Keeyask Generation Project

Terrestrial Effects Monitoring Plan

Summer Resident Caribou Range Monitoring Report

TEMP-2016-07

KEEYASK

Manitoba Conservation and Water Stewardship Client File 5550.00
Manitoba Environment Act Licence No. 3107

2015 - 2016

KEEYASK GENERATION PROJECT

TERRESTRIAL EFFECTS MONITORING PLAN

REPORT #TEMP-2016-07

SUMMER RESIDENT CARIBOU RANGE

MONITORING REPORT

Prepared for

Manitoba Hydro

By

Wildlife Resource Consulting Services MB Inc.

June 2016

This report should be cited as follows:

Wildlife Resource Consulting Services MB Inc. 2016. Summer Resident Caribou Range Monitoring Report. Keeyask Generation Project Terrestrial Effects Monitoring Plan Report #TEMP-2016-07. Prepared for Manitoba Hydro by Wildlife Resource Consulting Services MB Inc., Winnipeg, MB.

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.

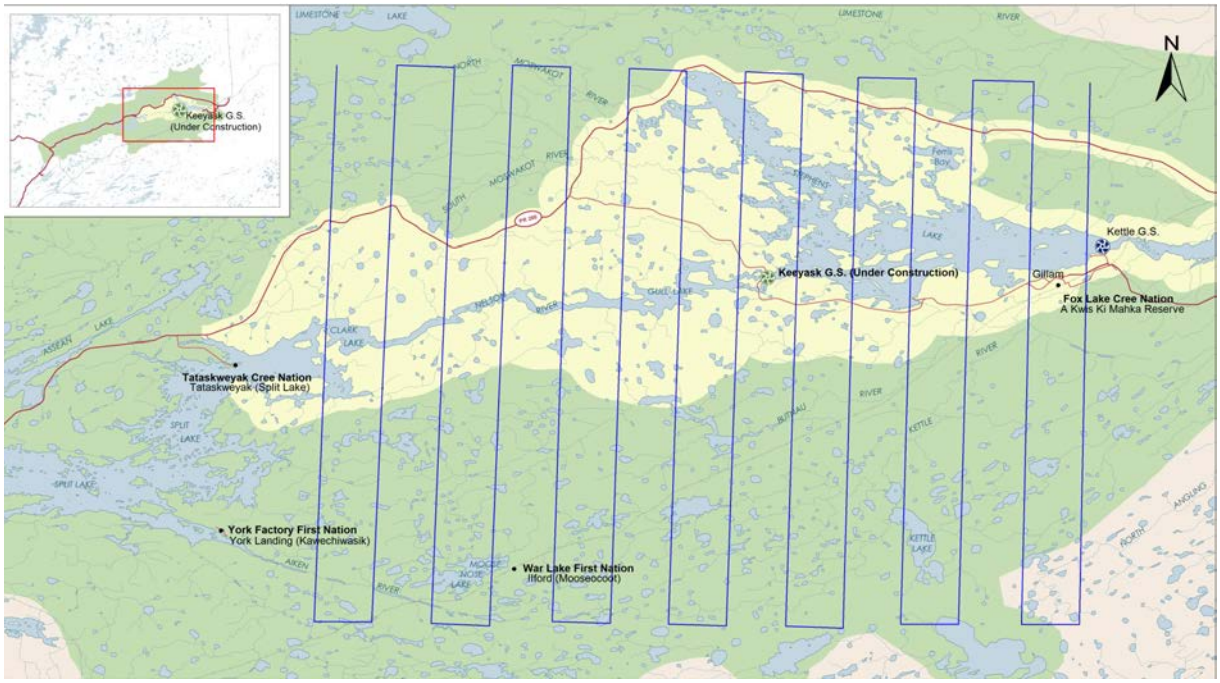
The objective of this study was to identify the winter distribution and range of the caribou (*Rangifer tarandus*) that occupy the Keeyask Region in summer (referred to as summer resident caribou). This report describes the results of an aerial survey conducted for the summer resident caribou in early winter 2015. 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. A fourth group of caribou is known to stay in the Keeyask Region in the summer, and calve solitarily in the Gull and Stephens lakes area. Their herd association and core range have not been defined. While their summer distribution near Gull and Stephens lakes has generally been identified, the summer resident caribou's winter distribution and range are unknown.

WHAT WAS DONE?

An aerial survey for summer resident caribou was conducted from November 26 to 29, 2015. The survey took place before the Pen Islands coastal caribou herd had migrated 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. 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 were compared with their summer distribution by measuring the distance between known calving areas at Gull and Stephens lakes and their winter locations.



Survey route for November 2015 aerial survey

Fecal samples also were collected during the aerial survey in November 2015 and will be genetically tested to verify the identity of the caribou observed and to map their home range. Results will be 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 summer resident caribou.

WHAT WAS FOUND?

Caribou or their signs were observed at 28 locations during the November aerial survey, all south of the Nelson River between Clark and Gull lakes. Twenty-five caribou were observed in two groups; one group of six and one group of 19 were identified. Of these, 10 were calves. Radio-collars were observed on at least two animals. All signs and observations were south or west of summer residents' known calving range in an area approximately 61 km² in size. The nearest observation was approximately 28 km southwest of Gull Rapids, and the farthest was approximately 42 km away.

Twenty-nine fecal pellet samples were collected at two locations during the aerial survey. Results of the genetic analyses are pending.

Caribou observed during aerial survey in November 2015

WHAT DOES IT MEAN?

Observations of caribou and their signs during the aerial survey indicate that the summer residents' winter range may include areas not surveyed in summer. Early in the winter of 2015/16, caribou activity was concentrated in a relatively small area, and not scattered throughout the broader region. Data from the survey will contribute to winter range mapping for the summer resident caribou.

WHAT WILL BE DONE NEXT?

The summer resident caribou aerial survey will be repeated at least two more times 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 Conservation and Water Stewardship) may also be used to help define the winter range of individuals that remain in the Keeyask Region in the summer.

STUDY TEAM

We would like to thank Pat Chartier of Gillam Air, Jessie Whittaker of Custom Helicopters, Sherrie Mason, Rachel Boone and Caroline Walmsley 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, 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
- Mark Baschuk (M.Sc.) – Reporting
- Gordon Macdonald (B.Env.Sc.) – Crew leader
- Nicholas LaPorte (M.N.R.M.) – Survey personnel
- Jonathan Kitchekeesik (TCN) – Survey personnel

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 METHODS 3
2.1 AERIAL SURVEY 3
2.2 FECAL PELLET SAMPLE COLLECTION 3
3.0 RESULTS 7
3.1 AERIAL SURVEY 7
3.2 FECAL PELLET SAMPLE COLLECTION 7
4.0 SUMMARY AND CONCLUSIONS 14
5.0 LITERATURE CITED 15

LIST OF MAPS

Map 1: Geographic Zones Used for Terrestrial Study Areas 5
Map 2: Aerial Survey Transect Lines for Summer Resident Caribou Range Study, November 2015 6
Map 3: Summer Resident Caribou Signs and Observations During Aerial Survey in November 2015 8
Map 4: Distribution of Summer Resident Caribou in Winter 2015 and Summers of 2011–2014.....11
Map 5: Fecal Pellet Collection Locations in September 2014.....12
Map 6: Fecal Pellet Collection Locations in July and August 2015.....13

LIST OF PHOTOS

Photo 1: Caribou Tracks 9
Photo 2: Group of Six Caribou 9
Photo 3: Group of 19 Caribou 10

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 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. The *Terrestrial Effects Monitoring Plan* (TEMP) was developed 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, unlike migratory caribou, they disperse and calve solitarily in the Keeyask Region in spring. Their herd association and core range have not been identified, 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 residents' winter distribution and range are unknown. 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 identify 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 November 26 to 29, 2015. 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 range 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 occupy the Keeyask Region at the time of the survey, and it is believed that all observations were of summer residents or their signs.

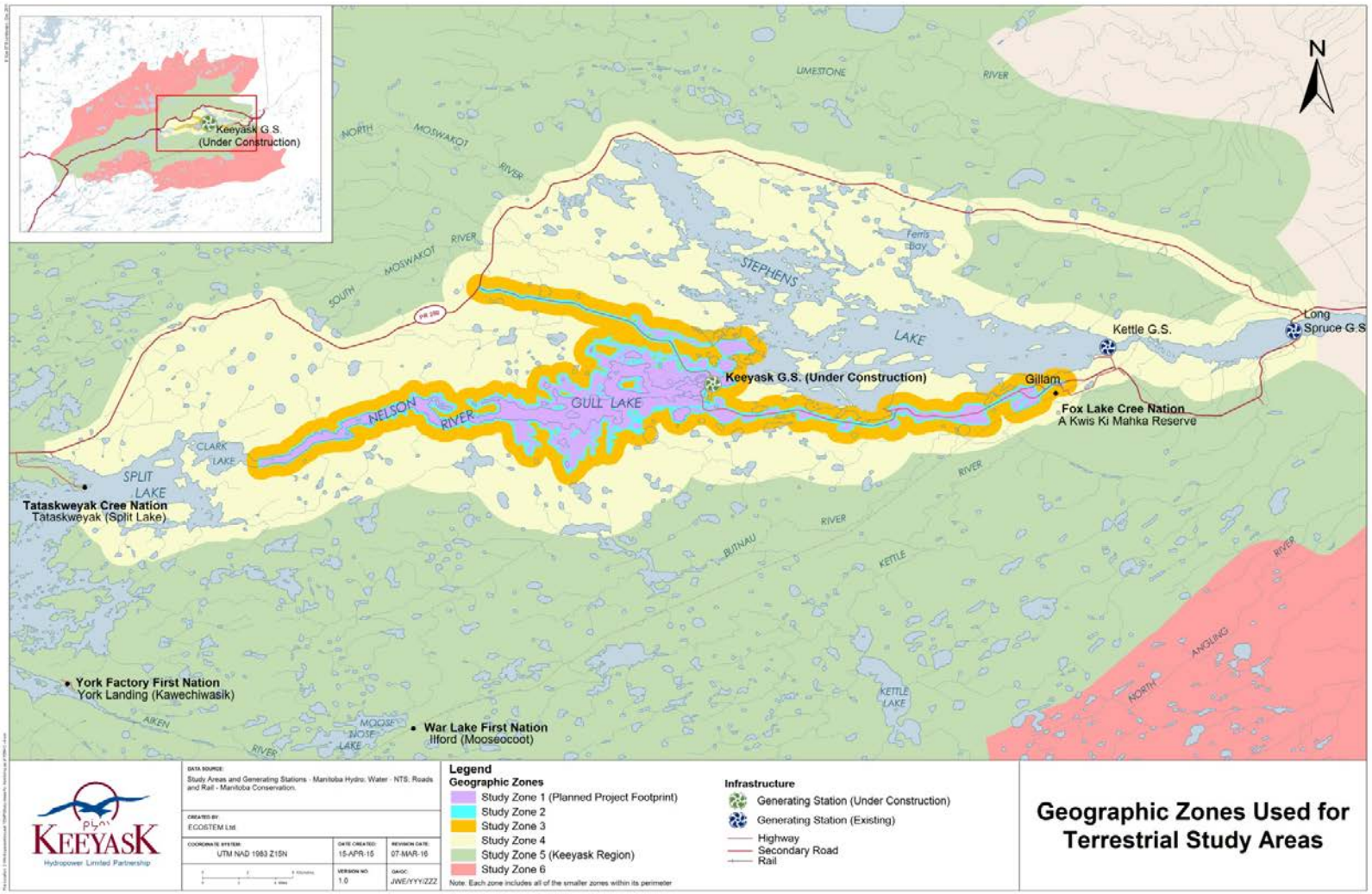
Following the aerial survey, the winter locations of caribou and their tracks were mapped. The winter distribution of the summer resident caribou was compared with their summer distribution by measuring the distance between known calving areas at Gull and Stephens lakes and their winter locations.

2.2 FECAL PELLET SAMPLE COLLECTION

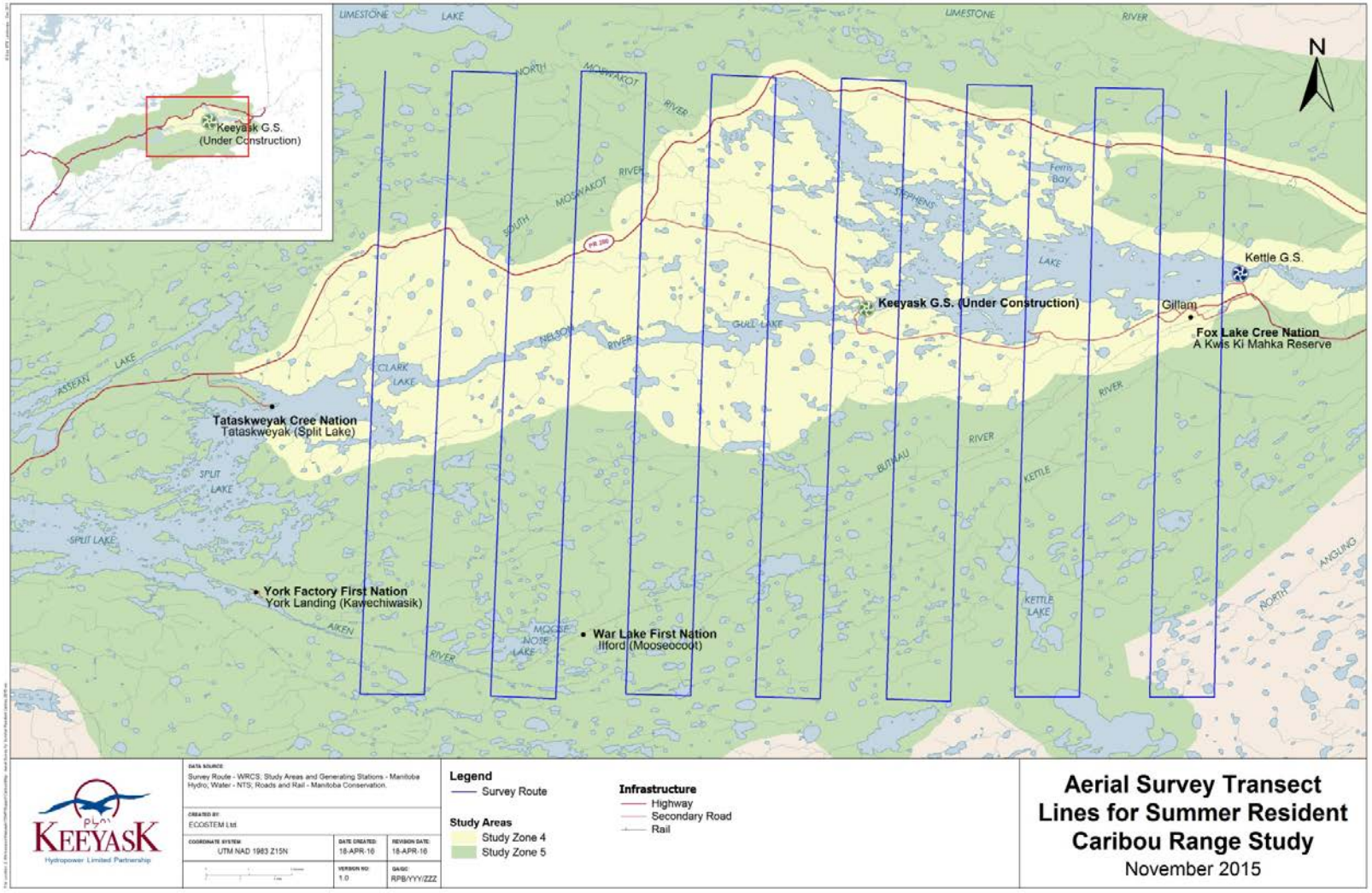
Fecal samples were collected from islands in Gull and Stephens lakes in September 2014 and in July and August 2015, to help define the genetic signature of summer resident caribou via genetic analysis. As large numbers of migratory caribou are generally absent from the Keeyask Region in spring and summer, fresh fecal samples were from caribou that remained in the area for the calving season. Fecal samples were also collected during the aerial survey in November 2015 and sent for testing to verify the herd association of the caribou observed and to map their home range. All fecal samples were placed in sterile bags, frozen, and shipped to Trent University in Ontario for genetic analysis.

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, November 2015

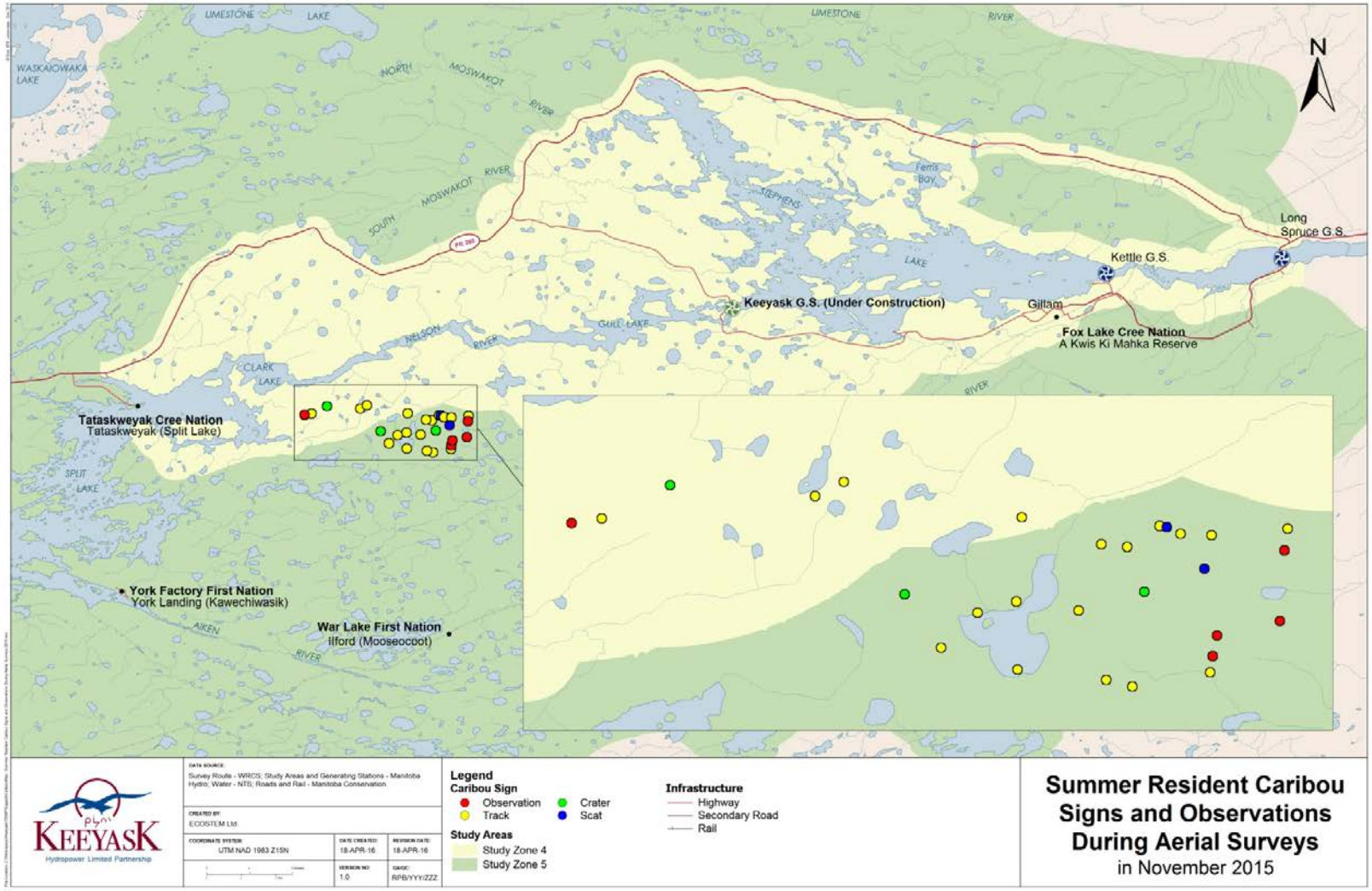
3.0 RESULTS

3.1 AERIAL SURVEY

Caribou and/or their signs were observed at 28 locations during the November aerial survey, all south of the Nelson River between Clark and Gull lakes (Map 3). Tracks were mainly oriented east-west or west-east (Photo 1). Twenty-five caribou were observed in two areas; one group of six (Photo 2) and one group of 19 were identified (Photo 3). Of these, 10 were calves. Radio-collars were observed on at least two animals. Caribou and their signs were found in a relatively small area, roughly 61 km^2. All were south or west of the summer residents' known calving range (Map 4). The nearest observation of signs was approximately 28 km southwest of Gull Rapids, and the farthest was approximately 42 km away.

3.2 FECAL PELLET SAMPLE COLLECTION

Twenty-nine samples were collected at two locations during the aerial survey in November 2015 (see Map 3). Twelve fecal pellet samples were collected opportunistically during other terrestrial fieldwork on September 30 and 31, 2014 - four were collected from two islands in Stephens Lake, five were gathered north of Provincial Road (PR) 290 near Limestone Generating Station, and three were collected between Stephens Lake and PR 280 (Map 5). Seventy samples were also collected in the Gull and Stephens lakes region between July 11 and August 12, 2015 (Map 6), as part of the caribou ground tracking fieldwork. Results of the genetic analyses are pending.

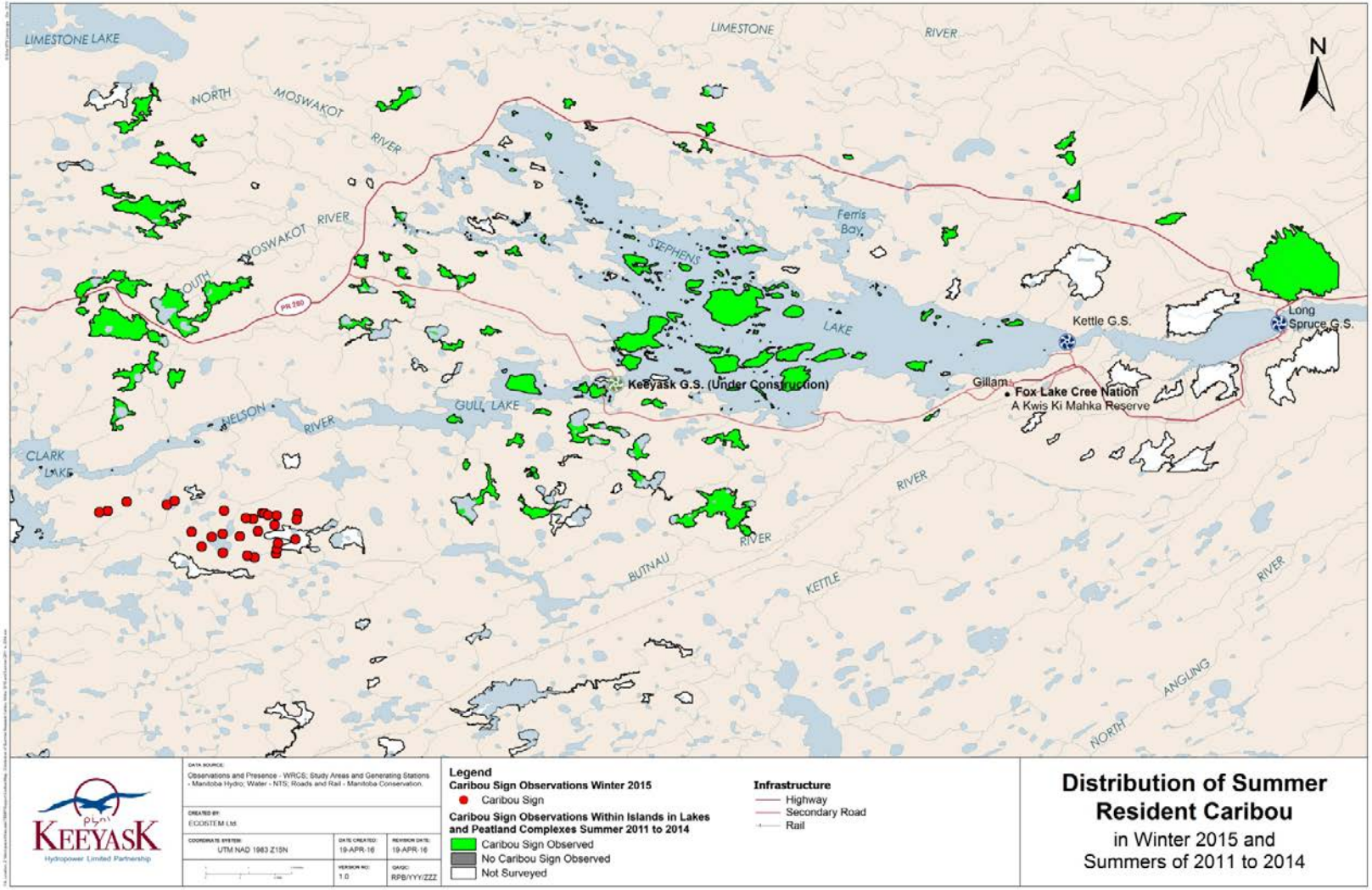


Map 3: Summer Resident Caribou Signs and Observations During Aerial Survey in November 2015

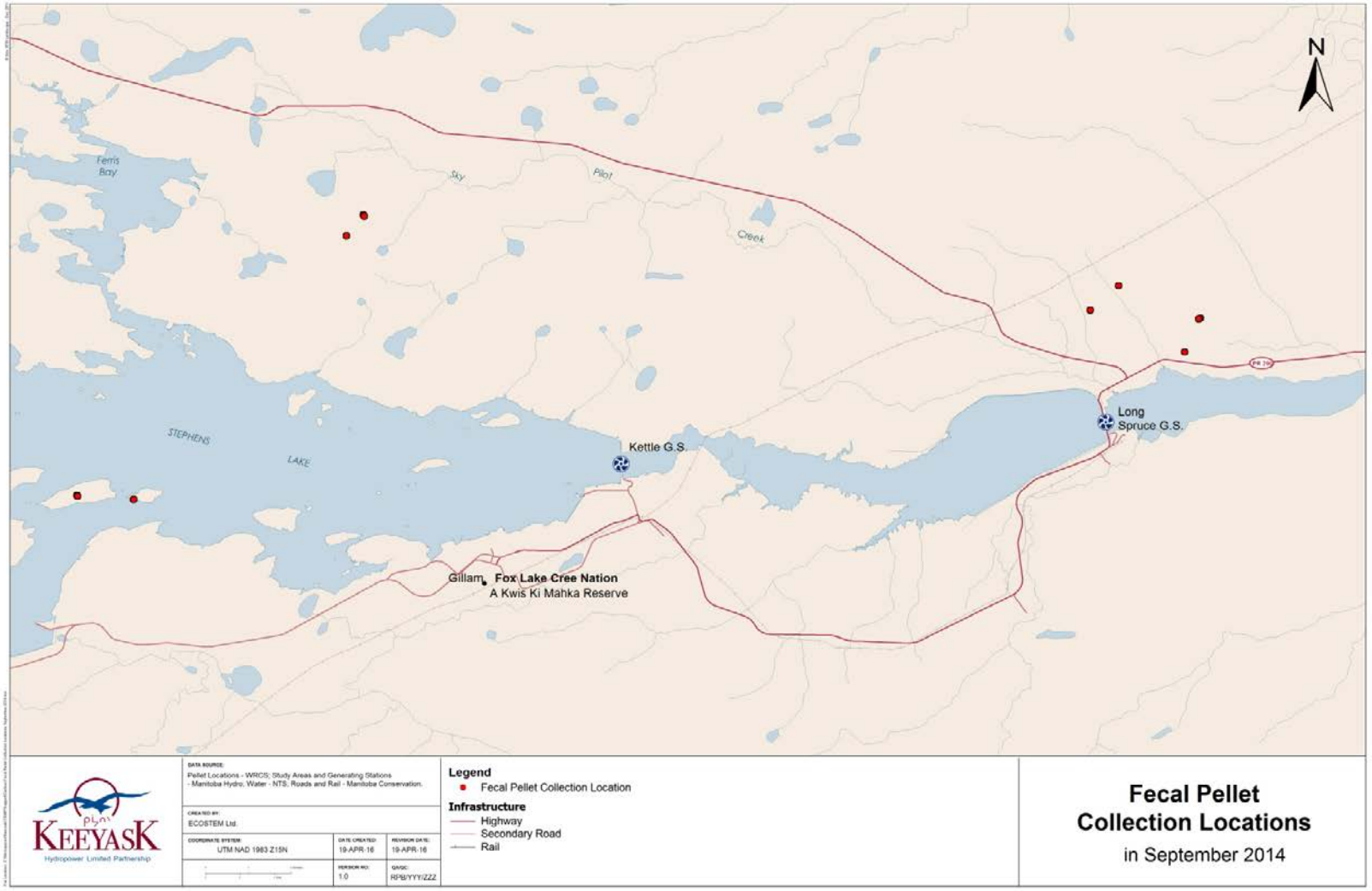
Photo 1: Caribou Tracks

Photo 2: Group of Six Caribou

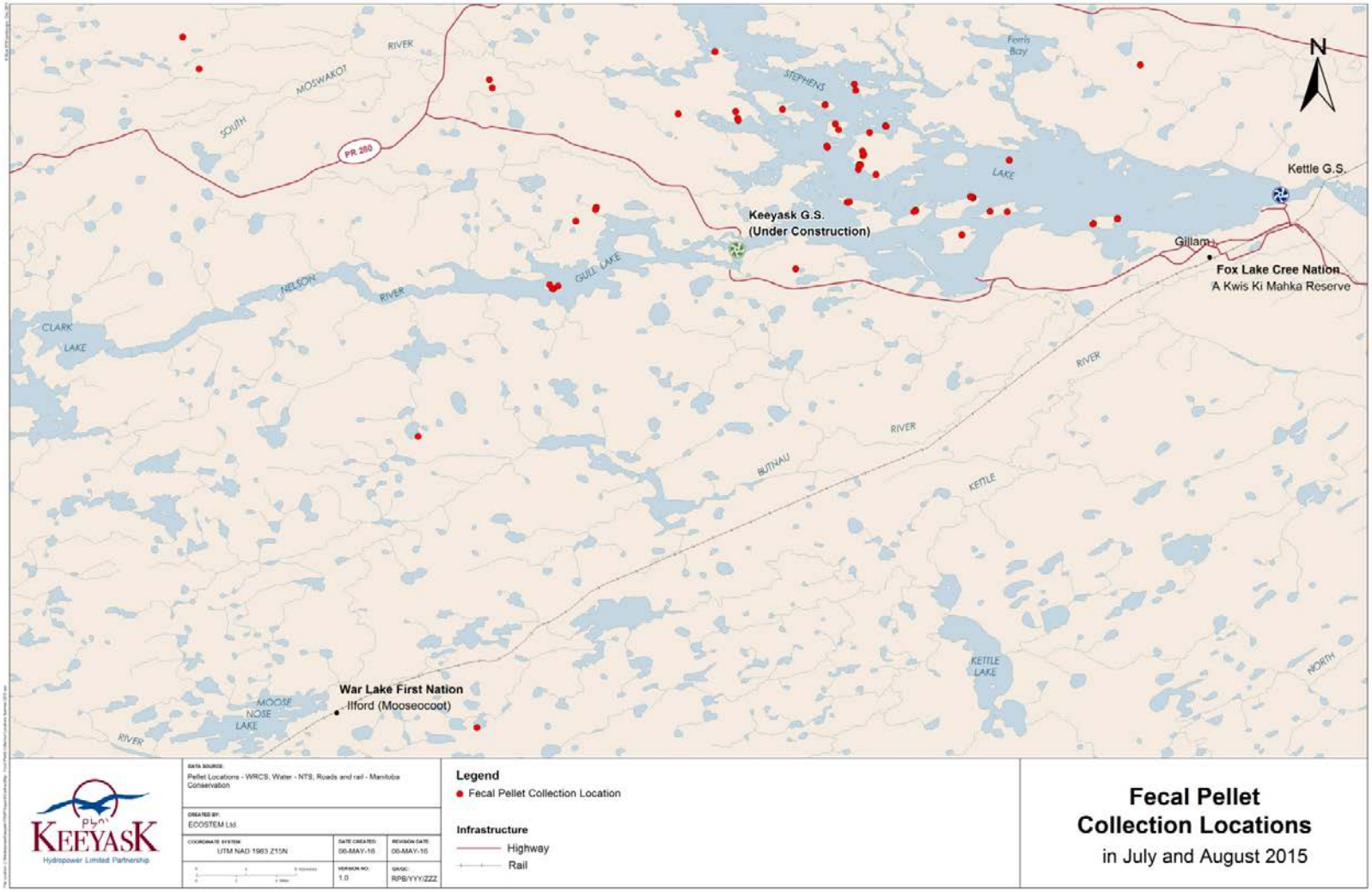
Photo 3: Group of 19 Caribou



Map 4: Distribution of Summer Resident Caribou in Winter 2015 and Summers of 2011–2014



Map 5: Fecal Pellet Collection Locations in September 2014



Map 6: Fecal Pellet Collection Locations in July and August 2015

4.0 SUMMARY AND CONCLUSIONS

Observations of caribou and their signs during the November 2015 aerial survey indicate that the summer residents' winter range may include areas not surveyed in summer. Early in the winter of 2015/16, caribou activity was concentrated in a relatively small area, and not scattered throughout the Keeyask Region. Data from this initial survey will contribute to winter range mapping for the summer resident caribou, which will continue in at least two more years in the early winter during the construction period. Information from radio-collared caribou (a program being led by Manitoba Conservation and Water Stewardship) may also be used to help delineate the winter range of individuals that remain in the Keeyask Region in the summer.

5.0 LITERATURE CITED

Ball, M. C., Pither, R., Manseau, M., Clark, J., Petersen, S. D., Kingston, S., Morrill, N., and Wilson, P. 2007. Characterization of target nuclear DNA from faeces reduces technical issues associated with the assumptions of low-quality and quantity template. Conservation Genetics 8: 577–586 pp.

Bishop, M. D., Kappes, S. M., Keele, J. W., Stone, R. T., Sunden, S. L., Hawkins, G. A., Toldo, S. S., Fries, R., Grosz, M. D., and Yoo, J. 1994. A genetic linkage map for cattle. Genetics 136: 619–639 pp.

Cronin, M. A., MacNeil, M. D., and Patton, J. C. 2005. Variation in mitochondrial DNA and microsatellite DNA in caribou (*Rangifer tarandus*) in North America. Journal of Mammalogy 86: 495–505 pp.

Falush, D., Stephens, M., and Pritchard, J. K. 2003. Inference of population structure: extensions to linked loci and correlated allele frequencies. Genetics 164: 1567–1587 pp.

Galpern, P., Manseau, M., Hettinga, P., Smith, K., and Wilson, P. 2012. Allelematch: an R package for identifying unique multilocus genotypes where genotyping error and missing data may be present. Molecular Ecology Resources 12: 771–778 pp.

Pritchard, J. K., Stephens, M., and Donnelly, P. 2000. Inference of population structure using multilocus genotype data. Genetics 155: 945–959 pp.

Wilson, G. A., Strobeck, C., Wu, L., and Coffin, J. W. 1997. Characterization of microsatellite loci in caribou *Rangifer tarandus*, and their use in other artiodactyls. Molecular Ecology 6: 697–699.

ᑭᔨᔪᓴ

KEEYASK

ᑭᔨᔪᓴ

KEEYASK

www.keeyask.com