



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



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Winnipeg, Manitoba
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Keeyask Transmission Project 2019/20 Environmental Effects Monitoring Report

Prepared by Manitoba Hydro

Licensing & Environmental Assessment

June 2020

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	Keyyask Hydroelectric Limited Partnership
KTP	Keyyask 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 fourth annual monitoring report and describes progress from April 1, 2019 through March 31, 2020. 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. The Keeyask Transmission Project and all its components are currently on schedule and nearly all complete. The in-service date for the Project is anticipated for later in 2020.

3.1 Radisson Converter Station Upgrades

Upgrades to the existing Radisson converter station are required to accommodate the Keeyask Transmission Project. Work at Radisson Converter Station has involved the replacement of four breakers and the construction of the new Bay 1, the installation of associated equipment, and 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 transfer 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, reliable source of power during construction. 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 now complete.

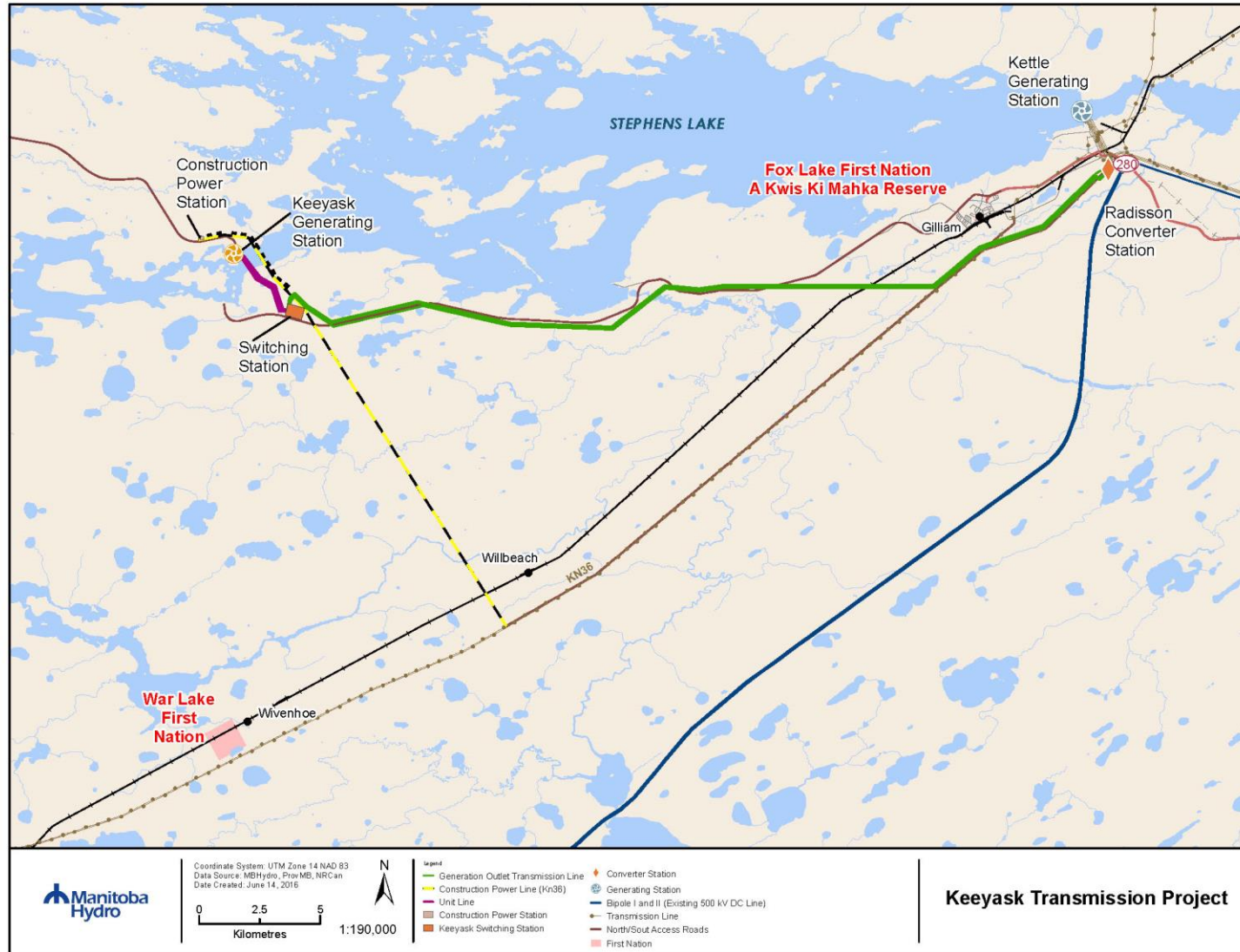
2019/20 Environmental Effects Monitoring Highlights

Key monitoring highlights during this reporting period include:

- Of the 39 water crossing sites assessed, none showed non-compliance with prescribed mitigation measures. Sites identified in 2015 and 2016 as being non-compliant with the prescribed mitigation showed signs of successful natural revegetation.
- Caribou continue to occupy and calve in the peatland complexes and islands around the Project area. The percentage of islands on which caribou were photographed increased slightly from 2017 to 2019.
- Vegetation surveys identified very minimal observations of invasive plant species. Total non-native cover remained low, and distribution remained limited to a few locations in 2019.
- Passive data recorders were deployed to assess breeding success of bird species of conservation concern including rusty blackbird and olive-sided flycatcher. Project-related disturbance did not appear to influence the amount of olive-sided flycatcher and rusty blackbird activity.
- Similar numbers of gulls and terns used habitat in the Keeyask Study Area in 2019 compared to previous years (2015-2018). As predicted, construction of the Keeyask Generation Project did appear to displace some nesting activities.
- 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. Construction of the Project is now 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 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 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 Manitoba Hydro Environmental Specialist, an on-site Construction Environmental Inspector continued environmental oversight for the 2019/20 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 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: Final tower assembly on the Keeyask Transmission Project.



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

Table 1: 2019/20 Monitoring Activities by Environmental Component

Component	Environmental Indicator	2019/20 Monitoring Status
Aquatics	Fish habitat	Post-construction stream crossing surveys conducted at 39 sites. Additional information in technical report.
Mammals	Moose	Moose population survey completed and reported in 2017/18. No surveys were conducted in 2019/20.
	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 were completed in 2016/2017. No surveys were conducted in 2019/20. Additional information in technical report.
	Ecosystem diversity	Ecosystem diversity survey were completed in 2016 and 2018. No surveys were conducted in 2019/20. Additional information in technical report.
	Invasive plants	Invasive plant survey conducted along the Project ROW. Additional information in technical report.
Birds	Bird wire collision mortality	All bird-wire collision surveys were completed in 2017/18. No surveys were conducted in 2019/20.
	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	All heritage surveys have been completed. No surveys were conducted in 2019/20

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 2019. The survey was conducted on June 17th, 2019.

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. Of the 39 watercourse sites assessed in 2019, all 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. Sites identified in 2015 and 2016 as being non-compliant with the prescribed mitigation showed signs of successful natural revegetation. Re-vegetation is occurring slowly, with forbs and shrubs observed growing along the stream banks and no active sedimentation of the stream being noted since being identified in 2015. As determined in previous monitoring years, due to naturally occurring re-vegetation and the marginal nature of the stream to fish, no further remediation is required.

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 recovery timelines for affected stream crossings.



Photo 4: Vegetative regrowth along a tributary of the Butnau River photographed on June 17th, 2019.

affected islands were unoccupied by caribou in 2019. 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 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 2019 KHL P Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 5: Caribou in a peatland complex in 2019.

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 the 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 (KHL P) to jointly study Project effects on caribou.

In 2019, 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 23% of the islands in lakes surveyed in 2019, 5% 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-



Photo 6: Caribou cow and calf on an Island in Gull Lake in 2019.

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. No surveys were conducted in 2018/19 or 2019/20.

A detailed report on the findings of the moose population and survey can be found in the 2017/18 KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 7: Moose observed on island in Nelson River during caribou sensory disturbance survey in 2019.

8.3 Wildlife Mortalities

Project environmental inspectors did not identify any wildlife mortalities or road-killed wildlife related to the Project in 2019/20.

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 2019, an invasive plant survey was conducted from August 18th to 20th. Surveys consisted of 17 transects totalling 11 km in length, repeating the surveys done in 2017 and 2018.

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 of invasive species. Non-native plants were found at one site in 2016 and at four sites in 2017. Relatively large increases in the number of sites and total non-native plant cover did not occur until 2018. However, total non-native cover remained low, and distribution remained limited to a few locations in 2019. Most of the non-native plant cover was observed close to either a Keeyask Generation Project south access road ditch or the Radisson Converter Station. Seven non-native plant species were recorded during the surveys, which was five more than 2017. Of these species, perennial sow-thistle and white sweet clover were of moderate invasive concern while three were of minor invasive concern.

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. The low cover of non-native plants in the surveyed areas was likely due to a combination of factors including the low proportion of the ROW area with exposed mineral substrates, limitations on potential sources of seeds, and increasing native vegetation cover. The increase in the number of sites with non-native plants between 2017 and 2018 was linked to the construction of the South Access Road for the Keeyask Generation Project and to Project spreading of plants that were long-established in the Radisson Converter Station footprint.

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. The likelihood that control efforts would be successful is limited by the close proximity of the same non-native plants in either the south access road ditch or the Radisson converter station. Also, ongoing expansion of native plant cover was expected to eventually crowd out or even eliminate non-native plants at some of the sites.

Confirm compliance with regulatory requirements:

Compliance with regulatory requirements continues.

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

The final 2019/20 technical report has contributed to understanding long-term changes in invasive species.



Photo 8: A patch of perennial sow-thistle growing in the ROW north of the South Access Road.



Photo 9: White sweet clover growing beside the South Access Road.

9.2 Ecosystem Diversity

Ecosystem diversity surveys were conducted in 2016 and 2018. During this time, 63 priority habitat patches were surveyed by air and 23 of these that were within walking distance of a road were ground surveyed.

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

The monitoring found that actual Project effects on ecosystem diversity were less than predicted in the EA Report. As expected, 47 of the 125 priority habitat patches that existed along the Project footprint prior to construction were entirely or almost entirely removed by Project clearing. In contrast, there were only minor Project effects on the portions of priority habitat patches that were outside of the standard cleared ROW corridor width. Only one of the effects was large enough to be seen during low-altitude aerial surveys. All of the remaining effects were localized, small in area and never extending more than 20 meters from the edge of ROW clearing. The types of effects included tree damage, tree collapse, tree mortality, understorey vegetation mortality and understorey vegetation loss.

Assess the effectiveness of mitigation measures implemented:

Monitoring results indicated that mitigation measures were implemented correctly during Project construction.

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:

No follow up mitigation is required based on the survey findings.

Confirm compliance with regulatory requirements;

Compliance with regulatory requirements continues.

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

The final 2019/20 technical report has summarized the long-term changes in ecosystem diversity.



Photo 10: Mechanical damage to tree in priority habitat patch.

9.3 Priority Plants

Reporting for priority plants was completed in 2016/17. The final 2019/20 technical report has contributed to understanding long-term changes in priority plants.

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

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

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. Surveys for olive-sided flycatcher and rusty blackbird continued in 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; 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 are mapped. Further information about the results of common nighthawk surveys in the region can be found in the KHLP annual environment reports.

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

The monitoring found that actual Project effects on species of conservation concern were similar to what was predicted in the EA Report. Project effects do not appear to have had a significant affect on local populations or habitat availability.

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 is included in 2019/20.

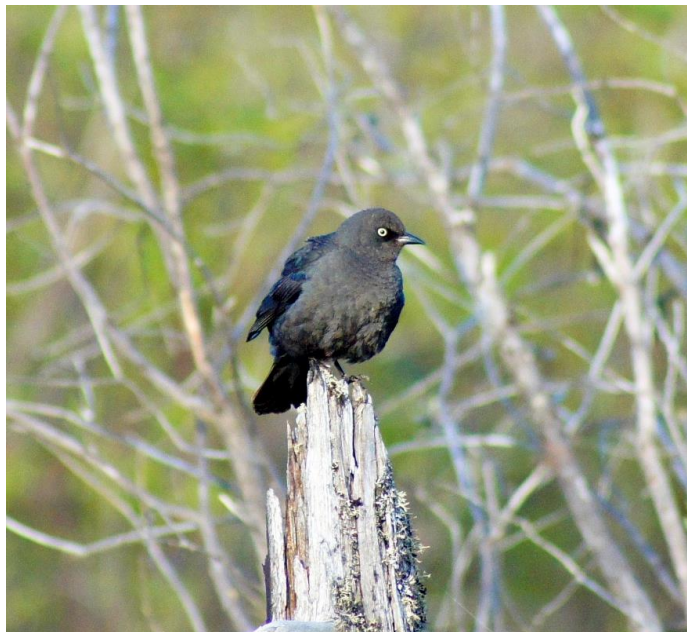


Photo 11: A rusty blackbird near the Keeyask Transmission Project.

10.3 Colonial Nesting Sites

Manitoba Hydro is working cooperatively with the Keeyask Hydroelectric Limited Partnership (KHLP) to jointly study Project effects on colonial waterbirds. In 2019, 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:

The numbers of gulls and terns in Keeyask study area were stable in 2019 compared to previous years (2015-2017). As predicted in the environmental assessment, Project construction related to the Keeyask Generation Project did appear to displace some nesting colonial waterbirds in 2019.

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 2019 KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report.



Photo 12: A congregation of ring-billed gulls on an island in Split Lake, Manitoba.

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 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 2019/20 all Project components of the Keyyask Transmission Project were in compliance with applicable requirements. No regulatory citations or warnings were issued. There were a number of minor hazardous material releases, however none meeting the threshold requiring a report to the Province. All spills have been identified with remediation completed. No wildlife mortalities were reported.



Photo 13: Environmental inspections were made of vehicles and equipment used on the construction site.

12 FUTURE MONITORING

The following monitoring activities are planned for 2020/21. Detailed descriptions of all monitoring activities can be found in the Keyyask Transmission Project Environmental Effects Monitoring Plan (EEMP).

Aquatics

Post construction surveys will continue in 2020/21 in accordance with the EEMP. These include stream crossing surveys at the unit lines over the Nelson River.

Terrestrial & Vegetation

All vegetation surveys are complete.

Mammals

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

Birds

Post construction surveys will continue in 2020/21 in accordance with the EEMP. These include breeding bird surveys for species of conservation concern.

Heritage

All heritage related surveys have been completed.