



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



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Winnipeg, Manitoba
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Keeyask Transmission Project 2020/21 Environmental Effects Monitoring Report

Prepared by Manitoba Hydro

Licensing & Environmental Assessment

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Prepared for:

Environmental Approvals Branch

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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	Keyask Hydroelectric Limited Partnership
KTP	Keyask Transmission Project
km	Kilometre
kV	Kilovolt
m	Metres
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. 3106). 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 fifth annual monitoring report and describes progress from April 1, 2020 through March 31, 2021. 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:

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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. Construction activities were largely completed by end of March 2020; however due to the pandemic challenges were encountered over the course of this monitoring period. The Keeyask Transmission Project and all its components are now complete and went in-service in February 2021.

3.1 Radisson Converter Station Upgrades

Upgrades to the existing Radisson converter station were required to accommodate the Keeyask Transmission Project. Work at Radisson Converter Station included the replacement of four breakers and the construction of the new Bay 1, the installation of associated equipment, and placement of structures for the termination of the new transmission lines. The station work was energized in November 2019.

3.2 Keeyask Switching Station

The Keeyask switching station accepts power from the generating station via four-unit transmission lines and transfers that power to three generation outlet transmission lines. The switching station was energized in March 2020.

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, and reliable source of power. The construction power station and lines are in-service.

3.4 Transmission Line Construction

The unit transmission lines transmit power from the seven generators located at the Keeyask generating station to the new Keeyask switching station. The four-unit transmission lines are located in a single corridor. Construction of the towers and spans over the Nelson River was completed in late 2019.

Three generation output transmission (GOT) lines transmit power from the Keeyask switching station to the existing Radisson converter station. Construction is complete and the Project in-service.

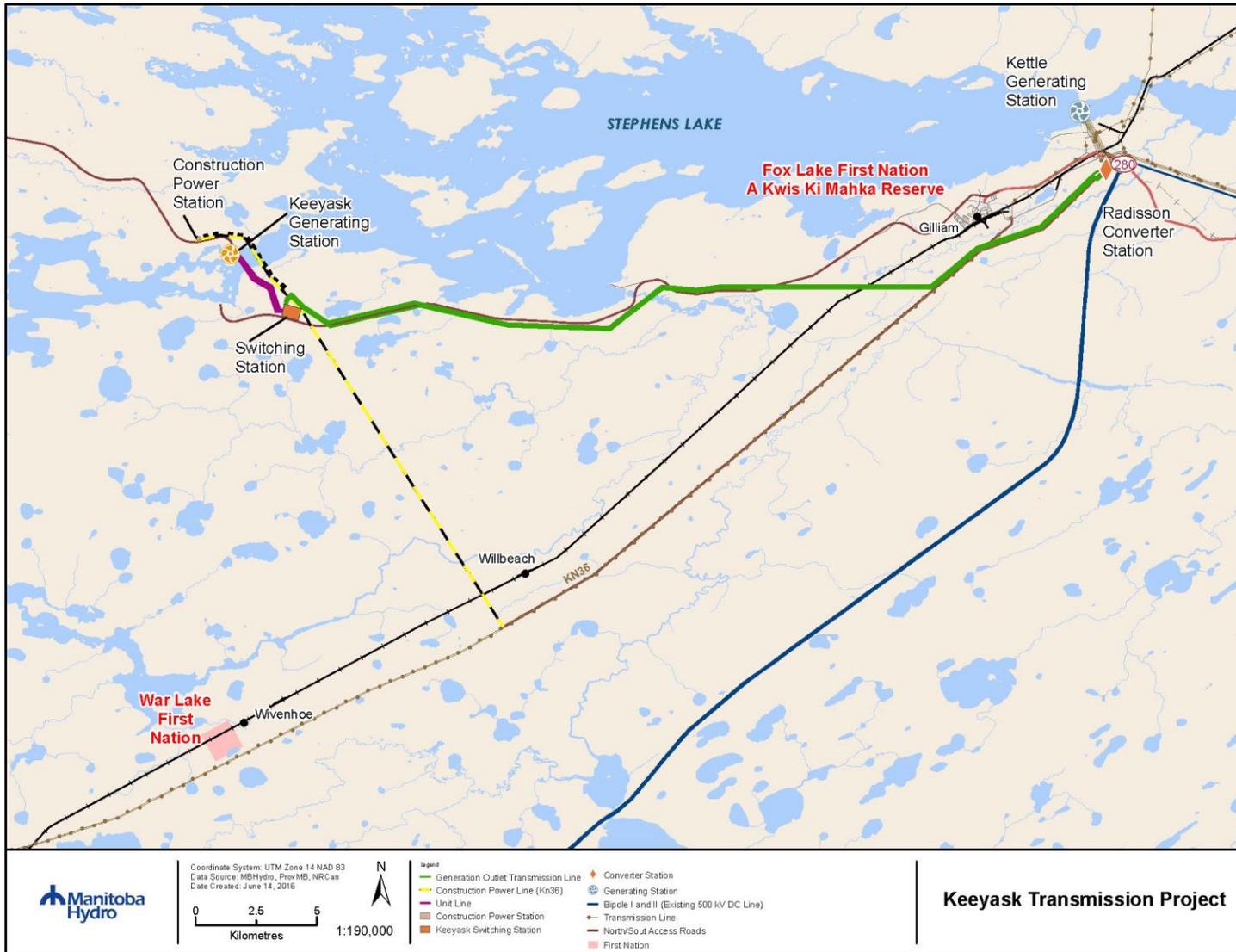
2020/21 Environmental Effects Monitoring Highlights

Key monitoring highlights during this reporting period include:

- All transmission lines associated with the Project were complete at the time of stream crossing monitoring including the construction power line, the temporary construction power line, the three generation outlet transmission lines and the four unit transmission lines. In 2021, no mitigation measures were deemed to be not in compliance with prescribed mitigation. With the completion of Project construction, no further stream crossing monitoring is required.
- Caribou continue to occupy and calve in the peatland complexes and islands around the Project area. However, as expected, some fluctuations in caribou use of the area has been detected.
- Passive data recorders were deployed to assess breeding success of bird species of conservation concern including rusty blackbird and olive-sided flycatcher. A statistical analysis will be conducted in the coming year to determine if there any project related effects.
- High water levels within the Nelson River and Project construction activity affected some colonial nesting waterbirds in the Gull Rapids area in summer 2020. Due to the high water levels, available habitat was reduced in Gull Rapids and several, smaller islands were under water during the nesting season. No nesting was observed.
- Survey personnel from Tataskweyak, War Lake, York Factory and Fox Lake Cree Nations were vital in conducting many field activities.



Photo 1: Keeyask Transmission Project is located south of Gillam, MB. The Project is complete and in-service.



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 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 EEMP 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 environmental assessment
- 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. These 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 experience 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

Oversight during transmission line construction was provided through an on-site Construction Environmental Inspector reporting to a Manitoba Hydro Environmental Specialist. In addition, Manitoba Hydro's Licensing and Environmental Assessment Department provided 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 Project's construction

phase. In previous years during active construction, Manitoba Hydro funded qualified and interested individuals from Indigenous communities to work as environmental monitors and community liaisons.

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. During construction activities, the EPIMS will facilitate the transfer of knowledge and experience 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: Completed towers on the north shoreline of the Nelson River.



Photo 3: Bird diverter installation on the Keeyask Transmission Project.

Table 1: 2020/21 Monitoring Activities by Environmental Component

Component	Environmental Indicator	2020/21 Monitoring Status
Aquatics	Fish habitat	Post-construction stream crossing surveys conducted at the Nelson River. Additional information in technical report.
Mammals	Moose	Moose population survey completed and reported in 2018. No surveys were conducted in 2020/21.
	Caribou	Sensory disturbance survey conducted. Additional information in KHLP - Keeyask Generation Project - Terrestrial Effects Monitoring Report.
Terrestrial Ecosystems and Vegetation	Priority plants	Priority plant surveys completed in 2017.
	Ecosystem diversity	Ecosystem diversity surveys completed in 2016 and 2018.
	Invasive plants	Invasive plant surveys completed in 2019.
Birds	Bird wire collision	Bird-wire collision surveys completed in 2018.
	Bird species of conservation concern	Passive audio recorders survey conducted during bird breeding season to detect rusty blackbird and olive-sided flycatcher. Additional information in technical report.
	Colonial bird nesting sites	Aerial survey of colonial nest sites conducted. Additional reporting in KHLP - Keeyask Generation Project Terrestrial Effects Monitoring Report
Heritage	Heritage sites	Heritage surveys completed in 2018.

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 spring 2021. The survey was conducted on May 31st, 2021.

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 and have recovered. All watercourse sites assessed in 2021, were compliant with prescribed mitigation and have recovered from construction effects.

Assess the effectiveness of mitigation measures implemented:

The implementation of mitigation recommendations outlined in the construction environmental protection plan was effective. No mitigation measures were deemed to be not in compliance with prescribed mitigation.

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 has contributed to the understanding of vegetation recovery for affected stream crossings.

The stream crossing monitoring program is now complete. No further monitoring is required.



Photo 4: The south shoreline of the Nelson River crossing on May 31st, 2021.

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 as both species occur in the Project's vicinity. 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 2020, a sensory disturbance survey was conducted in the spring and summer.

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

Caribou occupied 56% of the islands in lakes surveyed in 2020, 8% of which were also occupied by calves. During the pre-construction period (2010 to 2014), the percentage of islands on which caribou and their calves were detected declined. The trend continued in 2015 and then reversed in 2017 to 2019, when caribou and calves were detected on a greater percentage of islands than in 2015. As predicted in the EA, many Project-affected islands were unoccupied by caribou in 2020. However, there was also less caribou activity on unaffected islands than in

previous survey years.

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 are 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 populations, 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 2020 KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 5: Caribou on an island in Stephens Lake in 2020.



Photo 6: Caribou cow and calf on an Island in Stephens Lake in 2020.

8.2 Moose

Manitoba Hydro is working cooperatively with the Keeyask Hydroelectric Limited Partnership (KHLP) to jointly study Project effects on moose. Moose population surveys were conducted and reported in 2017/18. A moose survey planned for 2020/21 was cancelled due to the pandemic.

Detailed reports on the findings of the moose population and surveys can be found in the KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 7: Moose observed during caribou sensory disturbance survey in 2020.

8.3 Wildlife Mortalities

Due to construction activities being completed in March 2020, there were no wildlife mortalities or road-killed wildlife related to the Project in 2020/21.

9 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.

9.1 Bird-Wire Collision

The bird-wire collision survey and reporting were completed in 2017/18.

9.2 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. Surveys for olive-sided flycatcher and rusty blackbird were conducted in 2016, 2017 and 2019 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. For each potential nesting territory surveyed at a disturbed site, a potential territory at a site with no disturbance was also surveyed.

Recordings from automated recording units were analyzed and olive-sided flycatcher and rusty blackbird calls were identified and counted. The number of calls for each location within the recorder listening area was calculated, and maps were produced showing areas with high and low olive-sided flycatcher or rusty blackbird activity.

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

A multivariate statistical and GIS analysis to be conducted in the next year will incorporate the road disturbance, transmission line disturbance (if any), weather, and habitat quality data to control for the factors that influence the bird call rates. These results will be available next year.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including construction timing windows, appear to have been 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 local populations and habitat use near the Project area.

A technical report on bird species of conservation concern was developed for 2020/21.



Photo 8: A biologist setting up an automated recording unit to record rusty black bird and olive-sided flycatcher calls.

9.3 Colonial Nesting Sites

Manitoba Hydro is working cooperatively with the Keeyask Hydroelectric Limited Partnership (KHLP) to jointly study Project effects on colonial waterbirds. In 2020, 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 present within the Nelson River and

Project construction activity appeared to affect some colonial nesting waterbirds in the Gull Rapids area in 2020. Due to the high water levels, habitat availability was reduced in the Gull Rapids area and several, smaller islands were under water during the nesting season. The number of colonial waterbirds in the Gull Rapids area was reduced in comparison to previous years and no successful nesting of any gull or tern species was observed.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including bird-wire diverters, 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 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 2020 KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 9: A congregation of ring-billed gulls on an island in Gull Rapids, Manitoba.

10 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 environmental inspectors 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 2020/21 all Project components of the Keeyask Transmission Project were in compliance with applicable requirements. No regulatory citations or warnings were issued.

11 FUTURE MONITORING

The following monitoring activities are planned for

2020/21: Detailed descriptions of all monitoring activities can be found in the Keeyask Transmission Project Environmental Effects Monitoring Plan (EEMP).

Aquatics

All aquatics surveys are complete.

Terrestrial & Vegetation

All vegetation surveys are complete.

Mammals

Post construction surveys will continue in 2020/21 in accordance with the EEMP. These include a caribou sensory disturbance survey and a moose population survey.

Birds

Bird surveys are complete; however, analysis of the multiyear dataset will be conducted, and the results will be synthesized.

Heritage

All heritage related surveys are complete.

