



# Keeyask Generation Project Terrestrial Effects Monitoring Plan

## Ruffed Grouse Habitat Effects Monitoring Report

TEMP-2019-11



# **KEEYASK GENERATION PROJECT**

## **TERRESTRIAL EFFECTS MONITORING PLAN**

REPORT #TEMP-2019-11

### **RUFFED GROUSE HABITAT EFFECTS 2018**

Prepared for

Manitoba Hydro

By

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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 more needs to be done to reduce harmful effects.

Ruffed grouse are year-round residents at the edge of their range in the Keeyask region. Aspen forest or mixed forest with a large proportion of aspen is preferred for breeding, when males drum by standing on a log and beating their wings. Potential construction-related effects on ruffed grouse identified in the Project's environmental assessment were loss and alteration of some breeding and foraging habitat, with a possible increase in mortality due to traffic on the north and south access roads and to increased harvest through increased access to the area. Ruffed grouse were rarely detected in the Keeyask region during environmental assessment studies.

## Why is the study being done?

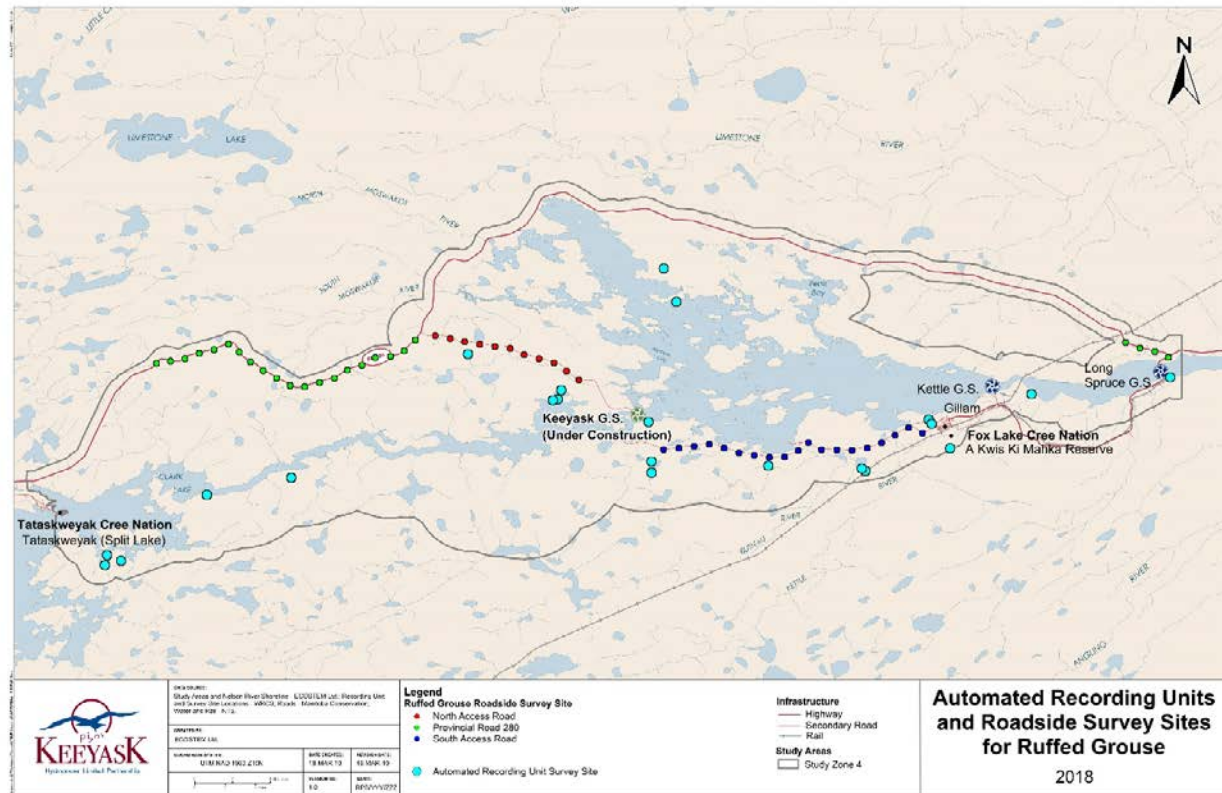
Suitable ruffed grouse breeding habitat was limited in the Keeyask region before Project construction began; much of this habitat was temporarily removed by forest fires in 2013. The objectives of ruffed grouse monitoring were to evaluate whether enough ruffed grouse can be found to verify the predictions of the habitat quality model defined in the environmental impact statement and to assess mortality associated with the Project. If possible, the validated and potentially refined habitat quality model will be used to evaluate how the Project changes the distribution and abundance of ruffed grouse breeding habitat in the Keeyask region.

## What was done?

Construction phase monitoring for ruffed grouse began in 2018. In early May, automated recording units were placed at 22 sites in the Keeyask region, from the Split Lake area to the Long Spruce Generating Station. Recordings made from May 5 to 24 were reviewed for ruffed grouse drumming and the number of days grouse drummed at each site was recorded.

Roadside surveys for ruffed grouse were also conducted at 54 sites along the north access road, south access road, and Provincial Road (PR) 280 on May 5 and 6, 2018. Surveys occurred between 4:30 a.m. and 8:30 a.m., when an observer listened for ruffed grouse drumming for 5 minutes at each site.





## Automated Recording Unit and Roadside Survey Sites for Ruffed Grouse, 2018

### What was found?

Ruffed grouse drumming was recorded at 6 of the 22 sites surveyed in 2018. During pre-construction Project monitoring in 2012, ruffed grouse were found at 6 of the 24 sites surveyed. While the species was found at the same number of sites both years, the sites were more widely distributed in 2018 and grouse were found over a larger area. No breeding activity was detected immediately north of Gull Lake in 2018, where it was concentrated in 2012.

No ruffed grouse drumming was heard during the roadside surveys at the 54 sites along the north and south access roads and PR 280. No confirmed reports of Project-related ruffed grouse mortality have been made to date.

### What does it mean?

Ruffed grouse were found at the same number of sites in 2018 as in 2012, but none were detected in the area north of Gull Lake. As the habitat in this area still appears suitable for ruffed grouse breeding, Project-related disturbances could have resulted in birds avoiding the area. Ruffed grouse breeding habitat, which was limited prior to Project construction, can still be found in the Keeyask region.

**What will be done next?**

Ruffed grouse monitoring that began in 2018 will continue in 2020. If enough data can be collected to validate and refine the habitat quality model, it will be applied to the post-Project terrestrial habitat map to identify and measure changes in suitable breeding habitat.

# STUDY TEAM

We would like to thank Sherrie Mason and Rachel Boone of Manitoba Hydro for editorial comments, and Kim Bryson and Megan Anger of Manitoba Hydro, Custom Helicopters, and Ron Bretecher of North/South Consultants Inc., for logistical assistance in the field. We would also like to thank Dr. James Ehnes, ECOSTEM Ltd., for GIS-supported study design and cartography.

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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 *Keeyask Generation Project 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, ruffed grouse (*Bonasa umbellus*), during the construction and operation phases.

Ruffed grouse are year-round residents at the edge of their range in the Keeyask region (Taylor 2018). They have been identified as important birds that are harvested by members of the partner First Nations. Aspen forest or mixed forest with a large proportion of aspen is preferred for breeding (Taylor 2018). During the breeding season, males drum by standing on a log and beating their wings (Rusch et al. 2000). Predicted Project-related effects on ruffed grouse were mainly loss or alteration of some breeding and foraging habitat, with a possible increase in mortality due to traffic on the north and south access roads and to increased harvest through increased access to the area. Ruffed grouse were rarely detected in the Keeyask region during EIS studies and suitable breeding habitat appeared to be limited. Much of the ruffed grouse habitat identified during EIS studies was temporarily removed by forest fires in 2013.

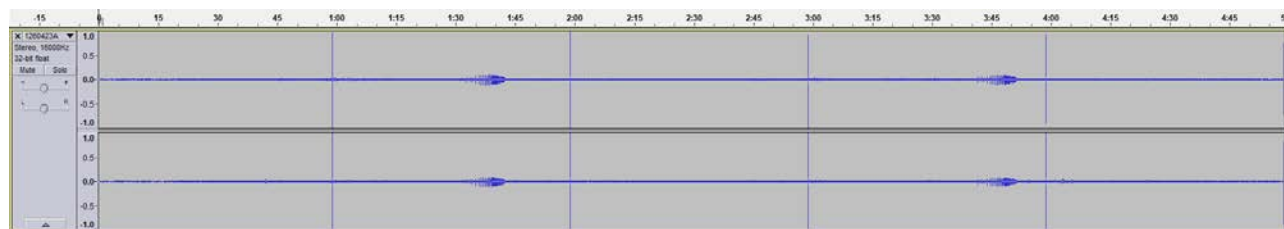
The objectives of ruffed grouse monitoring were to evaluate whether the species can be detected in sufficient numbers to verify the predictions of the expert information habitat quality model defined in the EIS and to estimate how Project-related harvest and accidental mortality affect ruffed grouse abundance. If possible, the validated and potentially refined habitat quality model will ultimately be used to evaluate how the Project changes the distribution and abundance of ruffed grouse breeding habitat in the Keeyask region.

## 2.0 METHODS

Automated recording units (ARUs) were placed at 22 sites in Study Zone 4, from the Split Lake area to the Long Spruce GS (Map 1), on May 2 and 3, 2018 (Appendix 1, Table A-1). Sites were in hardwood-dominated, mixedwood, and tall shrub habitats thought to be suitable for ruffed grouse breeding (Table 1). Recorders were programmed to record for 5 minutes every 15 minutes from 4:30 a.m. to 7:00 a.m. Waveforms from recordings made over a 20-day period from May 5 to 24 were visually reviewed for ruffed grouse drumming (Figure 1) using Audacity® audio software. The number of days ruffed grouse drumming was detected at each site was recorded.

**Table 1: Habitat at Ruffed Grouse Automated Recording Unit Sites, 2018**

Habitat	Number of Automated Recording Units
Balsam poplar dominant or mixedwood	3
Tall shrub	1
Trembling aspen dominant or mixedwood	10
White birch dominant or mixedwood	8



**Figure 1: Distinct Waveform of Ruffed Grouse Drumming**

On May 5 and 6, 2018, roadside surveys for ruffed grouse were conducted at 11 sites along the north access road, 19 sites along the south access road, and 24 sites along Provincial Road (PR) 280 (Map 1; Appendix 1, Table A-2). Sites were spaced 1.5 kilometres apart and were selected for systematic distribution along the roads rather than only for suitable habitat. From 4:30 a.m. to 8:30 a.m., an observer listened for ruffed grouse drumming for 5 minutes at each of the 54 sites.



**Photo 1: Roadside Ruffed Grouse Monitoring Site on the North Access Road, May 2018**

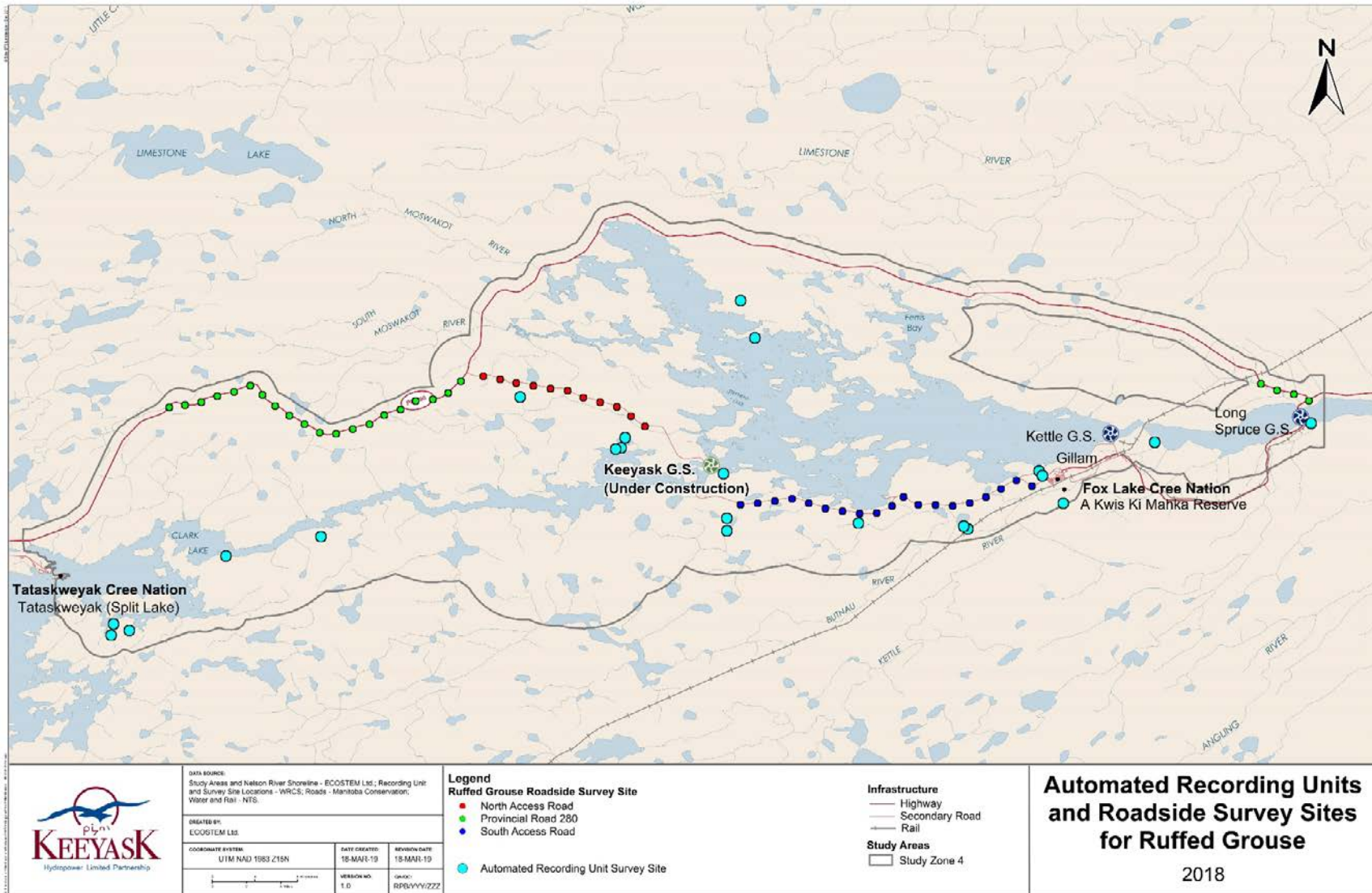


**Photo 2: Roadside Ruffed Grouse Monitoring Site on the South Access Road, May 2018**



**Photo 3: Roadside Ruffed Grouse Monitoring Site on Provincial Road 280, May 2018**





Map 1: Automated Recording Unit and Roadside Survey Sites for Ruffed Grouse, 2018

### 3.0 RESULTS

Ruffed grouse drumming was recorded from the western to the eastern portions of Study Zone 4, at 6 of the 22 sites surveyed (Map 2). All breeding activity was recorded south of the Nelson River. Ruffed grouse were found in all four hardwood and tall shrub habitats (Table 2). The drumming at the site in tall shrub habitat (site 559) was faint, likely because the ruffed grouse was not near the ARU. Two individuals were identified at site 15, in trembling aspen habitat.

**Table 2: Sites at which Ruffed Grouse Drumming Was Recorded, 2018**

Habitat	Number of Sites at which Ruffed Grouse Drumming Was Recorded	Percentage of Sites at which Ruffed Grouse Drumming Was Recorded
Balsam poplar dominant or mixedwood	1	33
Tall shrub	1	100
Trembling aspen dominant or mixedwood	3	30
White birch dominant or mixedwood	1	13

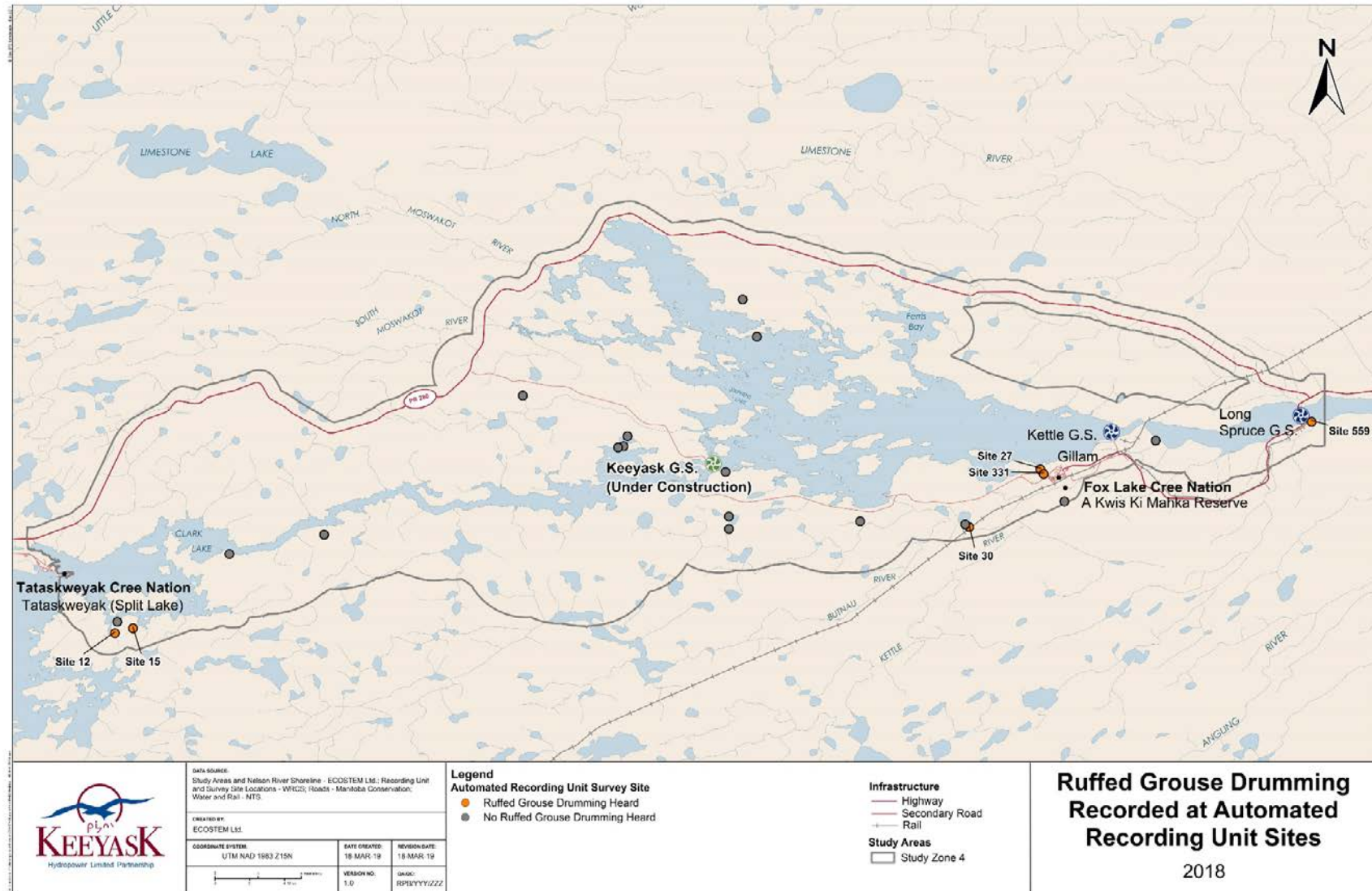
Beginning May 5<sup>th</sup>, ruffed grouse drumming was recorded all 20 days at 3 sites (Table 3). At site 30, where ruffed grouse breeding activity was detected over 7 days, drumming was recorded at the end of the 20-day period, from May 18 to 24. At site 559, drumming was recorded for six days beginning May 12 and intermittently until May 21. No drumming was recorded at site 331 on May 12, 18, 21, or 24.

**Table 3: Number of Days Ruffed Grouse Drumming Was Recorded at Six Automated Recording Unit Sites, 2018**

Site	Habitat	Number of Days Ruffed Grouse Drumming was Recorded
12	Trembling aspen dominant	20
15	Trembling aspen dominant	20
27	Balsam poplar dominant	20
30	Trembling aspen dominant	7
331	White birch dominant	16
559	Tall shrub	6

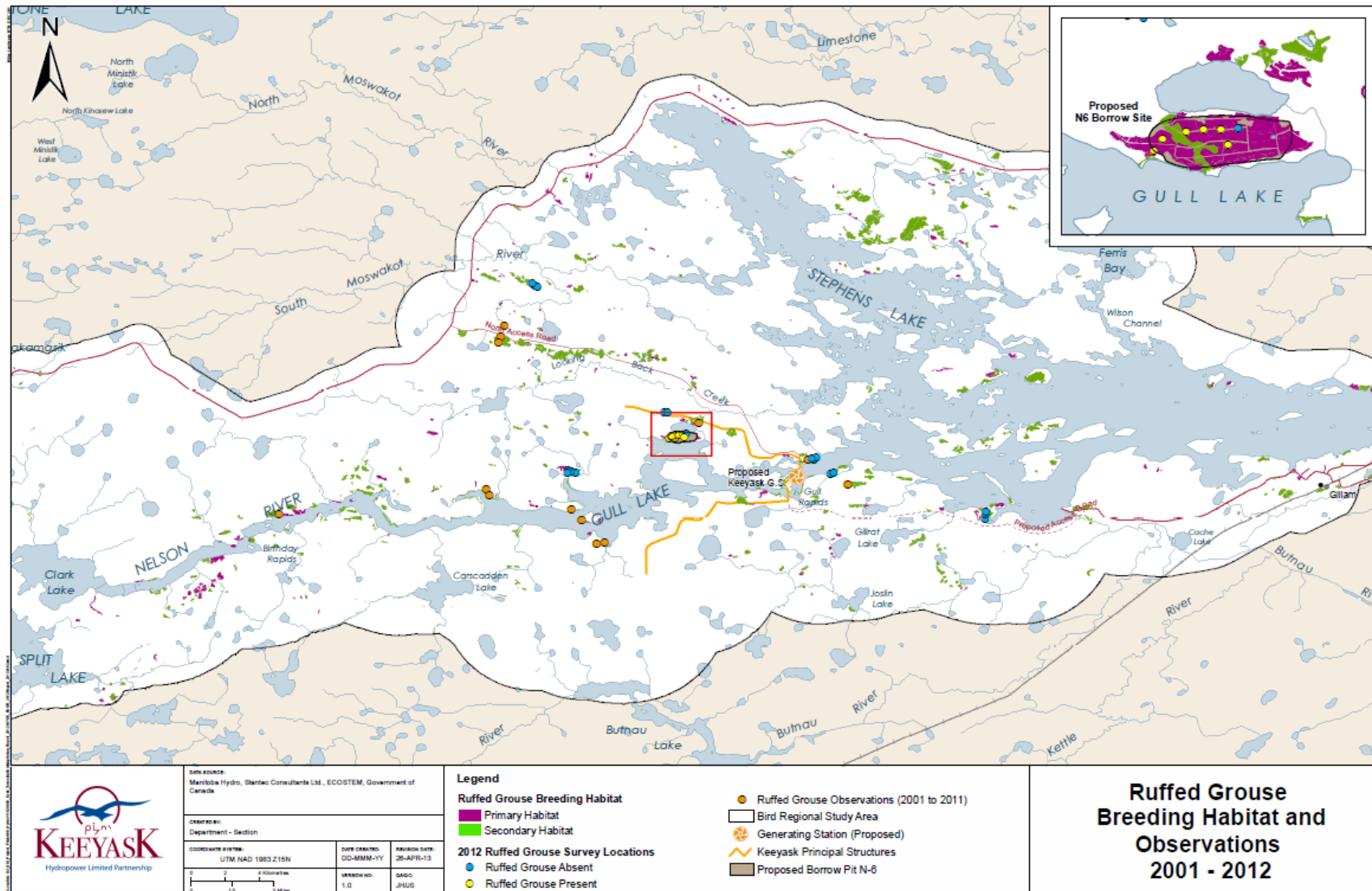
Pre-construction ruffed grouse surveys were conducted near Gull and Stephens lakes in spring 2012 (Stantec Consulting 2013). Ruffed grouse were found at 6 of the 24 sites surveyed, all immediately north of Gull Lake in trembling aspen or white birch mixedwood habitat (Figure 2). Three sites surveyed in 2018 were in the same area but no ruffed grouse were detected (see Map 2). While ruffed grouse were found at the same number of sites in 2012 and 2018, the sites were more widely distributed in 2018 and grouse were found over a larger area.

No ruffed grouse drumming was heard during the roadside surveys at the 54 sites along the north and south access roads and PR 280. No confirmed reports of Project-related ruffed grouse mortality have been made to date.



Map 2: Ruffed Grouse Drumming Recorded at Automated Recording Unit Sites, 2018





Map 3: Ruffed Grouse Observations, Spring 2012 (Stantec Consulting 2013)

## 4.0 DISCUSSION

Ruffed grouse were detected in a range of hardwood and shrub habitats from Split Lake to the Long Spruce GS. The species was found at six sites, including one where two individuals were identified. All detections of ruffed grouse were in the western and eastern portions of Study Zone 4 with none close to the Project construction site, including along the access roads and PR 280. The faint drumming at site 559, the easternmost site, could indicate that the recorder was at the edge of or just beyond the bird's breeding territory.

Ruffed grouse were found at the same number of sites in 2018 as in 2012. However, the greater distribution of sites surveyed in 2018 resulted in a wider distribution of the grouse detected. In 2018, ruffed grouse were absent from the area north of Gull Lake, the only place they were found during the 2012 surveys. As the forest habitat at these sites still appeared to be suitable for ruffed grouse breeding, Project-related disturbances could have resulted in ruffed grouse avoiding the area. Although ruffed grouse were not detected in the Project construction area in 2018, breeding habitat, which was limited before construction began, can still be found in the Keeyask region.



## 5.0 SUMMARY AND CONCLUSIONS

Project-related sensory disturbances may have affected the suitability of ruffed grouse breeding habitat north of Gull Lake. However, breeding habitat is available and was occupied elsewhere in the Keeyask region. No Project-related effects on ruffed grouse mortality have been identified. Ruffed grouse monitoring that began in 2018 will continue in 2020. If enough data can be collected to validate and refine the habitat quality model, it will be applied to the post-Project terrestrial habitat map to identify and measure changes in suitable breeding habitat.

## 6.0 LITERATURE CITED

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- Taylor, P. 2018. Ruffed Grouse. In *The Atlas of the Breeding Birds of Manitoba, 210-2014*. Edited by C. Artuso, A.R. Couturier, K.D. De Smet, R.F. Koes, D. Lepage, J. McCracken, R.D. Mooi, and P. Taylor. Bird Studies Canada, Winnipeg, MB. Available from <https://www.birdatlas.mb.ca/accounts/speciesaccount.jsp?sp=RUGR&lang=en> [accessed March 11, 2019].

## **APPENDIX 1: TABLES**

**Table A-1: Automated Recorder Unit Sites, 2018**

Site	UTM Coordinate	Habitat
3	15 V 377245 6242354	Balsam poplar dominant on uplands
4	15 V 367062 6261575	Balsam poplar mixedwood on uplands
12	14 V 684853 6232565	Trembling aspen
15	15 V 314231 6233086	Trembling aspen
27	15 V 392856 6246862	Balsam poplar
30	15 V 386697 6241855	Trembling aspen dominant on uplands
57	15 V 357081 6249728	Trembling aspen dominant on uplands
102	15 V 368296 6258347	Trembling aspen dominant on uplands
113	15 V 402853 6249336	Trembling aspen dominant on uplands
141	15 V 322580 6239517	Trembling aspen dominant on uplands
204	15 V 365582 6246628	Trembling aspen mixedwood on uplands
254	14 V 684972 6233550	Trembling aspen mixedwood on uplands
312	15 V 394942 6244070	Trembling aspen mixedwood on uplands
326	15 V 356739 6248854	White birch dominant on uplands
327	15 V 365873 6241693	White birch dominant on uplands
331	15 V 393144 6246450	White birch dominant on uplands
332	15 V 356269 6248747	White birch dominant on uplands
333	15 V 386347 6242088	White birch dominant on uplands
343	15 V 365871 6242779	White birch dominant on uplands
345	15 V 348009 6253244	White birch dominant on uplands
347	15 V 330793 6241194	White birch mixedwood on uplands
559	15 V 416361 6250975	Tall shrub on mineral soil

**Table A-2: Roadside Survey Sites, 2018**

Road	Site	UTM Coordinate
<b>North access</b>	NAR1	15 V 344821 6255020
	NAR2	15 V 346277 6254745
	NAR3	15 V 347671 6254438
	NAR4	15 V 349150 6254196
	NAR5	15 V 350629 6253950
	NAR6	15 V 352108 6253777
	NAR7	15 V 353465 6253163
	NAR8	15 V 354914 6252773
	NAR9	15 V 356362 6252384
	NAR10	15 V 357590 6251565
	NAR11	15 V 358791 6250701
<b>South access</b>	SAR1	15 V 367044 6243922
	SAR2	15 V 368532 6244041
	SAR3	15 V 370017 6244252
	SAR4	15 V 371505 6244435
	SAR5	15 V 372950 6244056
	SAR6	15 V 374379 6243603
	SAR7	15 V 375861 6243370
	SAR8	15 V 377346 6243157
	SAR9	15 V 378824 6243204
	SAR10	15 V 380142 6243820
	SAR11	15 V 381137 6244586
	SAR12	15 V 382409 6243905
	SAR13	15 V 383898 6243893
	SAR14	15 V 385388 6243827
	SAR15	15 V 386867 6244077
	SAR16	15 V 388258 6244585
	SAR17	15 V 389574 6245304
	SAR18	15 V 390890 6246023
	SAR19	15 V 392234 6245524
<b>PR 280</b>	PR1	15 V 416172 6252904
	PR2	15 V 414871 6253471
	PR3	15 V 413412 6253812
	PR4	15 V 412026 6254364
	PR58	15 V 342886 6254588
	PR59	15 V 341789 6253567
	PR60	15 V 340461 6253021
	PR61	15 V 338977 6252884
	PR62	15 V 337675 6252143
	PR63	15 V 336259 6251650
	PR64	15 V 334984 6250876
	PR65	15 V 333543 6250458

Road	Site	UTM Coordinate
PR 280	PR66	15 V 332103 6250040
	PR67	15 V 330683 6250154
	PR68	15 V 329371 6250881
	PR69	15 V 328060 6251610
	PR70	15 V 326831 6252458
	PR71	15 V 325735 6253421
	PR72	15 V 324683 6254208
	PR73	15 V 323284 6253667
	PR74	15 V 321833 6253296
	PR75	15 V 320448 6252779
	PR76	15 V 319043 6252526
	PR77	15 V 317680 6252340