	KI122006	3	2	3	3	3
KI122200	KI122200	3	–	–	–	–
KI122202	KI122202	3	–	–	–	–
KI123005	KI123005	3	0	0	2	3
KI123008	KI123008	0	0	0	2	3
KI123010	KI123010	3	2	3	3	3
KI123012	KI123012	3	2	3	3	3
	KI123012_001	–	2	3	3	3
KI123012_2	KI123012_2	3	–	–	–	–
KI123205	KI123205	3	–	–	–	–
KI123206	KI123206	3	–	–	–	–
KI123207	KI123207	3	–	–	–	–
KI123209	KI123209	3	–	–	–	–
KI123210	KI123210	3	–	–	–	–
KI123214	KI123214	3	–	–	–	–
KI123215	KI123215	3	–	–	–	–
KI123216	KI123216	3	–	–	–	–
KI123217	KI123217	3	–	–	–	–
KI123218	KI123218	3	–	–	–	–
KI123219	KI123219	3	–	–	–	–
KI123220	KI123220	3	–	–	–	–
KI123221	KI123221	3	–	–	–	–
KI123226	KI123226	3	–	–	–	–
KI123229	KI123229	3	–	–	–	–
KI123230	KI123230	3	–	–	–	–
KI123231	KI123231	3	–	–	–	–
KI123233	KI123233	3	–	–	–	–
KI123237	KI123237	3	–	–	–	–
KI123238	KI123238	3	–	–	–	–
KI123252	KI123252	3	–	–	–	–
KI124003	KI124003	3	2	3	3	3
KI124004	KI124004	3	2	2	2	3
KI124005	KI124005	3	2	3	3	3
KI124007	KI124007	3	2	3	3	3
KI124009	KI124009	3	2	3	3	3

Island	Transect	2021	2020	2018	2017	2015
KI124010	KI124010	3	2	3	3	3
KI124013	KI124013	3	2	2	3	3
KI124015	KI124015	3	2	3	3	3
KI124016	KI124016	3	2	3	3	3
KI124017	KI124017	3	2	3	3	3
KI124018	KI124018	3	2	3	3	3
KI124019	KI124019	3	2	3	3	3
KI124020	KI124020	3	2	3	3	3
KI124022	KI124022	3	2	3	3	3
KI124024	KI124024	3	2	3	3	3
KI124026	KI124026	3	2	3	3	3
KI124029	KI124029	3	2	3	3	3
KI124030	KI124030	3	2	3	3	3
KI124035	KI124035	3	2	3	3	3
KI124037	KI124037	3	2	3	3	3
KI124038	KI124038	3	2	3	3	3
KI124040	KI124040	3	2	3	3	3
KI124041	KI124041	3	2	3	3	3
KI124042	KI124042	3	2	3	3	3
KI124043	KI124043	3	2	3	3	3
KI124044	KI124044	3	2	3	3	3
KI124045	KI124045	3	2	3	3	3
KI124046	KI124046	3	2	3	3	3
KI124047	KI124047	3	2	3	3	3
KI124050	KI124050	3	2	3	3	3
KI124052	KI124052	3	2	3	3	3
KI124053	KI124053	3	2	3	3	3
KI124055	KI124055	3	2	3	3	3
KI124056	KI124056	3	2	3	3	3
KI124057	KI124057	3	2	3	3	3
KI124058	KI124058	3	2	3	3	3
KI124060	KI124060	3	2	3	3	3
KI124063	KI124063	3	2	3	3	3
KI124065	KI124065	3	2	3	3	3
KI124066	KI124066	3	2	3	3	3
	KI124066_001	3	2	3	3	3
KI124069	KI124069	3	2	3	3	3
KI124070	KI124070	3	2	3	3	3
KI124072	KI124072	3	2	3	3	3
KI124075	KI124075	3	2	3	3	3

Island	Transect	2021	2020	2018	2017	2015
KI124079	KI124079	3	2	3	3	3
KI124080	KI124080	3	2	3	3	3
KI124082	KI124082	3	2	3	3	3
KI124083	KI124083	3	2	2	3	3
KI124086	KI124086	3	2	3	3	3
KI124088	KI124088	3	2	3	3	3
KI124089	KI124089	3	2	3	3	3
KI124090	KI124090	3	2	3	3	3
KI124091	KI124091	3	2	3	3	3
KI124092	KI124092	3	2	3	3	3
	KI124092_001	3	2	3	3	3
KI124094	KI124094	3	2	2	3	3
KI124096	KI124096	3	2	3	3	3
KI124097	KI124097	3	2	3	3	3
KI124100	KI124100	3	2	3	2	0
KI124102	KI124102	3	2	3	3	3
KI124103	KI124103	0	0	0	0	3
KI124105	KI124105	3	2	3	3	3
KI124111	KI124111	0	0	0	0	3
KI124115	KI124115	3	2	3	3	3
KI124117	KI124117	3	2	3	3	3
KI124120	KI124120	3	2	3	3	3
KI124124	KI124124	2	2	3	3	3
KI124125	KI124125	3	2	3	3	3
KI124128	KI124128	3	2	3	3	3
KI124129	KI124129	3	2	3	3	3
KI124133	KI124133	3	2	3	3	3
KI124136	KI124136	3	2	3	3	3
KI124141	KI124141	3	2	3	3	3
KI124145	KI124145	3	2	3	3	3
KI124146	KI124146	0	0	0	0	3
KI124147	KI124147	3	2	3	3	3
KI124150	KI124150	3	2	3	3	0
KI124151	KI124151	3	2	3	3	3
KI124152	KI124152	0	0	0	0	3
KI124153	KI124153	3	2	3	3	3
KI124155	KI124155	3	2	3	3	3
KI124156	KI124156	3	2	3	3	3
KI124158	KI124158	3	2	3	3	3
KI124162	KI124162	3	2	3	3	3

Island	Transect	2021	2020	2018	2017	2015
KI124163	KI124163	3	2	3	3	0
KI124164	KI124164	3	2	3	3	3
KI124165	KI124165	3	2	3	3	3
KI124166	KI124166	3	2	3	3	3
KI124167	KI124167	3	2	3	3	3
KI124170	KI124170	3	2	3	3	3
KI124173	KI124173	3	2	3	3	3
KI124176	KI124176	3	2	3	3	3
KI124178	KI124178	3	2	3	3	3
KI124180	KI124180	3	2	3	3	3
	KI124180_001	3	2	3	3	3
KI124181	KI124181	3	2	2	3	3
KI124182	KI124182	3	2	3	3	3
KI124186	KI124186	3	2	3	3	3
	KI124186_001	3	2	3	3	3
	KI124186_002	3	2	3	3	3
	KI124186_003	3	2	3	3	3
	KI124186_004	3	2	3	3	3
KI124192	KI124192	3	2	3	3	3
KI124193	KI124193	3	2	3	3	3
KI124194	KI124194	3	2	3	3	3
KI124196	KI124196	3	2	3	3	3
KI124197	KI124197	3	2	3	3	3
KI124202	KI124202	3	0	3	3	3
KI124205	KI124205	3	2	3	3	3
	KI124205_001	3	2	3	3	3
KI124206	KI124206	3	2	3	3	3
KI124209	KI124209	3	2	3	3	3
KI124210	KI124210	3	2	3	3	3
KI124212	KI124212	3	2	3	3	3
KI124214	KI124214	3	2	3	3	3
KI124217	KI124217	3	2	3	3	3
KI124227	KI124227	2	2	3	3	3
KI126011	KI126011	0	0	0	0	3
KI126016	KI126016	0	0	0	1	3
KI126017	KI126017	0	0	0	0	3
KI126020	KI126020	0	0	3	1	3

Table A-2: Number of Trail Cameras on Islands in Lakes, 2015 to 2021

Island	2021	2020	2019	2018	2017	2016	2015
KI122001	1	1	1	1	1	1	1
KI122003	1	1	1	1	1	1	1
KI122005	1	1	1	1	1	1	1
KI122006	1	1	1	1	1	1	1
KI122200	1	–	–	–	–	–	–
KI122202	1	–	–	–	–	–	–
KI123005	1	0	0	0	0	1	1
KI123008	0	0	0	0	0	1	1
KI123010	1	1	1	1	1	1	1
KI123012	1	1	2	2	2	2	2
KI123012_2	1	–	–	–	–	–	–
KI123205	1	–	–	–	–	–	–
KI123206	1	–	–	–	–	–	–
KI123207	1	–	–	–	–	–	–
KI123209	1	–	–	–	–	–	–
KI123210	1	–	–	–	–	–	–
KI123214	1	–	–	–	–	–	–
KI123215	1	–	–	–	–	–	–
KI123216	1	–	–	–	–	–	–
KI123217	1	–	–	–	–	–	–
KI123218	1	–	–	–	–	–	–
KI123219	1	–	–	–	–	–	–
KI123220	1	–	–	–	–	–	–
KI123221	1	–	–	–	–	–	–
KI123226	1	–	–	–	–	–	–
KI123229	1	–	–	–	–	–	–
KI123230	1	–	–	–	–	–	–
KI123231	1	–	–	–	–	–	–
KI123233	1	–	–	–	–	–	–
KI123237	1	–	–	–	–	–	–
KI123238	1	–	–	–	–	–	–
KI123252	1	–	–	–	–	–	–
KI124003	1	1	1	1	1	1	1
KI124004	1	1	1	1	0	1	1
KI124005	1	1	1	1	1	1	1
KI124007	1	1	1	1	1	1	1

Island	2021	2020	2019	2018	2017	2016	2015
KI124009	1	1	1	1	1	1	1
KI124010	1	1	1	1	1	1	1
KI124013	0	0	1	1	1	1	1
KI124015	1	1	1	1	1	1	1
KI124016	1	1	1	1	1	1	1
KI124017	1	1	1	1	1	1	1
KI124018	1	1	1	1	1	1	1
KI124019	1	1	1	1	1	1	1
KI124020	1	1	1	1	1	1	1
KI124022	1	1	1	1	1	1	1
KI124024	1	1	1	1	1	1	1
KI124026	1	1	1	1	1	1	1
KI124029	1	1	1	1	1	1	1
KI124030	1	1	1	1	1	1	1
KI124035	1	1	1	1	1	1	1
KI124037	1	1	1	1	1	1	1
KI124038	1	1	1	1	1	1	1
KI124040	1	1	1	1	1	1	1
KI124041	1	1	1	1	1	1	1
KI124042	1	1	1	1	1	1	1
KI124043	1	1	1	1	1	1	1
KI124044	1	1	1	1	1	1	1
KI124045	1	1	1	1	1	1	1
KI124046	1	1	1	1	1	1	1
KI124047	1	1	1	1	1	1	1
KI124050	1	1	1	1	1	1	1
KI124051	0	0	0	0	0	1	0
KI124052	1	1	1	1	1	1	1
KI124053	1	1	1	1	1	1	1
KI124055	1	1	1	1	1	1	1
KI124056	1	1	1	1	1	1	1
KI124057	1	1	1	1	1	1	1
KI124058	1	1	1	1	1	1	1
KI124060	1	1	1	1	1	1	1
KI124063	1	1	1	1	1	1	1
KI124065	1	1	1	1	1	1	1
KI124066	2	1	2	2	2	2	2

Island	2021	2020	2019	2018	2017	2016	2015
KI124069	1	1	1	1	1	1	1
KI124070	1	1	1	1	1	1	1
KI124072	1	1	1	1	1	1	1
KI124075	1	1	1	1	1	1	1
KI124077	1	1	1	1	0	1	0
KI124079	1	1	1	1	1	1	1
KI124080	1	1	1	1	1	1	0
KI124082	1	1	1	1	1	1	1
KI124083	1	1	1	1	1	0	1
KI124086	1	1	1	1	1	1	1
KI124088	1	0	1	1	1	1	1
KI124089	1	1	1	1	1	1	1
KI124090	1	1	1	1	1	1	1
KI124091	1	1	1	1	1	1	1
KI124092	2	1	2	2	2	2	2
KI124094	1	1	1	1	1	1	1
KI124096	1	1	1	1	1	1	1
KI124097	0	1	1	1	1	1	1
KI124102	1	1	1	1	1	1	1
KI124103	1	1	1	1	0	1	1
KI124105	1	1	1	1	1	1	1
KI124111	0	0	0	0	1	1	1
KI124113	1	1	1	1	0	1	0
KI124115	1	1	1	1	1	2	1
KI124117	1	1	1	1	1	1	1
KI124120	1	1	1	1	1	1	1
KI124124	1	1	1	1	1	1	1
KI124125	1	1	1	1	1	1	1
KI124128	1	1	1	1	1	1	1
KI124129	1	1	1	1	1	1	1
KI124131	1	1	1	1	0	1	0
KI124133	1	1	1	1	1	1	1
KI124136	1	1	1	1	1	1	1
KI124141	1	1	1	1	1	1	1
KI124145	1	1	1	1	1	1	1
KI124146	1	1	1	1	0	1	1
KI124147	1	1	1	1	1	1	1

Island	2021	2020	2019	2018	2017	2016	2015
KI124150	0	0	0	0	1	0	0
KI124151	1	1	1	1	1	1	1
KI124152	1	0	1	1	0	1	1
KI124153	1	1	1	1	1	1	1
KI124155	1	1	1	1	1	1	1
KI124156	1	1	1	1	1	1	1
KI124158	1	1	1	1	1	1	1
KI124162	1	1	1	1	1	1	1
KI124164	1	1	1	1	1	1	1
KI124165	1	1	1	1	0	1	1
KI124166	1	1	1	1	1	1	1
KI124167	1	1	1	1	1	1	1
KI124170	1	1	1	1	1	1	1
KI124173	1	1	1	1	1	1	1
KI124176	1	1	1	1	1	1	1
KI124178	1	1	1	1	1	1	1
KI124180	3	2	3	3	2	3	2
KI124181	1	1	1	1	1	0	0
KI124182	1	1	1	1	1	1	1
KI124186	6	5	6	6	5	6	4
KI124192	1	1	1	1	1	1	1
KI124193	1	1	1	1	1	1	1
KI124194	1	1	1	1	1	1	1
KI124196	1	1	1	1	1	1	1
KI124197	1	1	1	1	1	1	1
KI124202	1	1	1	1	1	1	1
KI124205	2	1	2	2	2	2	1
KI124206	1	1	1	1	1	1	1
KI124209	1	1	1	1	1	1	1
KI124210	1	1	1	1	1	1	1
KI124212	1	1	1	1	1	1	1
KI124214	1	1	1	1	1	1	1
KI124217	1	1	1	1	1	1	1
KI124227	1	1	1	1	1	0	1
KI126016	0	0	0	0	0	1	1
KI126017	0	0	0	0	0	0	1
KI126020	0	0	0	0	0	1	1

Table A-3: Number of Times Transects Were Surveyed in Peatland Complexes, 2015, 2017, 2018, 2020, and 2021

Complex	Transect	2021	2020	2018	2017	2015
KV022000	KV022001	3	2	3	3	3
	KV022002	3	2	3	3	3
	KV022003	3	2	3	3	3
	KV022004	2	2	3	3	3
	KV022005	3	2	3	3	3
	KV022006	3	2	3	3	3
	KV022007	3	2	3	3	3
	KV022008	3	2	3	3	3
	KV022009	3	2	3	3	3
	KV022010	3	2	3	3	3
	KV022011	3	2	3	3	3
	KV022012	3	2	3	3	3
	KV022013	3	2	3	3	3
	KV022014	3	2	3	3	3
	KV022015	3	2	3	3	3
KV023000	KV023001	3	2	3	3	3
	KV023002	3	2	3	3	3
KV036000	KV036001	3	2	3	3	3
	KV036002	3	2	3	3	3
	KV036003	3	2	3	3	3
	KV036004	3	2	3	3	3
	KV036005	3	2	3	3	3
	KV036006	3	2	3	3	3
	KV036007	3	2	3	3	3
	KV036008	3	2	3	3	3
	KV036009	3	2	3	3	3
	KV036010	3	2	3	3	3
	KV036011	3	2	3	3	3
	KV036012	3	2	3	3	3
	KV036013	3	2	3	3	3
	KV036014	3	2	3	3	3
	KV036015	3	2	3	3	3
	KV036016	3	2	3	3	3
	KV036017	3	2	3	3	3
KV037000	KV037001	3	2	3	3	3
	KV037002	3	2	3	3	3
	KV037003	3	2	3	3	3

Complex	Transect	2021	2020	2018	2017	2015
KV037000	KV037004	3	2	3	3	3
KV038000	KV038001	3	2	3	3	3
	KV038002	3	2	3	3	3
	KV038003	3	2	3	3	3
	KV038004	3	2	3	3	3
	KV038005	3	2	3	3	3
	KV038006	3	2	3	3	3
	KV038007	3	2	3	3	3
	KV038008	3	2	3	3	3
	KV038009	3	2	3	3	3
	KV038010	3	2	3	3	3
	KV038011	3	2	3	3	3
	KV038012	3	2	3	3	3
	KV038013	3	2	3	3	3
	KV038014	3	2	3	3	3
	KV038015	3	2	3	3	3
	KV038016	3	2	3	3	3
	KV038017	3	2	3	3	3
	KV038018	3	2	3	3	3
	KV038019	3	2	3	3	3
	KV038020	3	2	3	3	3
KV039000	KV039001	3	2	3	3	3
KV044000	KV044001	3	2	3	3	3
	KV044002	3	2	3	3	3
	KV044003	3	2	3	3	3
	KV044004	3	2	3	3	3
	KV044005	3	2	3	3	3
	KV044006	3	2	3	3	3
	KV044007	3	2	3	3	3
	KV044008	3	2	3	3	3
	KV044009	3	2	3	3	3
	KV044010	3	2	3	3	3
KV047000	KV047001	3	2	3	3	3
	KV047002	3	2	3	3	3
	KV047003	3	2	3	3	3
	KV047004	3	2	3	3	3
	KV047005	3	2	3	3	3
	KV047006	3	2	3	3	3
KV050000	KV050001	3	2	3	2	3

Complex	Transect	2021	2020	2018	2017	2015
KV050000	KV050002	3	2	3	3	3
	KV050003	3	2	3	3	3
	KV050004	3	2	3	3	3
	KV050005	3	2	3	3	3
	KV050006	3	2	3	3	3
	KV050007	3	2	3	3	3
	KV050008	3	2	3	3	3
KV058000	KV058001	3	2	3	3	3
	KV058002	3	2	3	3	3
	KV058003	3	2	3	3	3
	KV058004	3	2	3	3	3
	KV058005	3	2	3	3	3
	KV058006	3	2	3	3	3
	KV058007	3	2	3	3	3
	KV058008	3	2	3	3	3
	KV058009	3	2	3	3	3
	KV058010	3	2	3	3	3
	KV058011	3	2	3	3	3
	KV058012	3	2	3	3	3
	KV058013	3	2	3	3	3
	KV058014	3	2	3	3	3
KV061000	KV061001	3	2	3	3	3
	KV061002	3	2	3	3	3
	KV061003	3	2	3	3	3
KV062000	KV062001	3	2	3	3	3
	KV062002	2	2	3	3	3
KV063000	KV063001	3	2	3	3	3
	KV063002	3	2	3	3	3
	KV063003	3	2	3	3	3
	KV063004	3	2	3	3	3
	KV063005	3	2	3	3	3
	KV063006	3	2	3	3	3
KV066000	KV066001	3	2	3	3	3
	KV066002	3	2	3	3	3
	KV066003	3	2	2	3	3
KV069000	KV069001	3	2	3	3	3
	KV069002	3	2	3	3	3
	KV069003	3	2	3	3	3
	KV069004	3	2	3	3	3

Complex	Transect	2021	2020	2018	2017	2015
KV069000	KV069005	3	2	3	3	3
KV071000	KV071001	3	2	3	3	3
KV094000	KV094001	3	2	3	3	3
	KV094002	3	2	3	3	3
	KV094003	3	2	3	3	3
	KV094004	2	2	3	3	3
	KV094005	2	2	3	3	3
	KV094006	3	2	3	3	3
	KV094007	3	2	3	3	3
KV097000	KV097001	3	2	3	3	3
	KV097002	3	2	3	3	3
	KV097003	3	2	3	3	3
	KV097004	3	2	3	3	3
	KV097005	3	2	3	3	3
	KV097006	3	2	3	3	3
	KV097007	3	2	3	3	3
	KV097008	3	2	3	3	3
	KV097009	3	2	3	3	3
	KV097010	3	2	3	3	3
	KV097011	3	2	3	3	3
	KV097012	3	2	3	3	3
	KV097013	3	2	3	3	3
KV098000	KV098001	3	2	3	3	3
	KV098002	3	2	3	3	3
KV101000	KV101001	3	2	3	3	3
	KV101002	3	2	3	3	3
	KV101003	3	2	3	3	3
	KV101004	3	2	3	3	3
	KV101005	3	2	3	3	3
KV102000	KV102001	3	2	3	3	3
	KV102002	3	2	3	3	3
KV103000	KV103001	3	2	3	3	3
	KV103002	3	2	3	3	3
	KV103003	3	2	3	3	3
	KV103004	3	2	3	3	3
	KV103005	3	2	3	3	3
	KV103006	3	2	3	3	3
KV107000	KV107001	3	2	3	3	3
	KV107002	3	2	3	3	3

Complex	Transect	2021	2020	2018	2017	2015
KV107000	KV107003	3	2	3	3	3
	KV107004	3	2	3	3	3
	KV107005	3	2	3	3	3
	KV107006	3	2	3	3	3
	KV107007	3	2	3	3	3
	KV107008	3	2	3	3	3
	KV107009	3	2	3	3	3
KV113000	KV113001	3	2	3	3	3
	KV113002	3	2	3	3	3
	KV113003	3	2	3	3	3
	KV113004	3	2	3	3	3
	KV113005	3	2	3	3	3
	KV113006	3	2	3	3	3
	KV113007	3	2	3	3	3
	KV113008	3	2	3	3	3
	KV113009	3	2	3	3	3
	KV113010	3	2	3	3	3
	KV113011	3	2	3	3	3
	KV113012	3	2	3	3	3
	KV113013	3	2	3	3	3
	KV113014	3	2	3	3	3
KV116000	KV116001	3	2	3	3	3
KV119000	KV119001	2	2	3	3	3
	KV119002	2	2	3	3	3
	KV119003	2	2	3	3	3
	KV119004	2	2	3	3	3
	KV119005	2	2	3	3	3
	KV119006	2	2	3	3	3
KV120000	KV120001	3	2	3	3	3
	KV120002	3	0	3	3	3
KV121000	KV121001	3	2	3	3	3
KV122000	KV122001	1	2	0	3	3
KV123000	KV123001	2	2	3	3	3
KV124000	KV124001	3	2	3	3	3

Table A-4: Number of Trail Cameras in Peatland Complexes, 2015 to 2021

Complex	Transect	2021	2020	2019	2018	2017	2016	2015
KV005000	KV005814	0	0	0	0	0	1	0
KV006600	KV006602	0	0	0	0	0	1	0
KV022000	KV022002	1	1	1	1	1	1	1
KV023000	KV023001	1	1	1	1	1	1	1
KV036000	KV036006	1	1	1	1	1	1	1
KV037000	KV037003	1	1	1	1	1	1	1
KV038000	KV038008	1	1	1	1	1	1	1
KV039000	KV039001	1	1	1	1	1	1	1
KV044000	KV044001	1	1	1	1	1	1	1
KV047000	KV047001	1	1	1	1	1	1	1
KV050000	KV050006	1	1	1	1	1	1	1
KV580000	KV058014	1	1	1	1	1	1	1
KV061000	KV061003	1	1	1	1	1	1	1
KV062000	KV062001	1	1	1	1	1	1	1
KV063000	KV063005	1	1	1	1	1	1	1
KV066000	KV066002	1	1	1	1	1	1	1
KV069000	KV069005	1	1	1	1	1	1	1
KV071000	KV071001	1	1	1	1	1	1	1
KV094000	KV094002	0	1	1	1	1	1	1
KV097000	KV097002	1	1	1	1	1	1	1
KV098000	KV098001	1	1	1	1	1	1	1
KV101000	KV101005	1	1	1	1	1	1	1
KV102000	KV102002	1	1	1	1	1	1	1
KV103000	KV103001	1	1	1	1	1	1	1
KV107000	KV107007	1	1	1	1	1	1	1
KV113000	KV113005	1	1	1	1	1	1	1
KV116000	KV116001	1	1	1	1	1	1	1
KV119000	KV119005	1	1	1	1	1	1	1
KV120000	KV120001	1	1	1	1	1	1	1
KV121000	KV121001	1	1	1	1	1	1	1
KV122000	KV122001	1	1	1	1	1	1	1
KV123000	KV123001	1	1	1	1	0	1	1
KV124000	KV124001	1	1	1	1	1	1	1
KV597000	–	1	1	1	1	0	1	1

Table A-5: Number of Large Mammal Signs Detected During Three Visits to Tracking Transects on Islands in Lakes, 2021

Species	Transect	Visit 1	Visit 2	Visit 3	Total
Caribou	KI123005	1	0	0	1
	KI123012_1	0	8	3	11
	KI123012_2	1	0	3	4
	KI123207	0	12	0	12
	KI123209	0	0	1	1
	KI123210	0	0	1	1
	KI123219	0	0	2	2
	KI123231	0	2	0	2
	KI124003	0	0	2	2
	KI124004	0	0	1	1
	KI124005	3	0	2	5
	KI124010	0	0	1	1
	KI124016	0	2	0	2
	KI124017	0	4	2	6
	KI124018	0	3	8	11
	KI124019	0	6	0	6
	KI124020	0	0	3	3
	KI124022	0	3	5	8
	KI124024	0	0	4	4
	KI124026	0	0	1	1
	KI124029	0	11	5	16
	KI124030	0	3	1	4
	KI124035	0	3	0	3
	KI124037	0	5	1	6
	KI124038	0	15	1	16
	KI124040	0	4	0	4
	KI124041	0	1	0	1
	KI124043	0	2	1	3
	KI124044	0	0	2	2
	KI124045	0	1	0	1
	KI124046	0	7	0	7
	KI124047	0	0	1	1
	KI124050	0	3	3	6
	KI124055	0	6	1	7
	KI124056	0	0	2	2
	KI124057	0	4	0	4
	KI124058	0	0	7	7
	KI124060	0	6	0	6

Species	Transect	Visit 1	Visit 2	Visit 3	Total
Caribou	KI124063	0	4	1	5
	KI124069	0	0	1	1
	KI124070	0	3	0	3
	KI124072	0	1	0	1
	KI124075	0	1	3	4
	KI124079	0	1	0	1
	KI124082	0	3	4	7
	KI124083	0	0	3	3
	KI124088	0	2	0	2
	KI124089	0	6	0	6
	KI124091	0	13	4	17
	KI124092	0	2	7	9
	KI124096	0	0	1	1
	KI124102	0	0	1	1
	KI124115	3	0	18	21
	KI124117	2	9	0	11
	KI124120	0	3	4	7
	KI124128	0	1	7	8
	KI124136	0	3	0	3
	KI124145	0	1	0	1
	KI124147	0	1	2	3
	KI124151	0	0	2	2
	KI124164	0	1	0	1
	KI124165	0	1	0	1
	KI124166	5	12	2	19
	KI124167	0	0	8	8
	KI124170	0	0	1	1
	KI124173	0	3	4	7
	KI124176	12	4	1	17
	KI124180	0	4	15	19
	KI124181	0	3	2	5
	KI124182	0	0	6	6
	KI124186	0	33	262	295
	KI124193	0	1	4	5
	KI124196	0	8	10	18
	KI124210	0	17	3	20
	KI124212	0	1	5	6
	KI124214	1	0	0	1
	Total	28	253	445	726
Caribou calf	KI124010	0	1	1	2

Species	Transect	Visit 1	Visit 2	Visit 3	Total
Caribou calf	KI124040	0	2	0	2
	KI124050	0	1	0	1
	KI124089	0	2	0	2
	KI124091	0	1	0	1
	KI124115	0	0	1	1
	KI124120	0	1	0	1
	KI124136	0	3	0	3
	KI124173	0	2	0	2
	KI124180	0	0	1	1
	KI124186	0	0	3	3
	KI124196	0	1	0	1
	Total	0	13	6	19
Moose	KI122003	0	3	1	4
	KI122006	0	4	0	4
	KI122200	0	5	3	8
	KI122202	0	0	2	2
	KI123005	0	5	1	6
	KI123012_2	0	1	0	1
	KI123205	0	1	0	1
	KI123206	0	0	5	5
	KI123207	0	0	3	3
	KI123209	0	0	1	1
	KI123210	0	0	1	1
	KI123214	0	3	10	13
	KI123215	0	0	1	1
	KI123216	0	3	9	12
	KI123217	0	1	0	1
	KI123218	0	4	1	5
	KI123219	0	12	0	12
	KI123220	0	5	0	5
	KI123221	0	0	1	1
	KI123226	0	3	5	8
	KI123229	0	8	4	12
	KI123230	0	33	0	33
	KI123231	0	0	3	3
	KI123233	0	0	1	1
	KI123238	7	3	6	16
	KI124004	0	5	0	5
	KI124005	1	0	0	1
	KI124010	0	10	12	22

Species	Transect	Visit 1	Visit 2	Visit 3	Total
Moose	KI124016	0	0	2	2
	KI124017	0	0	3	3
	KI124018	0	0	8	8
	KI124019	0	0	2	2
	KI124022	1	0	0	1
	KI124024	0	7	0	7
	KI124026	0	7	0	7
	KI124029	0	0	2	2
	KI124035	0	0	7	7
	KI124038	0	1	7	8
	KI124040	0	2	9	11
	KI124041	0	0	2	2
	KI124044	0	5	1	6
	KI124045	0	1	0	1
	KI124046	0	1	0	1
	KI124047	3	12	4	19
	KI124050	1	0	1	2
	KI124055	0	0	1	1
	KI124056	0	1	0	1
	KI124057	0	3	2	5
	KI124058	0	5	0	5
	KI124060	0	2	0	2
	KI124063	0	0	1	1
	KI124065	0	9	7	16
	KI124066	1	9	1	11
	KI124072	0	0	3	3
	KI124075	0	11	8	19
	KI124079	0	2	0	2
	KI124082	0	5	1	6
	KI124088	0	0	1	1
	KI124089	0	0	2	2
	KI124092	2	26	18	46
	KI124096	0	2	1	3
	KI124100	0	1	0	1
	KI124102	0	4	0	4
	KI124105	0	4	0	4
	KI124115	0	118	52	170
	KI124117	0	1	4	5
	KI124124	0	4	1	5
	KI124128	0	8	2	10

Species	Transect	Visit 1	Visit 2	Visit 3	Total
Moose	KI124129	0	3	0	3
	KI124133	0	3	0	3
	KI124145	0	1	5	6
	KI124147	0	0	2	2
	KI124153	0	0	1	1
	KI124162	0	0	1	1
	KI124164	0	1	0	1
	KI124166	0	0	1	1
	KI124167	0	2	0	2
	KI124173	0	3	0	3
	KI124176	0	6	1	7
	KI124180	0	12	4	16
	KI124181	1	0	1	2
	KI124182	0	7	3	10
	KI124186	1	17	14	32
	KI124193	0	10	4	14
	KI124196	0	0	5	5
	KI124205	0	1	0	1
	KI124210	0	3	2	5
	KI124212	0	9	5	14
	KI124214	0	6	0	6
	KI124217	0	0	1	1
	Total	18	444	273	735
Moose calf	KI122006	0	1	0	1
	KI122200	0	3	1	4
	KI123214	0	0	1	1
	KI123230	0	2	0	2
	KI124038	0	1	0	1
	KI124044	0	1	0	1
	KI124057	0	0	1	1
	KI124063	0	0	1	1
	KI124066	0	1	0	1
	KI124092	0	1	1	2
	KI124115	0	4	0	4
	KI124129	0	1	0	1
	KI124167	0	1	0	1
	KI124180	0	2	0	2
	KI124182	0	1	0	1
	KI124186	0	1	0	1
	KI124212	0	4	0	4

Species	Transect	Visit 1	Visit 2	Visit 3	Total
Moose calf	Total	0	24	5	29
Black bear	KI123214	0	1	0	1
	KI124016	0	2	0	2
	KI124066	0	1	0	1
	KI124091	0	0	1	1
	KI124092	0	0	1	1
	KI124141	0	0	2	2
	KI124186	0	0	1	1
	KI124193	0	0	1	1
	Total	0	4	6	10
Gray wolf	KI122003	0	0	1	1
	KI124003	1	0	0	1
	KI124180	1	0	0	1
	KI124186	0	1	0	1
	KI124197	0	0	1	1
	Total	2	1	2	5

Table A-6: Number of Camera-days on Islands in Lakes, 2015–2021

Island Type	Island	2015	2016	2017	2018	2019	2020	2021
Project-affected	KI123010	172	154	161	150	167	175	153
	KI123012	344	308	322	304	334	350	153
	KI124090	168	107	157	154	163	167	149
	KI124092	340	320	309	300	327	334	300
	KI124102	163	160	149	157	165	170	150
	KI124103	150	159	153	147	163	167	149
	KI124141	161	160	157	160	167	168	148
	KI124145	164	58	145	157	165	171	148
	KI124146	144	159	153	160	167	171	148
	KI124162	117	159	147	154	165	171	148
	KI124164	166	159	154	160	167	168	149
	KI124192	168	161	155	146	163	171	149
	KI124193	170	159	155	157	164	167	150
	KI124197	164	160	157	160	165	168	152
	KI124202	161	160	153	163	163	171	149
	KI124206	164	160	157	160	165	168	148
	Total	2,916	2,703	2,784	2,789	2,970	3,057	2,543
Unaffected	KI122003	172	154	165	161	168	174	158
	KI124009	173	181	151	150	166	171	160
	KI124010	173	181	151	150	166	171	153
	KI124017	173	158	142	154	166	173	160
	KI124018	173	181	143	154	165	174	153
	KI124019	171	184	150	148	167	172	158
	KI124029	173	158	143	153	166	175	154
	KI124030	165	158	143	153	166	175	154
	KI124035	172	184	150	146	167	172	158
	KI124037	167	152	146	155	167	168	154
	KI124038	171	184	150	148	167	172	154
	KI124040	172	184	150	148	167	58	154
	KI124041	172	184	150	148	167	172	158
	KI124043	168	158	153	157	167	175	160
	KI124044	171	184	154	147	167	172	157
	KI124046	166	158	147	155	168	167	150
	KI124047	173	184	154	146	167	176	157
	KI124050	172	184	150	148	167	114	158
	KI124052	171	184	150	156	167	172	154
	KI124053	171	184	150	148	167	172	150
	KI124055	168	158	156	157	168	175	152
	KI124056	104	184	150	148	167	172	158

Island Type	Island	2015	2016	2017	2018	2019	2020	2021
Unaffected	KI124057	171	184	150	148	167	172	158
	KI124058	168	158	156	157	168	175	152
	KI124060	171	184	150	148	167	176	150
	KI124065	170	184	157	148	167	176	154
	KI124066	325	318	208	314	203	340	302
	KI124072	171	184	150	156	167	172	150
	KI124082	168	159	155	161	88	175	153
	KI124086	170	183	154	151	167	176	154
	KI124089	167	158	156	157	168	175	152
	KI124091	165	159	158	157	168	176	154
	KI124096	170	183	154	151	167	176	154
	KI124105	172	183	154	145	166	176	154
	KI124115	171	107	154	161	166	171	157
	KI124117	169	183	154	151	167	176	154
	KI124120	165	158	158	157	168	176	154
	KI124124	167	159	157	161	164	175	153
	KI124128	175	157	153	161	65	173	155
	KI124129	171	161	154	161	167	171	157
	KI124136	170	159	155	157	167	176	158
	KI124151	170	159	155	157	167	176	152
	KI124156	166	103	156	157	167	176	154
	KI124158	175	158	153	161	166	173	151
	KI124166	167	161	155	161	164	176	157
	KI124173	170	159	153	157	167	176	158
	KI124176	168	161	152	161	164	175	154
	KI124178	169	183	154	161	167	174	153
	KI124180	332	395	440	311	493	512	450
	KI124182	170	157	153	161	166	173	155
	KI124186	845	945	935	940	1,001	1,030	929
	KI124194	172	183	155	161	166	174	155
	KI124196	166	158	48	160	166	171	155
	KI124205	161	318	304	320	266	336	298
	KI124210	170	183	154	161	164	174	156
	KI124212	170	183	154	159	164	174	152
	Total	10,438	10,748	9,706	9,920	10,445	11,075	10,028
New	KI123012_2	–	–	–	–	–	–	153
	KI122200	–	–	–	–	–	–	158
	KI122202	–	–	–	–	–	–	158
	KI123205	–	–	–	–	–	–	153
	KI123206	–	–	–	–	–	–	153

Island Type	Island	2015	2016	2017	2018	2019	2020	2021
New	KI123207	–	–	–	–	–	–	157
	KI123210	–	–	–	–	–	–	158
	KI123214	–	–	–	–	–	–	157
	KI123215	–	–	–	–	–	–	157
	KI123216	–	–	–	–	–	–	157
	KI123217	–	–	–	–	–	–	157
	KI123218	–	–	–	–	–	–	153
	KI123219	–	–	–	–	–	–	153
	KI123220	–	–	–	–	–	–	153
	KI123221	–	–	–	–	–	–	153
	KI123226	–	–	–	–	–	–	153
	KI123229	–	–	–	–	–	–	157
	KI123230	–	–	–	–	–	–	157
	KI123231	–	–	–	–	–	–	153
	KI123233	–	–	–	–	–	–	153
	KI123237	–	–	–	–	–	–	153
	KI123238	–	–	–	–	–	–	153
	KI123252	–	–	–	–	–	–	158
	Total	–	–	–	–	–	–	3,720

Table A-7: Period Over which Caribou Were Photographed on 43 Islands in Lakes, 2015–2021

Island Type	Island	2015	2016	2017	2018	2019	2020	2021
Project-affected	KI123010							
	KI123012	June 8–Aug. 27	June 28–July 18	July 30		July 7		
	KI124090							
	KI124092						June 27	
	KI124102							
	KI124103							
	KI124141							
	KI124145					May 29	Aug. 18–19	
	KI124146							
	KI124162		June 17					
	KI124164					May 24		May 14
	KI124192							
	KI124193			July 16–22		July 26–Aug. 1	June 1–Aug. 19	Sep. 4
	KI124197							
	KI124202							
	KI124206							
Unaffected	KI122003							
	KI124009							
	KI124010							July 25–26
	KI124017	Aug. 27						June 20
	KI124018	Aug. 27					July 28–30	June 21 –Sep. 15
	KI124019							
	KI124029				July 16–Aug. 8	July 29	May 30–July 10	May 28–Aug. 10
	KI124030			June 10–11	June 29	July 12		April 25
	KI124035					June 12		
	KI124037			Sep. 7	June 12– Sep. 5			
	KI124038							

Island Type	Island	2015	2016	2017	2018	2019	2020	2021
Unaffected	KI124040							
	KI124041							
	KI124043	July 15			July 1–20		June 26	May 31
	KI124044							
	KI124046	June 22		Aug. 8				
	KI124047							
	KI124050							
	KI124052							May 11
	KI124053							
	KI124055	Aug. 7–Sep. 7				June 25–Aug. 1	Aug. 17	July 14–Aug. 26
	KI124056							
	KI124057							
	KI124058				Aug. 9–11	June 25–July 5		Aug. 7–25
	KI124060							
	KI124065						Sep. 5	
	KI124066							
	KI124072							
	KI124082						June 27	
	KI124086							
	KI124089					Sep. 8		
	KI124091		July 5		July 16		June 20–21	
	KI124096							July 23
	KI124105							
	KI124115							
	KI124117						June 13	
	KI124120		June 27–July 19	July 26–Aug. 1	July 12–23	June 25–July 11		July 26
	KI124124							
	KI124128	Aug. 6	Aug. 27	July 16–22	July 8	July 29–30	July 9–19	July 5–Aug. 20

Island Type	Island	2015	2016	2017	2018	2019	2020	2021
	KI124129		June 11–14					April 22–24
	KI124136	July 15–Aug. 19	June 7–Aug. 21		May 24–Aug. 20	June 6–Aug 9	June 26–Aug. 19	Aug. 14–15
	KI124151	June 22–Aug. 31	June 8–Aug. 16	July 10–Aug. 17	June 15–Aug. 27	June 24	Sep. 5	Aug. 12–Sep 12
	KI124156						June 30–July 15	
	KI124158			Aug. 5				
	KI124166			June 21		June 11	June 1–July 5	June 21–Aug. 17
	KI124173	June 23–Aug. 31	June 3–30 Aug.	June 13–Sep. 3	May 30–Aug. 27	June 3–Sep. 8	June 20–Sep. 8	June 30–Sep. 8
	KI124176		July 9	June 19–July 15	June 13–14	July 16	July 5	June 21
	KI124178							
	KI124180				July 8	July 8–Aug. 21	July 9–Aug. 22	July 7–Sep. 7
	KI124182	Aug. 19–21	July 14–Aug. 25	July 8–Aug. 27	June 10–Sep. 8	June 3–Aug. 15	June 10–Aug. 22	July 23–Aug. 27
	KI124186	Apr. 24–Sep. 15	May 1–Sep. 16	June 30–Sep. 6	May 27–Sep. 8	June 20–Sep. 19	June 4–Sep. 11	May 18–Sep. 13
	KI124194	July 22–23						
	KI124196	June 21–Sep. 16	June 12–Aug. 31		June 22–Aug. 16		June 6–Aug. 4	June 24–Sep. 16
	KI124205						June 4–Aug. 27	
	KI124210		Aug. 14		May 21–July 11	Aug. 15–16		June 20–Aug. 14
	KI124212	May 22–Sep. 15		June 24–Aug. 13	May 20	July 10–Aug. 29	Aug. 10–Sep. 8	July 23–Aug. 30

Table A-8: Number of Large Mammal Signs Detected During Three Visits to Tracking Transects in Peatland Complexes, 2021

Species	Complex	Transect	Visit 1	Visit 2	Visit 3	Total
Caribou	KV022000	KV022001	0	1	0	1
		KV022002	0	3	0	3
		KV022003	0	15	4	19
		KV022005	0	4	0	4
		KV022006	0	1	0	1
		KV022007	0	2	0	2
		KV022008	0	3	0	3
		KV022009	0	2	1	3
		KV022011	0	0	5	5
		KV022012	0	4	1	5
		KV022014	0	1	0	1
		KV022015	0	2	0	2
	KV023000	KV023001	2	0	1	3
	KV036000	KV036001	0	1	0	1
		KV036002	0	4	0	4
		KV036004	0	1	0	1
		KV036006	0	0	2	2
		KV036007	0	2	0	2
		KV036013	0	1	0	1
		KV036014	0	0	2	2
		KV036016	0	1	0	1
		KV036017	0	1	0	1
	KV037000	KV037002	0	0	2	2
		KV037003	0	0	4	4
		KV037004	0	0	2	2
	KV038000	KV038002	0	5	0	5
		KV038004	0	1	0	1
		KV038005	0	0	1	1
		KV038006	0	4	4	8
		KV038007	0	2	0	2
		KV038008	0	0	1	1
		KV038010	0	1	0	1
		KV038014	0	1	0	1
		KV038017	0	2	0	2
		KV038018	0	1	0	1
		KV038019	0	2	0	2
		KV038020	0	2	0	2
	KV039000	KV039001	0	1	5	6

Species	Complex	Transect	Visit 1	Visit 2	Visit 3	Total
Caribou	KV044000	KV044003	1	0	0	1
		KV044004	0	0	1	1
		KV044005	0	0	1	1
	KV047000	KV047001	0	1	2	3
		KV047003	0	0	1	1
	KV050000	KV050003	0	2	0	2
		KV050004	0	1	0	1
		KV050006	0	0	1	1
		KV050007	0	1	0	1
		KV050008	0	3	1	4
	KV058000	KV058002	0	3	2	5
		KV058007	0	4	1	5
		KV058012	0	4	0	4
	KV063000	KV063001	0	1	0	1
		KV063004	0	5	0	5
	KV066000	KV066002	0	0	3	3
		KV066003	0	0	2	2
	KV069000	KV069001	0	0	1	1
		KV069002	0	0	2	2
		KV069004	0	0	4	4
		KV069005	0	0	5	5
	KV094000	KV094006	0	1	0	1
	KV097000	KV097001	0	1	1	2
		KV097002	0	2	0	2
		KV097003	0	1	0	1
		KV097005	0	1	0	1
		KV097007	0	0	1	1
		KV097008	0	5	0	5
		KV097009	0	2	0	2
		KV097010	0	5	0	5
		KV097011	0	1	1	2
		KV097012	0	0	1	1
		KV097013	0	1	0	1
	KV098000	KV098001	0	1	0	1
	KV101000	KV101001	0	7	0	7
		KV101002	8	1	0	9
		KV101003	1	2	0	3
		KV101005	0	1	0	1
	KV103000	KV103001	0	1	0	1
		KV103002	0	1	0	1

Species	Complex	Transect	Visit 1	Visit 2	Visit 3	Total
Caribou	KV107000	KV107001	0	0	4	4
		KV107004	0	0	4	4
		KV107005	2	0	7	9
		KV107006	0	0	1	1
		KV107009	0	0	1	1
	KV113000	KV113006	0	0	1	1
	KV121000	KV121001	0	1	1	2
	KV124000	KV124001	0	1	0	1
	Total		14	132	85	231
Caribou calf	KV022000	KV022003	0	1	0	1
	KV058000	KV058012	0	1	0	1
	Total		0	2	0	2
Moose	KV022000	KV022002	2	0	0	2
		KV022003	0	2	1	3
		KV022005	0	1	0	1
		KV022009	0	1	0	1
		KV022010	0	1	0	1
		KV022011	0	1	0	1
		KV022012	0	1	0	1
	KV023000	KV023001	0	0	1	1
	KV036000	KV036001	0	1	2	3
		KV036002	0	3	3	6
		KV036003	0	2	2	4
		KV036006	0	0	1	1
		KV036007	0	0	3	3
		KV036008	0	0	1	1
		KV036009	0	3	1	4
		KV036010	0	1	0	1
		KV036011	0	2	0	2
		KV036012	0	1	2	3
		KV036013	0	1	2	3
		KV036014	0	2	2	4
		KV036015	1	2	1	4
		KV036017	0	0	2	2
	KV037000	KV037003	0	0	3	3
	KV038000	KV038001	0	0	2	2
		KV038002	3	2	3	8
		KV038003	0	0	1	1
		KV038004	0	0	1	1
		KV038005	0	0	4	4

Species	Complex	Transect	Visit 1	Visit 2	Visit 3	Total
Moose	KV038000	KV038007	0	0	1	1
		KV038010	0	0	3	3
		KV038011	0	1	0	1
		KV038014	0	1	2	3
		KV038016	0	1	1	2
		KV038017	0	0	2	2
		KV038018	0	0	2	2
		KV038019	0	2	2	4
		KV038020	0	0	1	1
	KV039000	KV039001	0	1	4	5
	KV044000	KV044001	0	2	0	2
		KV044002	2	3	6	11
		KV044003	0	1	0	1
		KV044009	2	1	0	3
	KV047000	KV047001	0	0	1	1
		KV047002	0	0	4	4
		KV047003	0	6	2	8
		KV047004	0	0	1	1
		KV047005	0	0	1	1
		KV047006	0	6	0	6
	KV050000	KV050002	0	7	0	7
		KV050003	2	6	10	18
		KV050005	0	3	0	3
		KV050006	0	1	0	1
		KV050007	0	1	0	1
		KV050008	0	2	1	3
	KV058000	KV058001	0	5	0	5
		KV058002	0	0	1	1
		KV058003	0	1	1	2
		KV058004	0	6	1	7
		KV058005	0	2	0	2
		KV058006	0	1	0	1
		KV058009	0	4	1	5
		KV058011	0	1	0	1
		KV058012	0	0	1	1
		KV058013	0	2	1	3
		KV058014	0	1	0	1
	KV061000	KV061001	0	1	2	3
		KV061003	0	3	5	8
	KV062000	KV062001	0	0	1	1

Species	Complex	Transect	Visit 1	Visit 2	Visit 3	Total
Moose	KV063000	KV063001	0	0	2	2
		KV063002	0	1	2	3
		KV063004	0	0	1	1
		KV063005	0	1	0	1
	KV066000	KV066001	0	1	21	22
	KV069000	KV069002	0	1	0	1
		KV069003	0	0	3	3
	KV094000	KV094002	0	3	0	3
		KV094004	0	1	0	1
		KV094005	0	4	0	4
		KV094007	0	1	0	1
	KV097000	KV097001	0	0	1	1
		KV097003	0	0	1	1
		KV097005	1	0	0	1
		KV097007	0	1	1	2
		KV097009	0	1	0	1
		KV097010	0	2	0	2
		KV097011	0	0	1	1
		KV097012	0	2	2	4
	KV098000	KV098001	0	0	1	1
		KV098002	0	0	1	1
	KV101000	KV101001	0	0	5	5
		KV101002	0	0	1	1
		KV101005	0	0	1	1
	KV102000	KV102001	0	5	0	5
		KV102002	0	3	0	3
	KV103000	KV103001	0	3	1	4
		KV103002	0	4	1	5
		KV103003	1	0	0	1
		KV103004	0	1	0	1
		KV103005	0	0	1	1
		KV103006	0	1	1	2
	KV107000	KV107001	0	3	4	7
		KV107002	0	2	4	6
		KV107004	0	1	0	1
		KV107005	0	3	2	5
		KV107006	0	3	0	3
		KV107007	0	6	0	6
		KV107008	0	2	0	2
		KV107009	0	2	0	2

Species	Complex	Transect	Visit 1	Visit 2	Visit 3	Total
Moose	KV113000	KV113001	0	7	3	10
		KV113003	0	1	1	2
		KV113004	0	2	2	4
		KV113006	0	3	4	7
		KV113007	0	1	2	3
		KV113008	0	3	3	6
		KV113009	0	3	0	3
		KV113010	0	1	0	1
		KV113012	0	0	2	2
		KV113013	0	6	0	6
		KV113014	0	3	3	6
	KV116000	KV116001	0	1	1	2
	KV119000	KV119002	1	0	3	4
		KV119003	0	0	5	5
		KV119004	0	0	1	1
		KV119005	0	0	6	6
		KV119006	0	0	5	5
	KV120000	KV120001	0	3	0	3
	KV121000	KV121001	0	6	0	6
	KV123000	KV123001	0	6	0	6
	KV124000	KV124001	2	4	0	6
	Total		17	207	195	419
Moose calf	KV022000	KV022003	0	1	0	1
	KV036000	KV036003	0	0	1	1
	KV037000	KV037003	0	0	1	1
	KV038000	KV038005	0	0	1	1
		KV038010	0	0	1	1
	KV047000	KV047003	0	1	0	1
		KV047006	0	3	0	3
	KV050000	KV050002	0	1	0	1
		KV050008	0	1	0	1
	KV058000	KV058001	0	2	0	2
		KV058009	0	1	0	1
	KV107000	KV107008	0	1	0	1
	KV113000	KV113014	0	0	1	1
	KV120000	KV120001	0	1	0	1
	KV121000	KV121001	0	1	0	1
	Total		0	13	5	18
Black bear	KV038000	KV038005	0	1	0	1
	KV058000	KV058004	0	1	0	1

Species	Complex	Transect	Visit 1	Visit 2	Visit 3	Total
Black bear	KV063000	KV063001	0	1	0	1
	KV066000	KV066001	0	0	1	1
	KV069000	KV069003	0	0	1	1
		KV069004	0	0	2	2
	KV094000	KV094002	0	0	1	1
	KV097000	KV097005	0	1	0	1
	Total		0	4	5	9
Gray wolf	KV063000	KV063001	0	0	1	1
		KV063004	0	1	0	1
	KV102000	KV102001	0	0	1	1
	KV121000	KV121001	2	0	0	2
	Total		2	1	2	5

Table A-9: Number of Camera-days in Peatland Complexes, 2015–2021

Complex Type	Burned in 2013	Complex	2015	2016	2017	2018	2019	2020	2021
Project-affected	Yes	KV103000	164	154	51	128	166	164	161
	No	KV047000	152	104	146	153	166	165	153
		KV061000	152	153	149	148	166	165	146
		KV062000	108	105	64	148	166	176	154
		KV063000	151	153	152	148	166	176	154
		KV066000	144	153	154	148	166	168	149
		Total	707	668	665	745	830	850	756
	Total		871	822	716	873	996	1,014	917
Reference	Yes	KV098000	155	154	154	153	167	174	155
		KV116000	155	155	157	152	168	172	153
		KV119000	159	154	151	153	167	173	158
		KV597000	157	155	152	163	170	176	156
		Total	626	618	614	621	672	695	622
	No	KV023000	154	151	156	144	163	171	160
		KV050000	148	155	165	149	168	173	151
		KV058000	143	48	146	148	166	166	155
		KV097000	154	155	164	152	168	173	154
		KV107000	158	155	164	143	168	172	153
		KV120000	162	107	146	148	167	165	154
		KV121000	162	155	146	148	167	165	154
		Total	1,081	926	1,087	1,032	1,167	1,185	1,081
	Total		1,707	1,544	1,701	1,653	1,839	1,880	1,703
Random	Yes	KV036000	149	154	161	151	166	173	152
		KV123000	157	155	152	528	169	173	149
		KV124000	169	155	158	145	167	112	154
		Total	475	464	471	824	502	458	455
	No	KV022000	153	154	161	149	166	185	153
		KV101000	154	155	156	151	168	173	153
		KV113000	156	155	157	144	168	172	154
		Total	463	464	474	444	502	530	460
	Total		938	928	945	1,268	1,004	988	915

Table A-10: Period Over which Caribou Were Photographed in 23 Peatland Complexes, 2015–2021

Complex Type	Complex	2015	2016	2017	2018	2019	2020	2021
Project	KV103000[1]							
	KV047000							
	KV061000							
	KV062000							
	KV063000						June 5	
	KV066000	June 11–Aug. 12	June 8	July 10–Aug. 20				
Reference	KV098000[1]						May 14	
	KV116000[1]							
	KV119000[1]							
	KV597000[1]							
	KV023000				July 4			
	KV050000		Sep. 8	Sep. 1	May 12			
	KV058000							
	KV097000	May 2–June 4			May 2–July 20	June 10–Aug. 31	June 20–Aug 31	May 1–3
	KV107000				May 27		Aug. 1	Apr. 21–July 12
	KV120000							
	KV121000							
Random	KV036000[1]							Sep. 12
	KV123000[1]							
	KV124000[1]				June 30	May 8–July 15		
	KV022000							
	KV101000	May 2–Aug. 5	June 6–Aug. 26		June 30–Aug. 29	May 3–Aug. 7	June 1–July 28	June 8–12
	KV113000	Aug. 30				May 3–Aug. 14	Aug. 26	

1. Burned in 2013.

Table A-11: Number of Large Mammal Signs Detected During Three Visits to Access Road Tracking Transects, 2021

Species	Access Road	Transect	Visit 1	Visit 2	Visit 3	Total
Caribou	North	N23	3	1	0	4
		N24	0	2	0	2
		N38	1	9	16	26
		N39	0	5	0	5
		N40	0	1	0	1
		S42	0	5	0	5
		S51	0	3	1	4
		S52	0	0	1	1
		S53	0	2	2	4
	South	S1	0	2	0	2
		S10	1	1	0	2
		S15	0	17	4	21
		S16	0	2	0	2
		S8	1	0	9	10
	Total		6	50	33	89
Caribou calf	North	N39	0	2	0	2
		S42	0	2	0	2
		S51	0	1	0	1
		S53	0	0	1	1
	Total		0	5	1	6
Moose	North	N23	1	23	22	46
		N24	8	105	119	232
		N34	16	26	7	49
		N36	19	21	23	63
		N38	10	49	43	102
		N39	8	18	34	60
		N40	0	29	34	63
		S42	2	10	21	33
		S46	9	6	29	44
		S51	6	38	14	58
		S52	8	22	21	51
		S53	0	46	21	67
	South	S1	0	27	41	68
		S10	1	11	24	36
		S15	22	30	17	69
		S16	6	15	19	40
		S18	17	20	6	43
		S8	6	5	45	56

Species	Access Road	Transect	Visit 1	Visit 2	Visit 3	Total
Moose	Total		139	501	540	1180
Moose calf	North	N23	0	0	2	2
		N24	0	3	2	5
		N38	0	5	0	5
		S42	0	1	0	1
		S46	0	0	1	1
		S51	0	3	0	3
		S52	0	1	0	1
		S53	0	6	0	6
	South	S1	0	1	2	3
		S15	0	1	1	2
	Total		0	21	8	29
Black bear	North	N24	0	0	1	1
		N36	0	1	0	1
		N38	0	2	10	12
		N39	1	0	1	2
		N40	2	0	1	3
		S42	0	1	0	1
		S51	0	1	0	1
		S52	0	1	0	1
	South	S1	0	1	2	3
		S18	0	0	1	1
		S8	0	0	2	2
	Total		3	7	18	28
Gray wolf	North	N36	1	0	0	1
		N38	0	1	0	1
		N39	0	1	0	1
		S42	0	1	0	1
		S51	0	2	0	2
	South	S16	1	0	0	1
		S18	4	0	0	4
		S8	0	0	1	1
	Total		6	5	1	12