



Keeyask Transmission Project **Environmental Effects Monitoring Plan** Annual Report



Prepared by:
Manitoba Hydro
Winnipeg, Manitoba
July 2018



This page intentionally left blank

Keeyask Transmission Project 2017/18
Environmental Effects Monitoring Report

Prepared by Manitoba Hydro

Transmission Planning & Design Division
Licensing & Environmental Assessment

July 2018

Prepared for:

Environmental Approvals Branch

TABLE OF CONTENTS

1 INTRODUCTION 1

2 PROJECT OVERVIEW 1

3 PROJECT STATUS 1

 3.1 Radisson Converter Station Upgrades..... 1

 3.2 Keyyask Switching Station..... 1

 3.3 Keyyask Construction Power..... 1

 3.4 Transmission Line Construction 1

4 ENVIRONMENTAL EFFECTS MONITORING PLAN OVERVIEW 4

 4.1 Adaptive Management..... 4

5 IMPLEMENTATION OF MONITORING AND FOLLOW-UP ACTIVITIES 4

 5.1 Environmental Inspection Staff..... 4

 5.2 Community Liaisons and Environmental Monitors..... 4

 5.3 Data Management 5

6 ENVIRONMENTAL COMPONENT MONITORING 6

7 AQUATICS 6

 7.1 Stream Crossings 6

8 MAMMALS 7

 8.1 Caribou..... 7

 8.2 Moose 8

 8.3 Wildlife Mortalities 8

9 TERRESTRIAL ECOSYSTEMS AND VEGETATION 8

 9.1 Invasive Plants..... 9

10 BIRDS..... 10

 10.1 Bird-Wire Collision 10

 10.2 Species of Conservation Concern..... 11

 10.3 Colonial Nesting Sites 11

11 COMPLIANCE MONITORING 12

12 FUTURE MONITORING..... 12

MAPS

Map 1: Keyyask Transmission Project Area 3

PHOTOS

Photo 1: Keyyask Transmission Project is located south of Gillam, MB. Construction of GOT lines 2 and 3 is nearly complete. 2

Photo 2: Aerial view of Keyyask Transmission Project..... 5

Photo 3: Tower assembly on the Keyyask Transmission Project. 5

Photo 4: No evidence of vehicle track damage in 2017 with shrub re-growth present throughout this water course crossing 7

Photo 5: Collared caribou and calf in a peatland complex near the Project in 2017..... 7

Photo 6: Caribou and calf on an island in Stephens Lake in 2017. 8

Photo 7: Moose observed during aerial survey in 2018..... 8

Photo 8: A common dandelion growing in the transmission ROW. 9

Photo 9: Regenerating native vegetation in the transmission ROW..... 9

Photo 10: Survey personnel searching for bird-wire collisions at environmentally sensitive sites. 10

Photo 11: Canada geese flying over bird diverters installed on the generation outlet transmission line..... 11

Photo 12: A passive audio recorder to monitor bird species of conservation concern. 11

Photo 13: A UAV used to monitor islands in Gull Rapids. 12

TABLES

Table 1: 2017/18 Monitoring Activities by Environmental Component 6

Abbreviations

AC	Alternating Current
EA	Environmental Assessment
EEMP	Environmental Effects Monitoring Plan
EPIMS	Environmental Protection Information Management System
EPP	Environmental Protection Program
GPS	Geographic Positioning System
GOT	Generation Outlet Transmission Line
KHLP	Keyyask Hydroelectric Limited Partnership
KTP	Keyyask Transmission Project
km	kilometre
kV	kilovolt
m	metres
SD	Sustainable Development
ROW	Right-of-way
UAV	Unmanned Aerial Vehicle

1 INTRODUCTION

The objective of this report is to present information and data on the Keeyask Transmission Project Environmental Effects Monitoring Plan in compliance with clause 16 of the Project *Environment Act* licence (No. 5614). Manitoba Hydro presents this information to inform interested parties on progress made on construction, monitoring and implementation of mitigation measures to minimize environmental effects.

This is the Project's third annual monitoring report and describes progress from April 1, 2017 through March 31, 2018. Map 1 outlines the Keeyask Transmission Project area. Anyone interested in further information about this report or the Project is invited to contact Manitoba Hydro at:

Licensing and Environmental Assessment
360 Portage Avenue (5)
Winnipeg MB R3C 0G8
1-877-343-1631 or 204-360-7888

2 PROJECT OVERVIEW

The Keeyask Transmission Project (the Project) involves the construction, operation and decommissioning of 22 km of new 138 kV ac construction power transmission line, a new 138 kV ac to 12.47 kV ac construction power station to be located north of the Keeyask generation station, upgrades to the existing Radisson converter station, a new Keeyask switching station to be located south of the Nelson River, 4 km of four 138 kV ac unit transmission lines that will transmit power from the Keeyask generation station to the Keeyask switching station, and three 38 km 138 kV ac generation outlet transmission lines that will transmit power from the new Keeyask switching station to the existing Radisson converter station. The Keeyask Transmission Project is owned and operated by Manitoba Hydro.

3 PROJECT STATUS

Construction for the Keeyask Transmission Project is occurring in parallel to construction of the Keeyask Generation Station. The Keeyask Transmission Project provides power for the construction of the generation

station and will allow for the integration of generation power into the Manitoba Hydro transmission system when the generation station is operational. Although limited construction occurred during this reporting period, the Keeyask Transmission Project and all its components are currently on schedule. The projected in-service date for the Project is anticipated for 2020.

3.1 Radisson Converter Station Upgrades

Upgrades to the existing Radisson converter station are required to accommodate the Keeyask Transmission Project. Equipment replacement and station upgrades are currently underway. Breaker replacements have been on-going throughout the winter and will continue until 2020.

3.2 Keeyask Switching Station

The Keeyask switching station will accept power from the generating station via four unit transmission lines and transfer that power to three generation outlet transmission lines. The switching station is continuing to be constructed.

3.3 Keeyask Construction Power

The Keeyask Construction Power Project, which consists of two transmission lines and a construction power station, provides the Keeyask construction site with a permanent, reliable source of power during construction. The construction power station and lines are in-service.

3.4 Transmission Line Construction

The unit transmission lines will transmit power from the seven generators located at the Keeyask generating station to the new Keeyask switching station. The four unit transmission lines will be located in a single corridor, which was cleared in winter 2015/2016. Tower construction is currently 8% complete.

Three generation output transmission (GOT) lines will transmit power from the Keeyask switching station to the existing Radisson converter station. Construction of the 138kV ac generation output transmission (GOT) Line 1 is complete. Tower construction for GOT Line 2 and GOT Line 3 are over 90% complete. Remaining tasks include some final tower assembly and stringing.

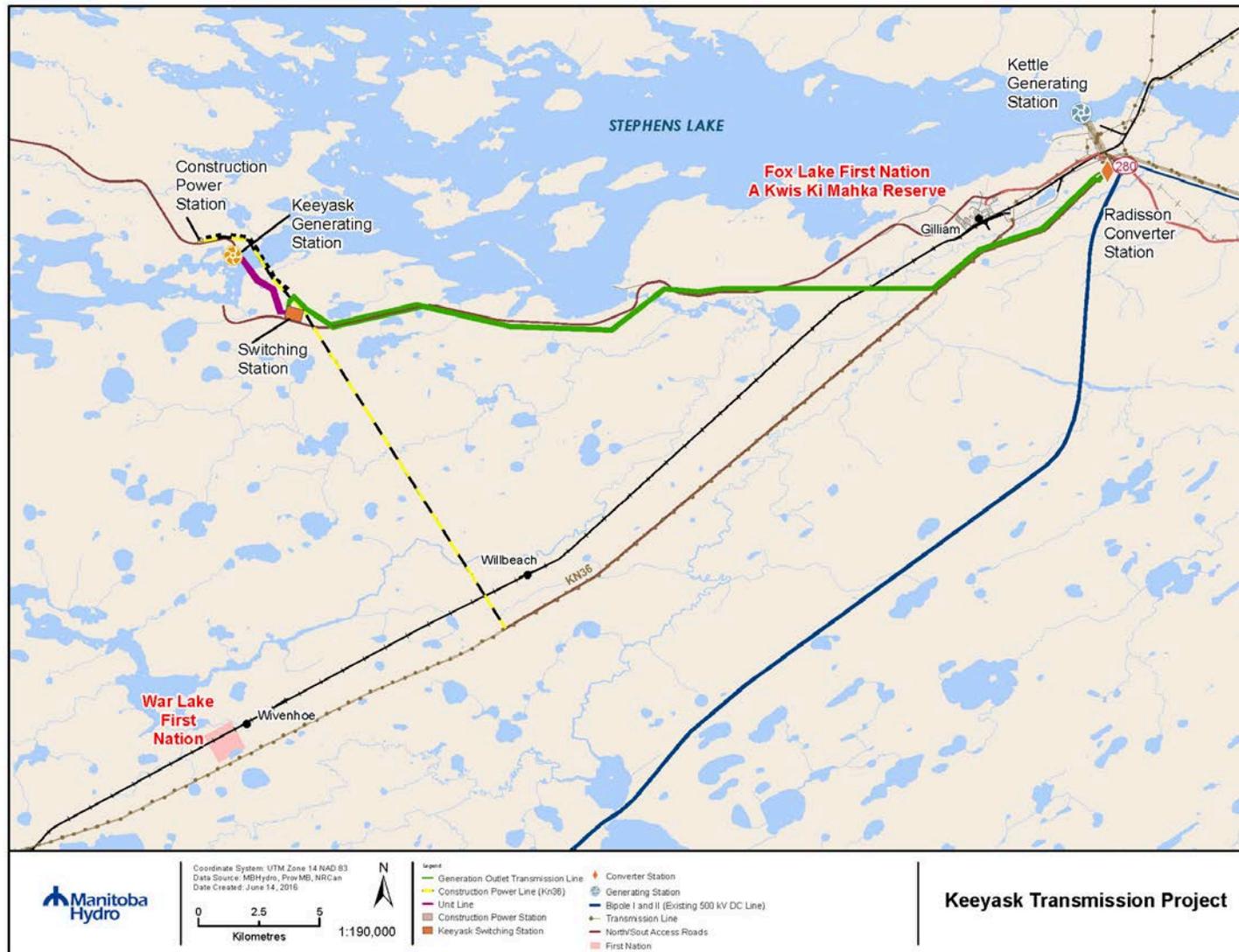
2017/18 Environmental Effects Monitoring Highlights

Key monitoring highlights during this reporting period include:

- Of the 46 water crossing sites assessed, none showed non-compliance with prescribed mitigation measures. Water crossing sites identified in 2015 and 2016 as being non-compliant with prescribed mitigation measures showed signs of successful natural revegetation, with no further remediation warranted.
- Summer resident caribou continue to calve in the peatland complexes and islands around the Project area, at an even higher rate than 2016. No caribou were detected in the Keeyask region during the late fall and winter of 2017/18.
- There were an estimated 1,040 moose in the Keeyask region, a 10% decrease since the previous survey in 2015. The population structure also changed since 2015 with lower bull to cow and calf to cow ratios. The current moose population is likely considered to be stable in the Keeyask surveyed area.
- Vegetation surveys identified very minimal observations of invasive plant species.
- The installation of bird diverters on the Keeyask transmission lines appears to have been successful at protecting birds from collisions.
- Passive data recorders were deployed to assess breeding success of bird species of conservation concern including common nighthawk, rusty blackbird and olive-sided flycatcher. Multi-year data and analysis will help determine Project effects.
- Gulls and terns attempted to nest on available habitat within Gull Rapids and at eight other locations in the study area, but due to very high water levels the nests were abandoned and no gull or tern chicks were observed in 2017.
- Survey personnel from Tataskweyak, War Lake, York Factory and Fox Lake Cree Nation were vital in conducting many field activities, including mammal sensory disturbance and bird-collision surveys.



Photo 1: Keeyask Transmission Project is located south of Gillam, MB. Construction of GOT lines 2 and 3 is nearly complete.



Map 1: Keeyask Transmission Project Area

4 ENVIRONMENTAL EFFECTS MONITORING PLAN OVERVIEW

Part of Manitoba Hydro's commitment to environmental protection includes the development of a comprehensive Environmental Protection Program (EPP) for the Keeyask Transmission Project. One aspect of this program is monitoring and follow up for biophysical environmental components identified in the Keeyask Transmission Project Environmental Assessment and associated technical reports. The Environmental Effects Monitoring Plan (EEMP) submitted to Manitoba Sustainable Development outlines the various monitoring activities that will occur during the different phases of the Project.

The scope of this plan includes physical and biological components of the environment. The purpose of the EMP is to identify the key activities that will be conducted as part of the monitoring and follow-up component of the Environmental Protection Program that will verify potential effects and effectiveness of mitigation.

The objectives of the EEMP are to:

- Confirm the nature and magnitude of predicted environmental effects as stated in the EA
- Assess the effectiveness of mitigation measures implemented
- Identify unexpected environmental effects of the Project, if they occur
- Identify mitigation measures to address unanticipated environmental effects, if required
- Confirm compliance with regulatory requirements
- Provide baseline information to evaluate long-term changes or trends

Environmental components requiring follow-up monitoring are discussed further in this annual Environmental Effects Monitoring Report include:

- Aquatics
- Terrestrial Ecosystems and Vegetation
- Mammals
- Birds
- Heritage

4.1 Adaptive Management

Adaptive management is a planned and systematic process used to continuously improve environmental management practices by learning about their outcomes. Manitoba Hydro

has accumulated knowledge and lessons learned from previous monitoring programs. The successes of those programs have been useful in implementing the EEMP for this Project.

An adaptive management framework is being used to deal with unexpected outcomes or events. Program documents, processes, procedures and mitigation measures are continuously evaluated by inspection, monitoring and communication programs. Data is reviewed as collected to determine if any of the environmental thresholds specified in the EEMP have been exceeded due to shortfalls in impact prediction, ineffective mitigation measures or inadequate monitoring approaches. Actions are developed in response to these contingencies.

5 IMPLEMENTATION OF MONITORING AND FOLLOW-UP ACTIVITIES

Environmental monitoring is being implemented for the Keeyask Transmission Project to verify the accuracy of the environmental assessment and the effectiveness of mitigation measures in protecting the environment. Manitoba Hydro has retained full-time staff for the implementation of the EEMP, funded participation of community environmental monitors, and retained highly qualified specialists in appropriate disciplines. Manitoba Hydro's Environmental Protection Information Management System (EPIMS) plays a major role in managing the EEMP implementation, coordination of field work, data collection and communications amongst the monitoring team.

5.1 Environmental Inspection Staff

Reporting to a Senior Manitoba Hydro Environmental Assessment Officer, an on-site Construction Environmental Inspector continued environmental oversight for the 2017/18 transmission line construction season. In addition, Manitoba Hydro's Licensing and Environmental Assessment Department provides advice and guidance to these on-site environmental inspectors.

5.2 Community Liaisons and Environmental Monitors

In addition to providing employment and business opportunities through the Project, Manitoba Hydro is committed to engaging local community-based environmental expertise during the construction of the

Keeyask Transmission Project. Manitoba Hydro is funding qualified and interested individuals from Indigenous communities to work as environmental monitors and community liaisons. The environmental monitors assist in undertaking inspections with environmental inspectors during construction and collect monitoring information in support of Manitoba Hydro's environmental effects monitoring programs. The community liaisons observe the construction and environmental protection program activities and report back to community leadership as well as inform the Manitoba Hydro construction supervisor of any concerns the communities may have with those activities.

5.3 Data Management

As the Project's EEMP requires and generates large amounts of data, the EPIMS was developed to manage, store and facilitate the transfer of Environmental Protection Program data and information amongst the Project team. The EPIMS will facilitate the transfer of knowledge and experiences encountered on a daily basis during construction activities from environmental inspectors and community environmental monitors to specialists that are responsible for monitoring Project effects on a real time basis. As well, monitoring results and mitigation measure adaptations will be communicated back to construction staff and contractors.



Photo 2: Aerial view of Keeyask Transmission Project.



Photo 3: Tower assembly on the Keeyask Transmission Project.

Table 1: 2017/18 Monitoring Activities by Environmental Component

Component	Environmental Indicator	2017/18 Monitoring Status
Aquatics	Fish habitat	Post-construction stream crossing surveys at 46 sites
Mammals	Moose	Moose population survey conducted – Additional reporting in Keeyask Generation Terrestrial Effects Monitoring Report
	Caribou	Summer resident caribou and sensory disturbance survey conducted – Additional reporting in Keeyask Generation Project Terrestrial Effects Monitoring Report
Terrestrial Ecosystems and Vegetation	Priority plants	No activity in 2017/18
	Ecosystem diversity	No activity in 2017/18
	Invasive plants	Invasive plant survey conducted along the Project ROW
Birds	Bird wire collision mortality	Bird wire collision mortality surveys conducted at 15 environmentally sensitive sites
	Bird species of conservation concern	Passive audio recorders deployed during bird breeding season to detect common nighthawk, rusty blackbird and olive-sided flycatcher. Additional reporting in Keeyask Generation Project Terrestrial Effects Monitoring Report
	Colonial bird nesting sites	Aerial survey of colonial nest sites conducted– Additional reporting in Keeyask Generation Project Terrestrial Effects Monitoring Report
Heritage	Heritage sites	All heritage surveys are completed

6 ENVIRONMENTAL COMPONENT MONITORING

Multiple environmental components were identified for follow-up monitoring in the environmental assessment, technical reports, and Environment Act licence. For each environmental component, one or more environmental indicators were selected to focus monitoring and follow-up efforts as indicated in the EEMP (Table 1).

7 AQUATICS

The potential effect of the Project on aquatics was a component of the environmental assessment. One of the main risks to existing fish habitat from transmission line construction is damage to stream banks and riparian vegetation leading to loss of cover and in-stream sediment delivery.

7.1 Stream Crossings

A stream crossing survey was conducted along Project components where construction was carried out in 2017.

Confirm the nature and magnitude of predicted environmental effects as stated in the EA:

As predicted in the EA, Project effects on stream crossings were minor. Of the 46 watercourse sites assessed in 2017, all were compliant with prescribed mitigation.

Assess the effectiveness of mitigation measures implemented:

The implementation of mitigation recommendations outlined in the construction Environmental Protection Plan was effective. Sites identified in 2015 and 2016 as being non-compliant with the prescribed mitigation showed signs of successful natural revegetation with small shrubs and forbs, with no further remediation warranted (Photo 4).

Identify mitigation measures to address unanticipated environmental effects, if required:

Due to the natural revegetation of disturbed sites, no further remediation is required.

Provide baseline information to evaluate long-term changes or trends:

Survey information will contribute to evaluating any long-term changes or trends in stream crossings.



Photo 4: No evidence of vehicle track damage in 2017 with shrub re-growth present throughout this water course crossing.

8 MAMMALS

The potential effect of the Project on moose (*Alces alces*) and caribou (*Rangifer tarandus*) was the focus of the environmental assessment for mammals. Both species occur in vicinity of the Keeyask Transmission Project. Survey support was provided by members of the Keeyask Cree Nations, including Tataskweyak, War Lake, York Factory and Fox Lake Cree Nations.

8.1 Caribou

Manitoba Hydro is working cooperatively with the Keeyask Hydroelectric Limited Partnership (KHLP) to jointly study Project effects on caribou.

In 2017, a sensory disturbance survey was conducted in the spring and summer, and a summer resident caribou survey was conducted in late fall.

Confirm the nature and magnitude of predicted environmental effects as stated in the EA:

Caribou occupied 69% of the islands in lakes surveyed in 2017. During the pre-construction period (2010 to 2014), the percentage of islands on which caribou and their calves were detected declined. The trend continued in 2015, then reversed in 2017, when caribou and calves were detected on a greater percentage of islands than in 2015. As predicted in the EA, several Project-affected islands were unoccupied by caribou in 2017. However, the percentage of Project-affected islands on which caribou were detected more than doubled (from 28% to 65%) from 2015 to 2017.

Despite evidence of summer calving activity, no caribou were identified in the 2017 late fall survey. However evidence from genetic analysis conducted in 2017 identified that that some summer resident caribou overwintered 40 km from the Project site in 2016/17, suggesting that overwintering habitat appears available near the Project area.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including construction timing windows appear to be effective.

Identify unexpected environmental effects of the Project, if they occur:

No unexpected environmental effects have been observed.

Identify mitigation measures to address unanticipated environmental effects, if required:

To date, none required.

Confirm compliance with regulatory requirement:

Compliance with regulatory requirements continues.

Provide baseline information to evaluate long-term changes or trends:

Survey information will contribute to evaluating long-term changes or trends in caribou population changes, calving locations, and habitat use in response to the transmission Project.

A detailed report on the findings of the caribou population and sensory disturbance survey can be found in the 2017 KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 5: Collared caribou and calf in a peatland complex near the Project in 2017.



Photo 6: Caribou and calf on an island in Stephens Lake in 2017.

8.2 Moose

Manitoba Hydro is working cooperatively with the Keeyask Hydroelectric Limited Partnership (KHLP) to jointly study Project effects on moose.

An aerial moose population survey was conducted over 18 days in January 2018.

Confirm the nature and magnitude of predicted environmental effects as stated in the EA:

The 2018 moose population in the entire survey area was estimated at 1,159 individuals and was unevenly distributed. There were an estimated 1,040 moose in the Keeyask region, a 10% decrease since the previous survey in 2015. The population structure also changed since 2015 with lower bull to cow and calf to cow ratios. The current moose population is likely considered to be stable in the Keeyask surveyed area. As of January 2018, no direct adverse effects from Project construction were identified on moose abundance, distribution or population structure. The lower ratio of bulls to cows than observed in 2015 and 2010 suggests that bulls are being selectively harvested, as recommended by the Cree Nation Partners in their 2013 Moose Harvest Sustainability Plan.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including construction timing windows appear to be effective.

Identify unexpected environmental effects of the Project, if they

occur:

No unexpected environmental effects have been observed.

Identify mitigation measures to address unanticipated environmental effects, if required:

To date, none required.

Confirm compliance with regulatory requirement:

Compliance with regulatory requirements continues.

Provide baseline information to evaluate long-term changes or trends:

Survey information will contribute to evaluating long-term changes or trends in moose population changes, in response to the Keeyask Transmission and Generation Project.

A detailed report on the findings of the moose population and survey can be found in the 2017 KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 7: Moose observed during aerial survey in 2018.

8.3 Wildlife Mortalities

Project environmental inspectors did not identify any wildlife mortalities directly related to the Project. Any suspected project related wildlife mortalities (e.g. a road killed red fox) were communicated with the regional Conservation Officer.

9 TERRESTRIAL ECOSYSTEMS AND VEGETATION

The potential effect of the Project on terrestrial ecosystems and vegetation was a component of the environmental assessment.

9.1 Invasive Plants

In 2017, an invasive plant survey was conducted on August 22nd and 29th. Surveys consisted of 17 transects totalling 11 km in length.

Confirm the nature and magnitude of predicted environmental effects as stated in the EA:

As predicted in the EA, Project construction had minimal effect on the spread invasive species. Non-native or invasive plants were not observed in the cleared Project ROW with the exception of 4 single plants; three common dandelion (*Taraxacum officinale*), and one common plantain (*Plantago major*). Two of the common dandelion plants and the single common plantain plant were found in the ROW near the south access road ditch. It was apparent that the western most common dandelion had already seeded, but no other plants were found nearby. The third common dandelion was found near the eastern end of the ROW, on a machine trail extending through the clearing.

Assess the effectiveness of mitigation measures implemented:

Mitigation actions prescribed in the Construction Environmental Protection Plan, to limit the exposure of mineral soils by clearing equipment were successfully implemented. Factors that appeared to be limiting the potential input of non-native seeds included winter clearing, equipment cleaning and the age of nearby recently cleared areas. Snow cover was expected to reduce the number of seeds picked up by equipment moving through sites.

Identify unexpected environmental effects of the Project, if they occur:

No unexpected environmental effects have been observed.

Identify mitigation measures to address unanticipated environmental effects, if required:

To date, none required. Control recommendations were not developed for the four observed plants for several reasons. While the common dandelion is considered a Tier 3 noxious weed in Manitoba, both that and common plantain are not listed as an invasive species of concern in Canada (White et al. 1993) or by the ISCM (2017).

These species are not known to crowd out native vegetation. Also, both species are difficult to control since they are ubiquitous in human-disturbed areas. In the case of dandelion, winds readily spread its light airborne seeds. Finally, given the limited amount of vegetation clearing and ground disturbance, it is expected that native plant regeneration will eventually control dandelion and plantain along most of the ROW.

Confirm compliance with regulatory requirements:

Compliance with regulatory requirements continues.

Provide baseline information to evaluate long-term changes or trends:

Survey information will contribute to evaluating long-term changes or trends in invasive plant species in the Project area.



Photo 8: A common dandelion growing in the transmission ROW.



Photo 9: Regenerating native vegetation in the transmission ROW.

Due to the staged timing of some monitoring components, surveys were not conducted for ecosystem diversity or priority plants in 2017.

10 BIRDS

The potential effect of the Project on bird wire collisions, species of conservation concern, and colonial bird nesting islands was a component of the environmental assessment.

10.1 Bird-Wire Collision

In 2017, a bird-wire collision survey in the Project area was conducted in May, June, and September at 16 sites along the Project ROW. Field support was provided by members of the Keeyask Cree Nations.

Confirm the nature and magnitude of predicted environmental effects as stated in the EA:

As predicted in the EA, the presence of bird diverters on the Keeyask Transmission Project transmission lines where streams were crossed appears to have been successful at protecting birds from collisions with the Keeyask Transmission Project transmission lines. After correcting for searcher efficiency, scavenger removal bias, and habitat bias, estimated collision mortality for birds in the spring migration season was 461 birds/km at GOT sites, 503.37 birds/km at CP sites, and 1,130.88 birds/km at reference sites. When the GOT and CP lines are considered as a single sampling unit, estimated collision mortality was 469.09 birds/km in the spring migration period. During the fall migration period estimated collision mortality was 9.06 birds/km at GOT sites and 13.75 birds/km at reference sites. The total estimated collision mortality at all sites during the spring migration period were unreasonably high, and considerably higher than other studies reporting bird-wire collision mortality. It should be noted, however, that comparisons to mortality rates in other studies are difficult as sources of bias can vary substantially between study locations. The anomalous spring data is most likely driven by extremely efficient local scavengers. When scavenger trials indicate near perfect efficiency at removing carcasses, calculations of estimated collision mortality become greatly inflated. The high collision mortality estimates in the spring migration period were primarily driven by scavengers removing nearly all planted birds over the one week trial. Furthermore, if

scavengers removal rates were 100%, a correction factor of one would have resulted in scavenger removal bias having no effect in calculating total estimated collision mortality. In such a scenario, estimated collision mortality would have been 42.22 birds/km at GOT and CP sites combined and 101.78 birds/km at reference sites in the spring migration period and 8.24 birds/km at reference sites in the breeding bird season, which appear to be a more reasonable estimate compared to the literature.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including the installation of bird wire diverters appears to be effective.

Identify unexpected environmental effects of the Project, if they occur:

No unexpected environmental effects have been observed.

Identify mitigation measures to address unanticipated environmental effects, if required:

To date, none required.

Confirm compliance with regulatory requirements:

Compliance with regulatory requirements continues.

Provide baseline information to evaluate long-term changes or trends:

Survey information will contribute to evaluating long-term changes or trends in bird wire collision rates on this and other Manitoba Hydro transmission Projects.



Photo 10: Survey personnel searching for bird-wire collisions at environmentally sensitive sites.



Photo 11: Canada geese flying over bird diverters installed on the generation outlet transmission line.

10.2 Species of Conservation Concern

Manitoba Hydro is working cooperatively with the Keeyask Hydroelectric Limited Partnership (KHLP) to jointly study Project effects on bird species of conservation concern.

Habitat effects surveys for common nighthawk continued in 2017, to evaluate Project-related changes in the distribution and abundance of suitable breeding habitat. Programmable four-microphone audio recorders were placed at 62 locations in major subtypes of common nighthawk nesting habitat in the Stephens, Gull, and Split lakes region during the breeding season. Recorders were programmed to record for 10 minutes at 30-minute intervals from dusk until dawn to record common nighthawk breeding activity in the form of calls and the booming sound made by territorial males as air rushes through their feathers. Audio recordings are being analyzed and results are pending.

Sensory disturbance surveys for olive-sided flycatcher and rusty blackbird also continued in 2017, to monitor the effects of sensory disturbance on the distribution and relative abundance of these species at risk. Territories for breeding pairs were mapped and programmable four-microphone audio recorders were placed within, at varying distances from the nearest source of disturbance- the north or south access roads, construction power or generation outlet transmission lines, or Provincial Road 280. Recorders were programmed to record six times each hour during the early morning hours of the spring breeding season to record olive-sided flycatcher or rusty blackbird songs. The direction

and distance of each bird to the fixed location of the recorder will be estimated and the positions of the bird in its territory will be mapped. Audio recordings are being analyzed and results are pending. Survey support was provided by members of the Keeyask Cree Nations, including Tataskweyak, War Lake, York Factory and Fox Lake Cree Nations.



Photo 12: A passive audio recorder to monitor bird species of conservation concern.

10.3 Colonial Nesting Sites

In 2017, colonial nesting site surveys in the Project area were conducted through spring and summer.

Confirm the nature and magnitude of predicted environmental effects as stated in the EA:

High water levels reduced the amount of colonial waterbird nesting habitat available in 2017, particularly in Gull Rapids where large colonies are known to occur. This resulted in reduced waterbird activity near the Project area.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including bird-wire diverters, appear to be effective. The decline colonial waterbird activity in the Project area was not related to the Keeyask Transmission Project.

Identify unexpected environmental effects of the Project, if they occur:

No unexpected environmental effects have been observed.

Identify mitigation measures to address unanticipated environmental effects, if required:

To date, none required.

Confirm compliance with regulatory requirements:

Compliance with regulatory requirements continues.

Provide baseline information to evaluate long-term changes or trends.

Survey information will contribute to evaluating long-term changes or trends in colonial waterbird populations and activity near the Project area.

A complete report on colonial nesting bird surveys can be found in the 2018 KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 13: A UAV used to monitor islands in Gull Rapids.

11 COMPLIANCE MONITORING

Compliance monitoring is observation or testing conducted to verify whether a practice or procedure meets the applicable requirements prescribed by legislation, licence conditions, permits, and/or environmental protection plans. Manitoba Hydro's Keeyask Transmission Project mitigation measures are aligned with both provincial and federal regulatory requirements.

The compliance program involves the use of a dedicated environmental inspector to observe and verify the implementation of the environmental protection plans. Information generated from these programs will be used

within an adaptive management approach to improve both mitigation measure effectiveness and monitoring program design.

In 2017/18 all Project components of the Keeyask Transmission Project were in compliance with applicable requirements. No regulatory citations or warnings were issued. There were a number of minor hazardous material releases, but only one meeting the threshold requiring a report to the Province. Project tours were regularly conducted with the regional Conservation Officer.

12 FUTURE MONITORING

The following monitoring activities are planned for 2018/19. Detailed descriptions of all monitoring activities can be found in the Keeyask Transmission Project Environmental Effects Monitoring Plan.

Aquatics

Post construction surveys will continue in 2018/19 in accordance with the EEMP. This includes post construction monitoring of stream crossings after the completion of construction of the GOT and unit transmission lines.

Terrestrial & Vegetation

Post construction surveys will continue in 2018/19 in accordance with the EEMP. This includes surveys for ecosystem diversity, priority plants and invasive species after the completion of the GOT and unit transmission lines.

Mammals

Post construction surveys will continue in 2018/19 in accordance with the EEMP. This includes a sensory disturbance survey for caribou.

Birds

Post construction surveys will continue in 2018/19 in accordance with the EEMP. This includes breeding bird surveys for species of conservation concern.

Heritage

All heritage related surveys have been completed.

