Keeyask Generation Project

Terrestrial Effects Monitoring Plan

Summer Resident Caribou Range Monitoring Report

TEMP-2017-09

KEEYASK

Manitoba Sustainable Development Client File 5550.00
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2016 - 2017

KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2017-09

SUMMER RESIDENT CARIBOU RANGE

MONITORING REPORT

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. 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 or not more needs to be done to reduce harmful effects.

The objective of this study was to identify the winter distribution and range of the caribou (*Rangifer tarandus*) that occupy the Keeyask Region in summer (referred to in the assessment as summer resident caribou). This report describes the results of an aerial survey conducted for the summer resident caribou in early winter 2016. The survey occurred in Study Zone 5, between Split Lake and Stephens Lake.

Why is the study being done?

Three groups of migratory caribou occasionally occupy the Keeyask Region in winter, which then depart for their calving grounds in spring, where they congregate in large numbers to calve. It is known that some caribou stay in the Keeyask Region in the summer (i.e., the summer resident caribou), and most calve solitarily in the Gull and Stephens lakes area. There is uncertainty about these caribou's herd association and core range. While their summer distribution near Gull and Stephens lakes has generally been identified, the summer resident caribou's winter distribution and range are largely unknown.

What was done?

An aerial survey for summer resident caribou was conducted on pre-defined survey transects from December 8 to 10, 2016. The survey took place before the Pen Islands coastal caribou herd typically migrates back into the Keeyask Region. Observers searched for signs of caribou presence, such as tracks or scat in the snow, to identify the distance that summer resident caribou travel from their known summer range at Gull and Stephens lakes, identified during environmental assessment studies (2011 to 2014). When caribou were observed, group size, age (calf or adult), and sex were recorded where possible. The winter locations of the summer resident caribou and their tracks were mapped and compared with their summer distribution by measuring the distance between previously identified calving areas at Gull and Stephens lakes and their winter locations.

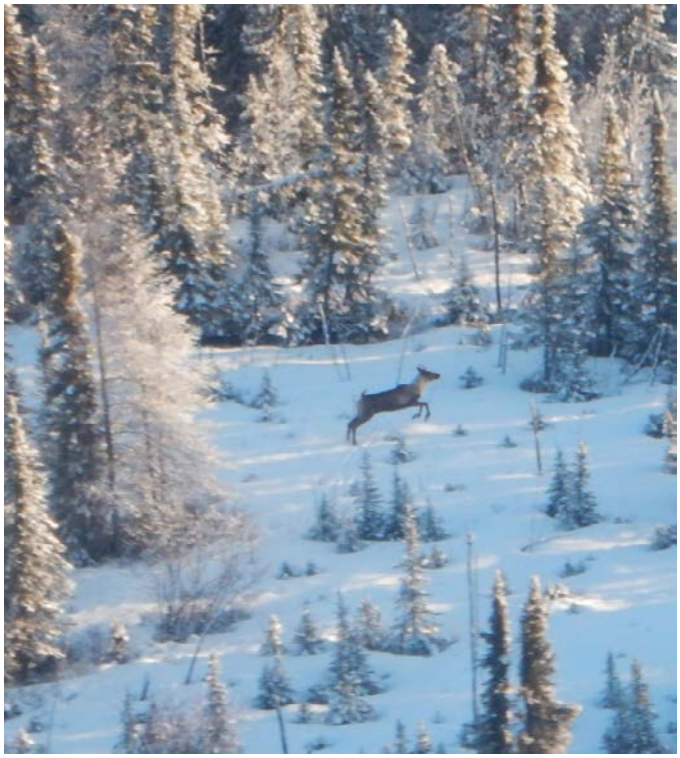
Fecal samples were collected during the aerial survey in December 2016 and were genetically tested to verify the identity of the caribou observed, and to provide an indication of their winter distribution. Results were compared with those from samples collected opportunistically in the

Gull and Stephens lakes region during other terrestrial fieldwork in early fall 2014 and summer 2015, which will help define the genetic signature of the summer resident caribou.

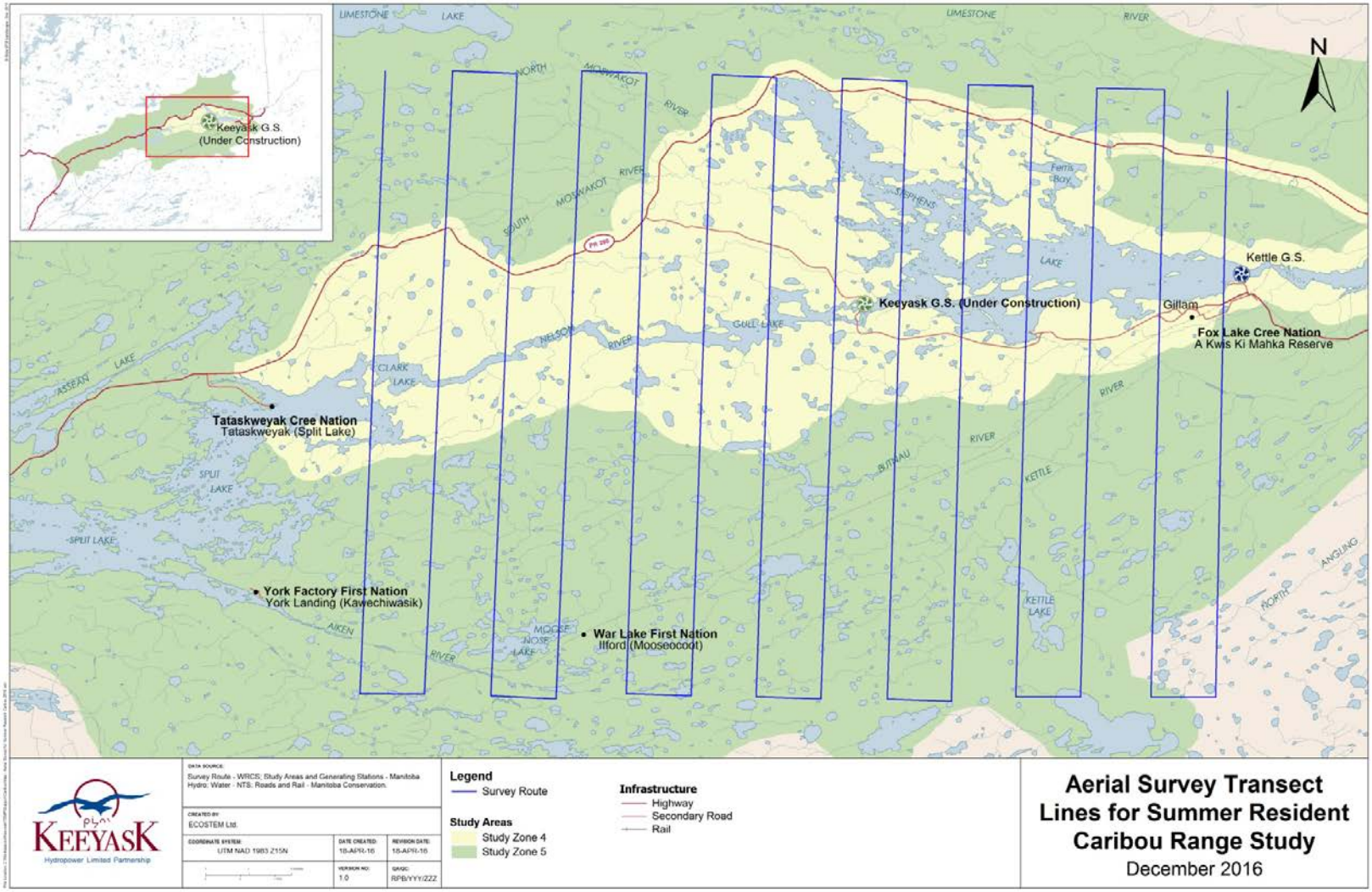
What was found?

Caribou or their signs were observed at five locations during the December aerial survey, all south of the Nelson River between Stephens and Clark lakes. Four caribou were observed in two groups, each with one female and one calf. No radio-collars were observed on either female. All signs and observations were south or west of the summer resident caribou's previously identified calving range, with approximately 60 km separating the two areas. The observation nearest to the Project was approximately 16 km southeast of the generating station site, and the farthest was approximately 45 km southwest of the site, near Clark Lake.

Eight fecal pellet samples were collected at the two locations where caribou were observed during the 2016 aerial survey, none of which matched samples collected in previous years, or samples collected from 2010-2015 by Manitoba Sustainable Development.



Caribou Observed During Aerial Survey in December 2016


Keeyask G.S.
(Under Construction)
LIMESTONE LAKE
LIMESTONE RIVER
NORTH MOSWAKOT RIVER
SOUTH MOSWAKOT RIVER
STEPHENS LAKE
Ferris Boy
PR 280
Kettle G.S.
Keeyask G.S. (Under Construction)
Gillam
Fox Lake Cree Nation
A Kwis Ki Mahka Reserve
NELSON RIVER
GULL LAKE
CLARK LAKE
ASSEAN LAKE
Tataskweyak Cree Nation
Tataskweyak (Split Lake)
SPLIT LAKE
BUTNAU RIVER
KETTLE RIVER
KETTLE LAKE
ANGLING LAKE NORTH
York Factory First Nation
York Landing (Kawechiwasik)
AIKEN RIVER
MOOSE NOSE LAKE
War Lake First Nation
Ilford (Mooseocoot)
N
Legend
Survey Route
Study Areas
Study Zone 4
Study Zone 5
Infrastructure
Highway
Secondary Road
Rail
Aerial Survey Transect Lines for Summer Resident Caribou Range Study
December 2016
KEEYASK
Hydropower Limited Partnership
ECOSTEM Ltd.
UTM NAD 1983 21SN
18-APR-16
1.0

What does it mean?

Observations of caribou and their signs during the aerial survey indicate that some summer resident caribou's winter range may include areas not surveyed in summer. Early in the winter of 2016/17, most caribou activity was concentrated in a relatively small area, and not scattered throughout the broader region, similar to the winter of 2015/16. In 2015, the genetics study found that one of the caribou that used Stephens Lake in summer was located south of the Nelson River in winter. No additional winter range of summer resident caribou was identified in 2016. Although it is possible that most summer resident caribou winter range may be found outside the eastern half of Study Zone 5, which is in part corroborated by Manitoba Sustainable Development's recent radio-collaring data, the absence of evidence suggests that this is not yet conclusive.

What will be done next?

The summer resident caribou aerial survey will be repeated at least once more during the construction period, in the early winter when suitable snow cover exists. Fecal samples will continue to be collected during field studies and will be analyzed to learn more about the herd association of these caribou. Additionally, information from radio-collared coastal caribou (a program being led by Manitoba Sustainable Development) may also be used to help further define the winter range of individuals that remain in the Keeyask Region in the summer.

STUDY TEAM

We would like to thank Sherrie Mason and Rachel Boone of Manitoba Hydro, Ron Bretecher of North/South Consultants Inc., and Custom Helicopters for logistical assistance in the field. We would also like to thank James Ehnes of ECOSTEM Ltd. for GIS support and mapping.

Biologists, technicians, and other personnel who designed, participated in, and drafted the survey results included:

- Robert Berger, (M.N.R.M.) – Design, analysis, and reporting
- Andrea Ambrose (B.Sc.) – Analysis and reporting
- Nicholas LaPorte (M.N.R.M.) – Crew leader
- Kaitlin McCormick (B.Sc. Hons.) – Survey personnel
- Leslie Flett (Tataskweyak Cree Nation) – Survey personnel

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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.

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, "summer resident" caribou (*Rangifer tarandus*) winter range, during the construction and operation phases.

Caribou are medium-sized ungulates (hoofed mammals) that require large tracts of undisturbed habitat in which to live. Further classification of the species is based mainly on morphological characteristics, habitat use, behaviour, and genetics. In particular, solitary versus *en masse* calving strategies and seasonal movements are distinguishing factors. The extent of seasonal movements varies by population, from short relocations within a home range to long-distance migrations.

Portions of three migratory caribou herds occasionally occupy the Keeyask Region in winter: barren-ground caribou (*R. t. groenlandicus*) from the Qamanirjuaq herd and two groups of coastal caribou, the Pen Islands and Cape Churchill herds, which are a forest-tundra ecotype of woodland caribou (*R. t. caribou*). Large groups of migratory caribou are generally absent from the Keeyask Region in spring and summer, as they leave the area to calve *en masse* in Nunavut, northern Ontario, or northern Manitoba.

In addition to the large migratory barren-ground and coastal caribou herds that may be present in winter, a small group of woodland caribou occupies the Keeyask Region in spring and summer. They are similar in appearance to coastal caribou, but most disperse and calve solitarily in the Keeyask Region in spring. There is uncertainty as to their herd association and core range, and they are referred to as summer resident caribou in the Project's assessment and monitoring. While they are known to occupy the Gull and Stephens lakes area in spring and summer, summer resident caribou's winter distribution and range are not well understood. As such, the objectives of the summer resident caribou range studies, outlined in Section 6.2.3 of the TEMP, were to evaluate their winter distribution via aerial survey and to provide an indication of their home range through genetic sampling, in order to verify potential Project

effects on this group in the winter, in addition to those anticipated during the calving and calf-rearing season.

2.0 METHODS

2.1 AERIAL SURVEY

An aerial survey for summer resident caribou was conducted in a portion of Study Zone 5 (Map 1) from December 8 to 10, 2016. Fourteen transects, 60 km in length and spaced 6 km apart, were flown in a Bell Jet Ranger helicopter (Map 2). Three observers and a pilot searched for signs of caribou presence, such as tracks or scat in the snow, to identify the distance summer resident caribou had travelled from their known summer calving areas (identified during Project assessment studies from 2011 to 2014) at Gull and Stephens lakes. Tracks were followed until they were no longer visible or until caribou were located. Group size and demographics were recorded where possible; then surveying along the transect was resumed. No large groups of coastal caribou were known to be within the Keeyask Region at the time of the survey, and it is believed that all observations were of summer resident caribou or their signs.

Following the aerial survey, the winter locations of caribou and their tracks were mapped. The winter distribution of the summer resident caribou was compared with their known summer distribution by measuring the distance between the previously identified calving areas at Gull and Stephens lakes and the winter locations.

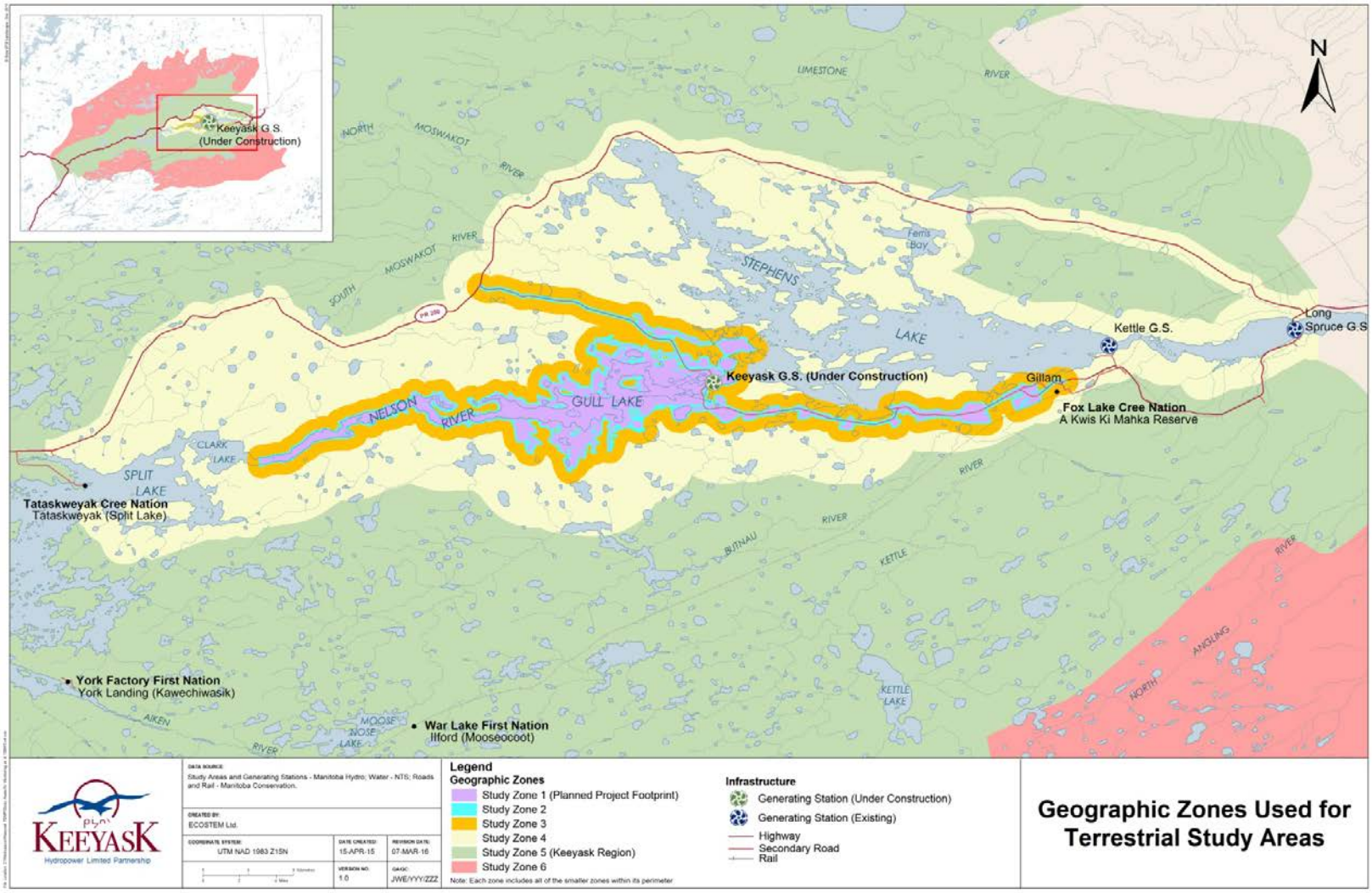
2.2 FECAL PELLET SAMPLE COLLECTION

Fecal samples were collected from islands in Gull and Stephens lakes in September 2014 and in July and August 2015, to help define the genetic signature of summer resident caribou via genetic analysis. As large numbers of migratory caribou are generally absent from the Keeyask Region in spring and summer, fresh fecal samples were from caribou that remained in the area for the calving season. Fecal samples were also collected during the aerial surveys in December 2016 and November 2015 and sent for testing to provide an indication of their home range. All fecal samples were placed in sterile bags, frozen, and shipped to Trent University in Ontario for genetic analysis. Samples were collected by Manitoba Sustainable Development between 2010-2015 (V. Trim, Pers. Comm.). These samples were made available for reference purposes to identify individuals.

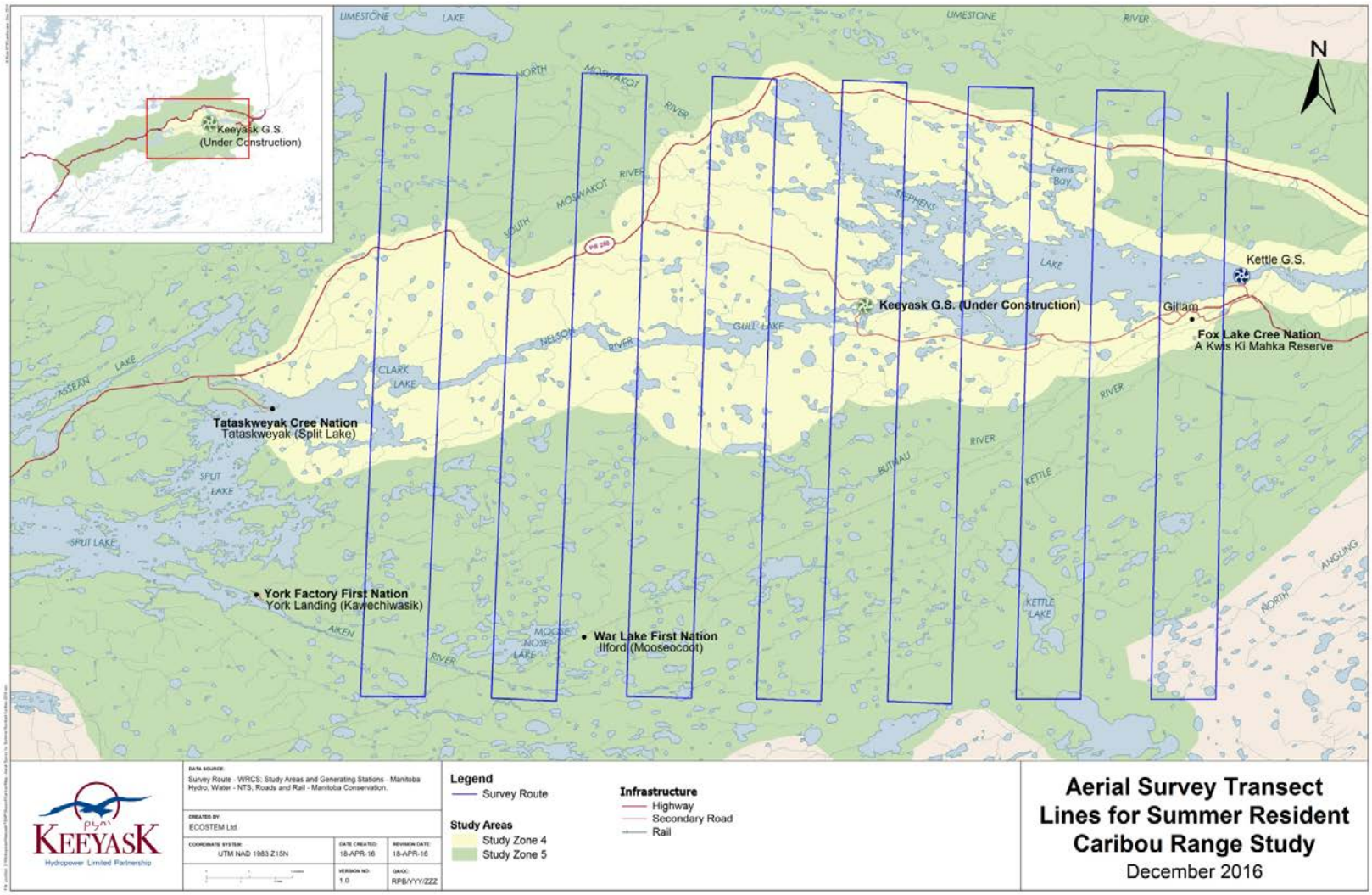
DNA extraction occurred by removing the mucosal layer of epithelial cells that coats the fecal pellets, as described by Ball *et al.* (2007). Nine polymorphic microsatellite loci were used (RT5, RT6, RT9, RT24, RT30, BM888, Map2C, BM848 and RT7; Bishop *et al.* 1994; Wilson *et al.* 1997; Cronin *et al.* 2005) along with caribou-specific Zfx/Zfy primers for sex identification. All samples were independently scored by two scorers to ensure high quality of allele scores.

Samples were reamplified if they failed or showed ambiguous scores. Samples were discarded from the analysis if too few loci amplified due to degraded DNA.

ALLELEMATCH, a computer program that identifies unique genotypes by clustering multilocus genotypic data from multiple samples (Galpern *et al.* 2012), was run on the samples to identify those with identical genotypes, indicating that they came from the same individual. Individuals and their locations were mapped using ArcGIS.



Map 1: Geographic Zones Used for Terrestrial Study Areas



Map 2: Aerial Survey Transect Lines for Summer Resident Caribou Range Study, December 2016

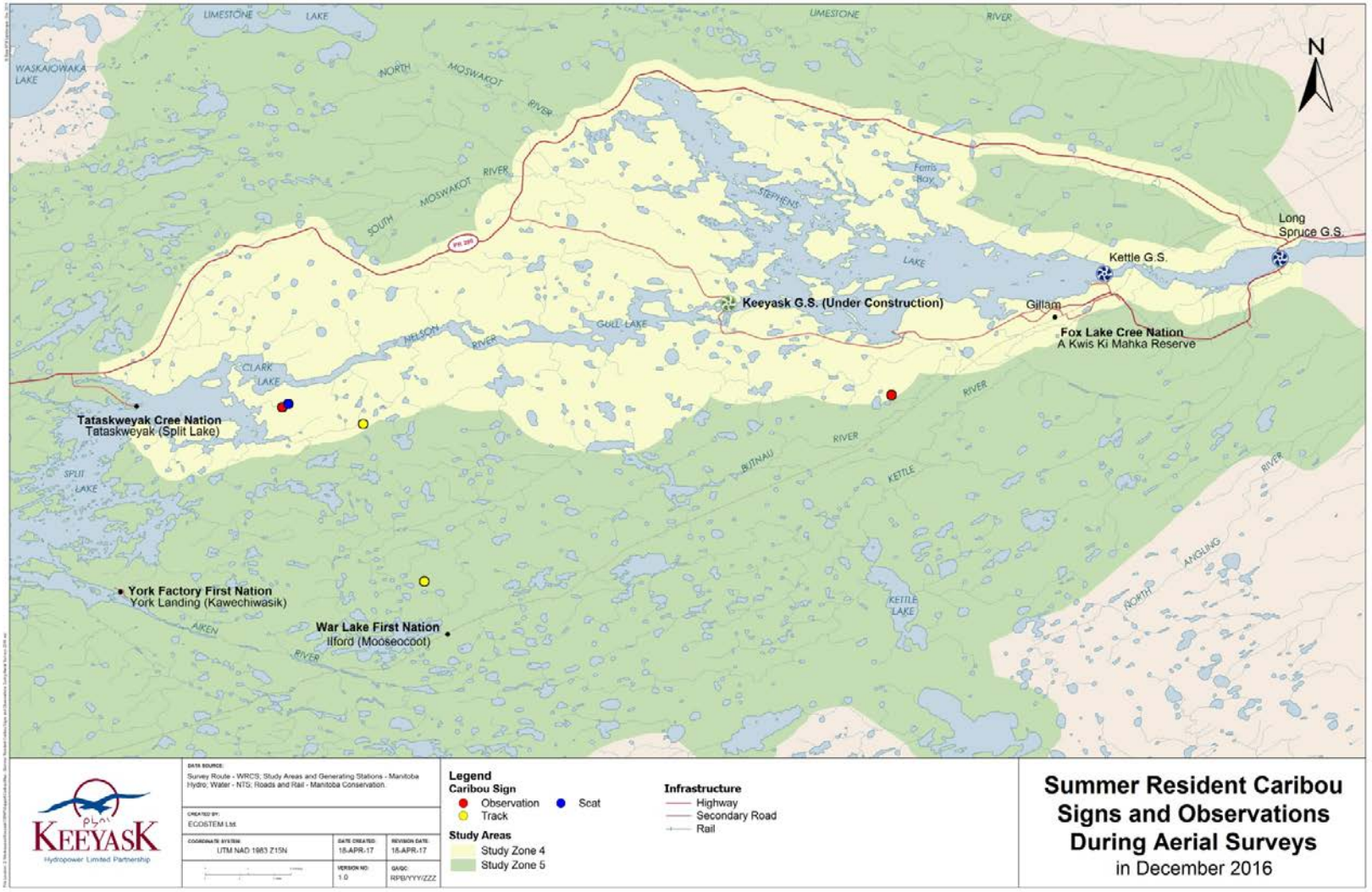
3.0 RESULTS

3.1 AERIAL SURVEY

Caribou and/or their signs were observed at five locations during the December 2016 aerial survey, all south of the Nelson River between Clark and Stephens lakes (Map 3). Two groups consisting of a female and calf were observed (Photo 1, Photo 2) approximately 60 km apart. Neither female was radio-collared. Caribou signs were recorded at three other locations. The nearest observation of caribou or their signs was approximately 16 km southeast of the Project site, and the farthest was approximately 45 km southwest of the site. Most observations were southwest of the summer resident caribou's known calving range, and near the caribou observed under the same study in November 2015 (Map 4).

3.2 FECAL PELLET SAMPLE COLLECTION

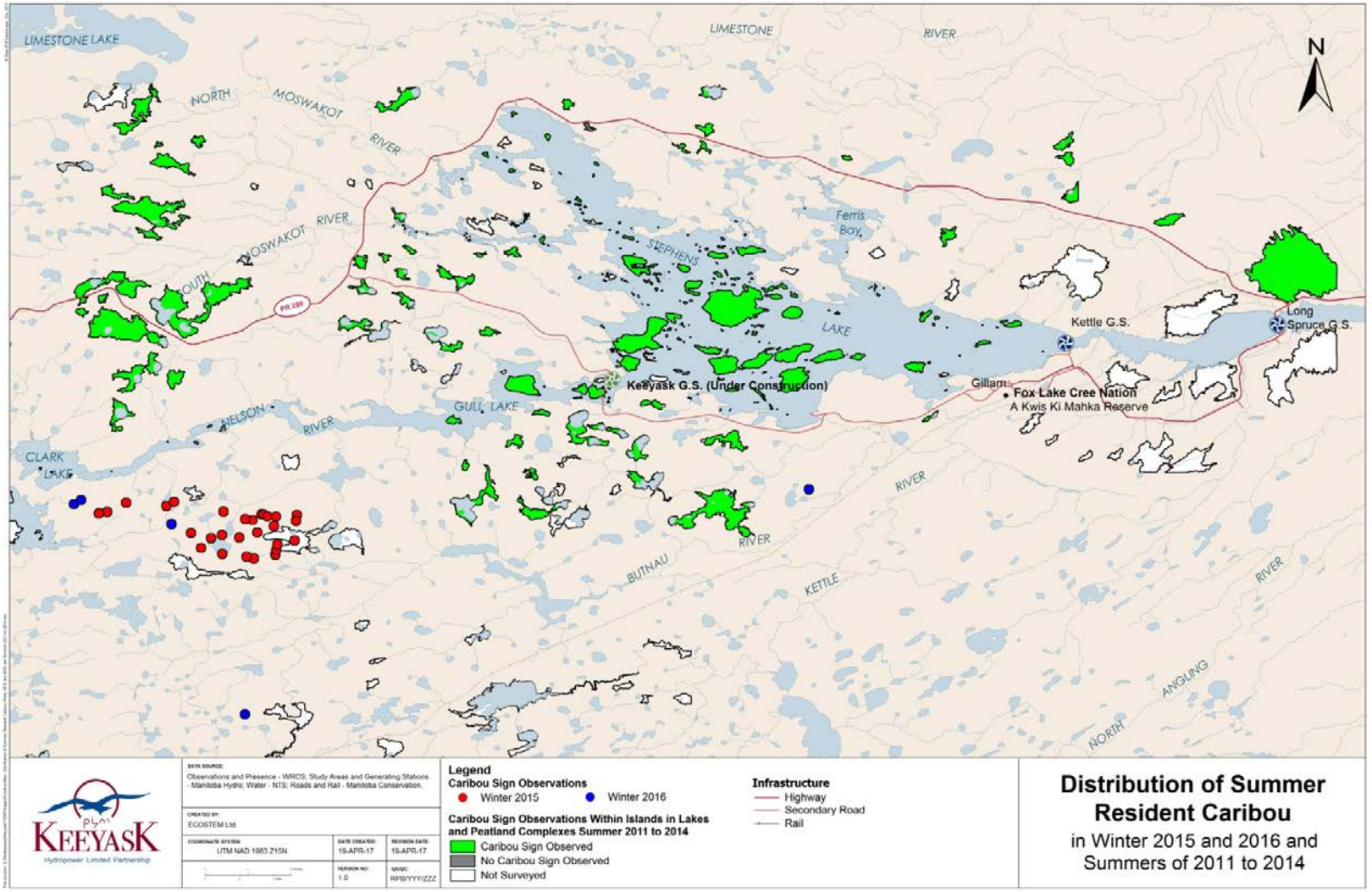
Eight samples were collected at the two locations where caribou were observed during the aerial survey in December 2016 (see Map 3). Twenty-nine samples were collected at two locations during the aerial survey in November 2015 (Map 5). Twelve fecal pellet samples were collected opportunistically during other terrestrial fieldwork in September 2014 - four were collected from two islands in Stephens Lake, five were gathered north of Provincial Road (PR) 290 near the Limestone GS, and three were collected between Stephens Lake and PR 280 (Map 6). Seventy samples were also collected in the Gull and Stephens lakes region between July 11 and August 12, 2015 (Map 7), as part of the caribou ground tracking fieldwork. None of the eight samples collected in 2016 matched those from previous years or those collected by Manitoba Sustainable Development from 2010-2015; no individuals previously sampled were re-identified.



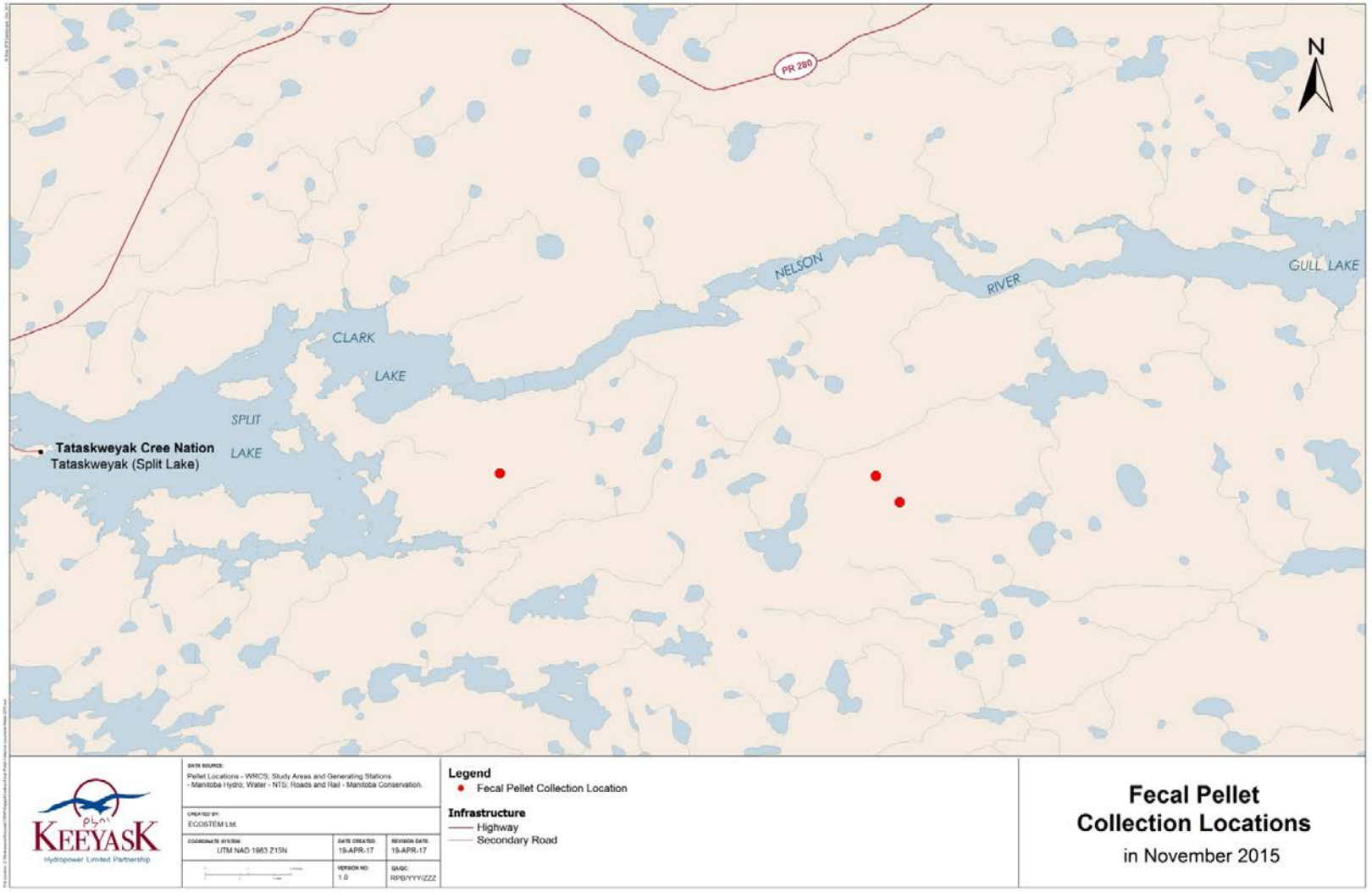
Map 3: Summer Resident Caribou Signs and Observations During Aerial Survey in December 2016

Photo 1: Caribou Female and Calf Observed in December 2016

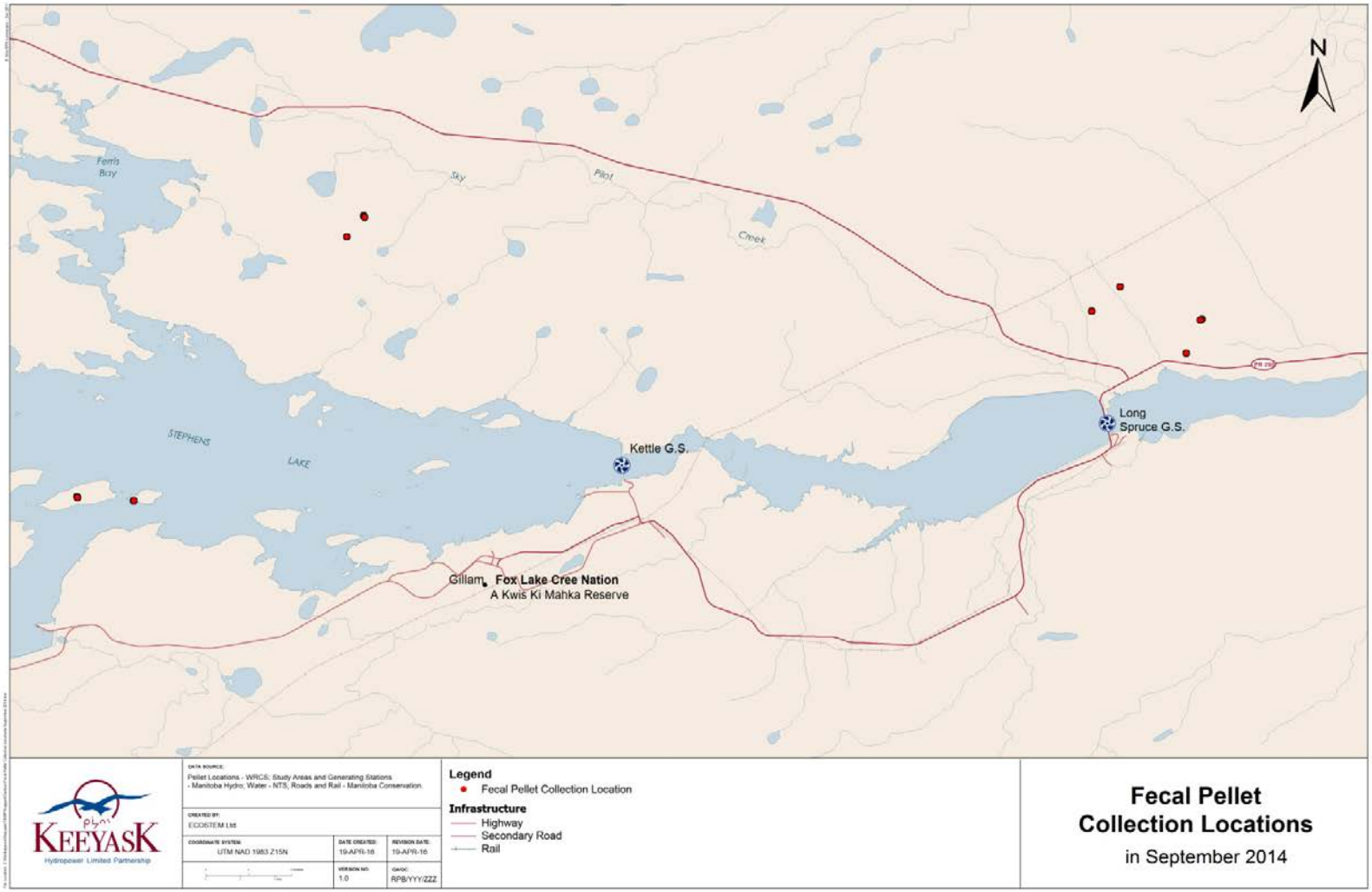
Photo 2: Second Caribou Female and Calf Observed in December 2016



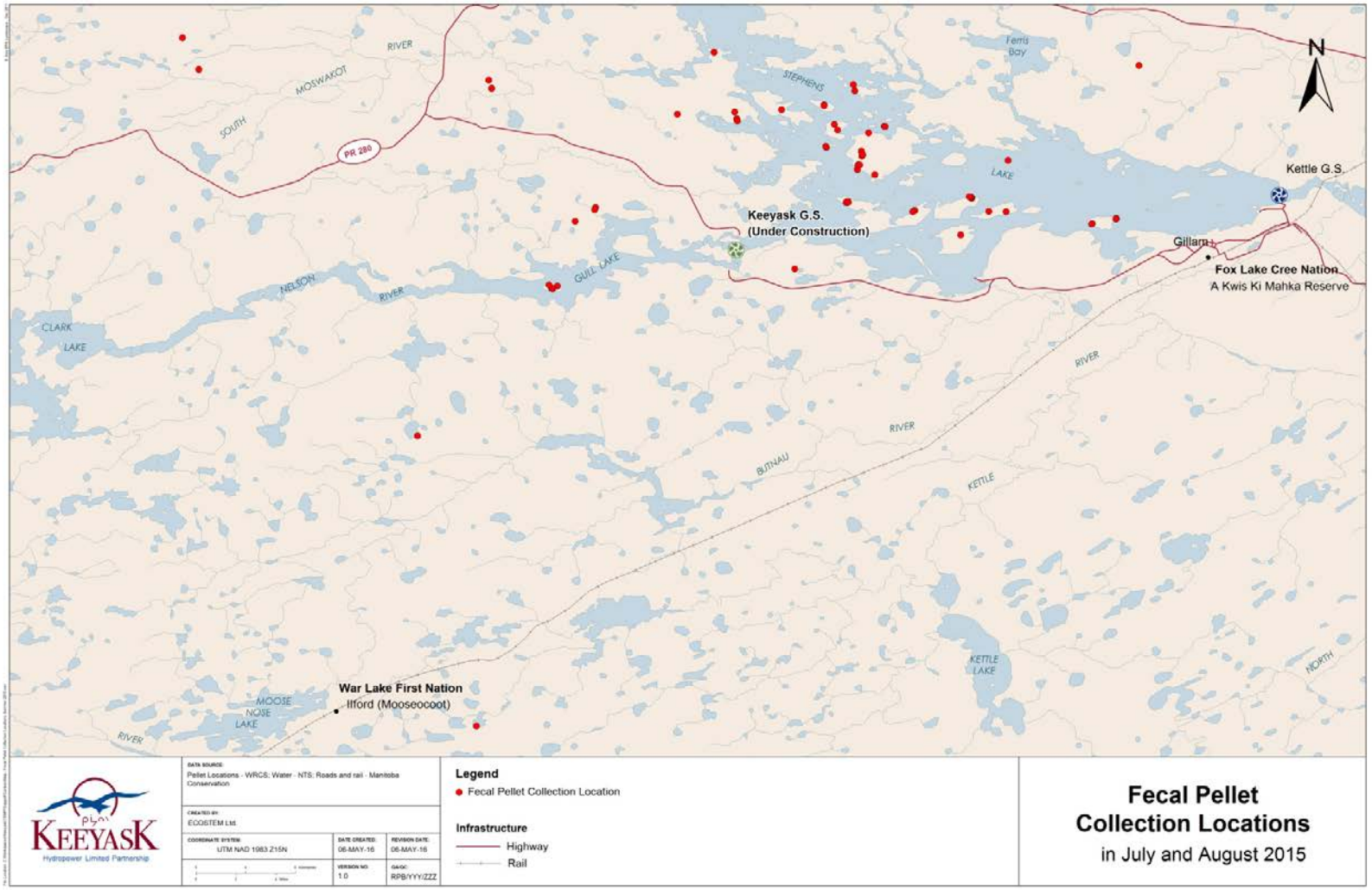
Map 4: Distribution of Summer Resident Caribou in Winters of 2015 and 2016 and Summers of 2011 to 2014



Map 5: Fecal Pellet Collection Locations in November 2015



Map 6: Fecal Pellet Collection Locations in September 2014



Map 7: Fecal Pellet Collection Locations in July and August 2015

4.0 SUMMARY AND CONCLUSIONS

Observations of caribou and their signs during the December 2016 aerial survey indicate that the summer resident caribou's winter range may include areas not surveyed in summer. No large groups of migratory caribou were known to be in the Keeyask region over the winter of 2016/17. Caribou were observed in large numbers outside of the Keeyask region near Shamattawa. A First Nations member reported that he had never seen so many caribou blocking the winter road in mid-February, 2017. These caribou were moving eastward.

In 2015, one caribou that calved on Stephens Lake was found south of Nelson River in winter in at least two locations. No additional winter range of summer resident caribou was identified in 2016.

Early in the winter of 2016/17, caribou activity in the Project area was concentrated in a relatively small area, and not scattered throughout the Keeyask Region, similar to the winter of 2015/16. Data from these surveys will contribute to winter range mapping for the summer resident caribou, which will be conducted in at least one more year in the early winter during the construction period; conditions will be evaluated to determine whether a survey will be conducted in a given winter. Information from radio-collared caribou (a program being led by Manitoba Sustainable Development) may also be used to help further delineate the winter range of individuals that remain in the Keeyask Region in the summer. Initial evidence suggests that a few caribou were found in the eastern half of Study Zone 5 in some years, while recently, animals have moved outside this study area. Although it is possible that most summer resident caribou winter range may be found outside the eastern half of Study Zone 5, which is in part corroborated by Manitoba Sustainable Development's recent radio-collaring data, the absence of evidence suggests that this is not yet conclusive.

5.0 LITERATURE CITED

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