



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



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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	3
5 IMPLEMENTATION OF MONITORING AND FOLLOW-UP ACTIVITIES	3
6 ENVIRONMENTAL COMPONENT MONITORING	5
7 AQUATICS	5
7.1 Stream Crossings.....	5
8 MAMMALS	6
8.1 Moose.....	6
8.2 Caribou.....	6
8.3 Black Bear Dens.....	6
8.4 Wildlife Mortalities.....	6
9 TERRESTRIAL ECOSYSTEMS AND VEGETATION	6
10 BIRDS	7
10.1 Bird-Wire Collision.....	7
10.2 Species of Conservation Concern.....	7
10.3 Colonial Nesting Sites.....	7
11 COMPLIANCE MONITORING	8
12 FUTURE MONITORING	8

MAPS

Map 1: Keyyask Transmission Project Area.....	2
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PHOTOS

Photo 1: View of cleared Keyyask Transmission Line.....	1
Photo 2: Keyyask Transmission Line Stringing.....	4
Photo 3: Keyyask Transmission Tower Erection.....	4
Photo 4: Riparian Zone Clearing Mitigation.....	5
Photo 5: Vegetation Survey near the Keyyask Transmission Line.....	6

Photo 6: Keeyask Transmission Line with Bird Diverters 7
Photo 7: Completed Keeyask Transmission Tower Assembly and Stringing..... 7
Photo 8: Ring-billed colony in the Nelson River..... 7

TABLES

Table 1: 2015/16 Monitoring Activities by Environmental Component..... 5

Abbreviations

ac	Alternating Current
BMP	Biophysical Monitoring Plan
dc	Direct 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
km	kilometre
kV	kilovolt
m	metres
SD	Sustainable Development
ROW	Right-of-way

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1 INTRODUCTION

The objective of this report is to present information and data on the Keyask Transmission Project Environmental Effects Monitoring Plan in compliance with clause 14 of the Project *Environment Act* licence (No. 5614). Manitoba Hydro presents this information to inform stakeholders and the general public on progress made on construction and implementation of mitigation measures that minimize environmental effects.

This report is the first in a series of annual reports and describes the Project's second year of construction. Map 1 outlines the Keyask transmission project area.

2 PROJECT OVERVIEW

The Keyask Transmission Project involves the construction, operation and decommissioning of 22 km of a 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 Keyask generation station, upgrades to the existing Radisson converter station, a new Keyask 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 Keyask generation station to the Keyask switching station, and three 38 km 138 kV ac generation outlet transmission lines that will transmit power from the new Keyask switching station to the existing Radisson converter station. The projected in-service date for the Project is anticipated for 2018.

3 PROJECT STATUS

Construction of the Keyask Transmission Project began in July 2014.

3.1 Radisson Converter Station Upgrades

Upgrades to the existing Radisson converter station are required to accommodate the Keyask transmission project. Staging and outage coordination activities are proceeding on schedule, which include relay building modifications, cable trench extensions, breaker replacements and zone box installation. Bus relocation to accommodate the installation of a new bus conductor is expected to occur in summer 2016.

3.2 Keyask Switching Station

The Keyask switching station will accept power from the generating station via four unit transmission lines and transfer that power to three generation outlet transmission lines. Construction surveys for the station wrapped up in spring 2016. Site clearing and geotechnical drilling are complete with station construction expected to begin fall 2016.



Photo 1: View of cleared Keyask Transmission Line

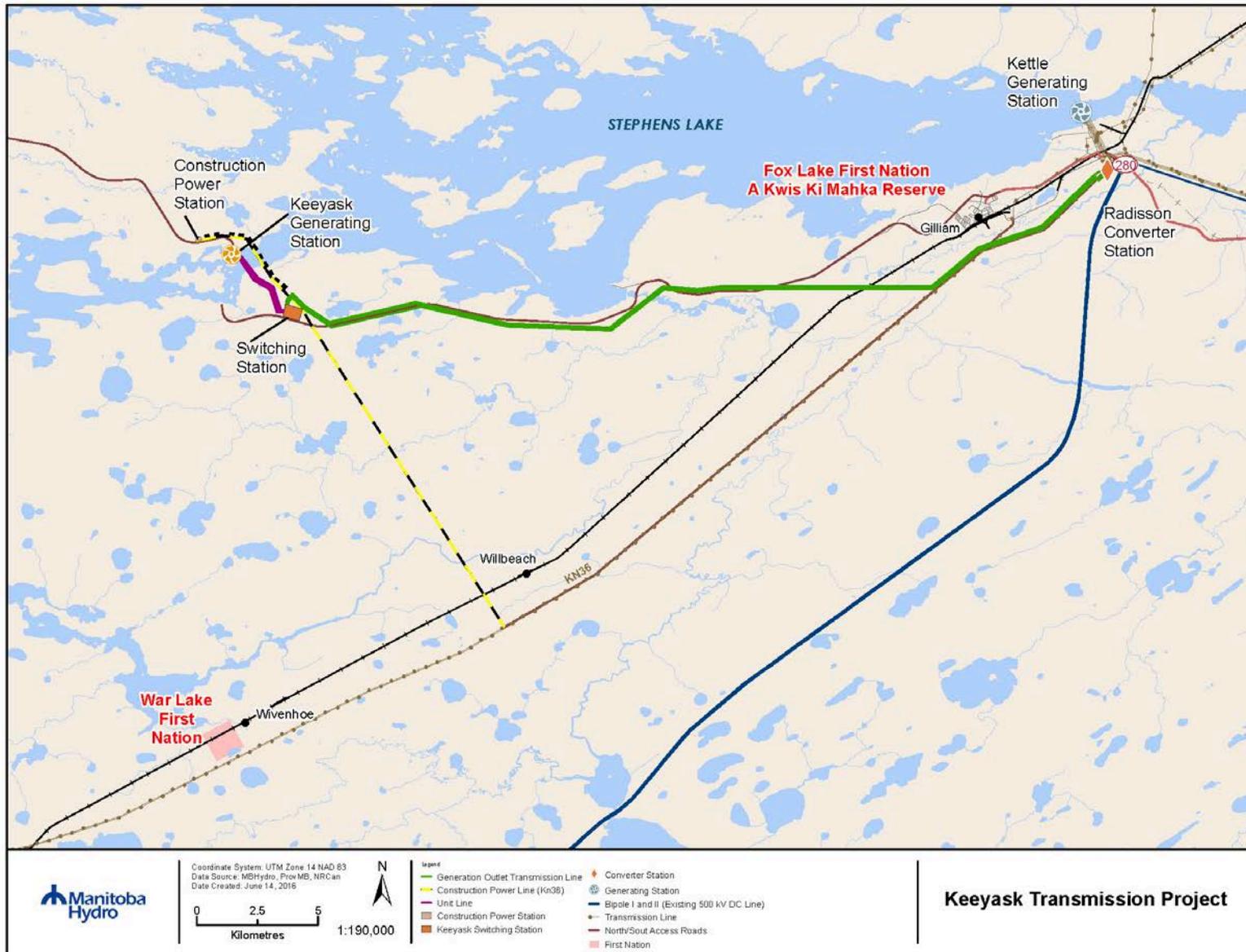
3.3 Keyask Construction Power

The purpose of the construction power line and construction power station is to provide power for construction activities associated with the Keyask generation project. Construction of the construction power station was completed in summer 2015. The station was energized and provides power for the Keyask generating station. Construction efforts for the construction power transmission line (KR1) were completed in winter 2016.

3.4 Transmission Line Construction

The unit transmission lines will transmit power from the seven generators located at the Keyask generating station to the new Keyask switching station. The four unit transmission lines will be located in a single corridor, which was cleared in winter 2015/2016. Geotechnical drilling is mostly complete, with remaining drilling expected to resume in winter 2016/17.

The generation output transmission (GOT) lines will transmit power from the Keyask switching station to the existing Radisson converter station. Construction of the 138kV ac generation output transmission (GOT) Line 1 is complete. Crews have finished assembling and erecting towers the length of the line and conductors have been strung. Work has also begun on GOT Line 2 and GOT Line 3 with ROW clearing, geotechnical drilling and preliminary tower spotting complete. Foundations and anchor installation are expected to begin winter 2016/17.



Map 1: Keeyask Transmission Project Area

2015/16 Environmental Effects Monitoring Highlights

Key monitoring highlights during this reporting period described in further detail in this document include:

- The identification of sufficient breeding bird territories to conduct detailed monitoring for olive-sided flycatcher (*Contopus cooperi*) and rusty blackbird (*Euphagus carolinus*).
- Five species of colonial waterbirds were encountered during helicopter and unmanned aerial vehicle surveys including ring-billed gull, common tern, American white pelicans, Bonaparte's gulls, and herring gulls.
- Of the 30 water crossing sites where construction was underway or had been completed, excessive clearing of the riparian buffer was the only mitigation measure in non-compliance at four sites. These areas will be revegetated naturally, monitored for success and assisted with planting, if required.
- Low densities of caribou were detected in the Keyask region during the winter of 2015/16. Previous studies have shown that variations in annual caribou migrations into the study area are considered normal.
- An aerial moose survey carried out in January 2015 showed an increase in the regional moose population relative to an aerial moose survey carried out in 2010.

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 Keyask Transmission Project. One aspect of this program is monitoring and follow up for biophysical environmental components identified in the Keyask Transmission Project EA and associated technical reports. The Environmental Effects Monitoring Plan (EEMP) submitted to SD for review in summer 2015 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; and

- 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; and
- Birds.

Adaptive Management

Manitoba Hydro has accumulated a wealth of knowledge and lessons learned from previous monitoring programs. The successes of those programs have been useful in developing the EEMP for the Project. This previous experience has been used to improve upon the plan's approach, methods and key environmental monitoring activities.

Going forward, an adaptive management framework will continue to be used to deal with unexpected outcomes or events based on monitoring information gathered. Data will be 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 will be developed in response to these contingencies.

5 IMPLEMENTATION OF MONITORING AND FOLLOW-UP ACTIVITIES

Environmental monitoring is being implemented for the

Keyask 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) will also play a major role in managing the EEMP implementation, coordination of field work, data collection and communications amongst the monitoring team.

Environmental Inspection Staff

Reporting to a Senior Manitoba Hydro Environmental Assessment Officer, an on-site Construction Environmental Inspector was retained and trained for the 2015/16 transmission line construction season. In addition, Manitoba Hydro's Licensing and Environmental Assessment Department provides advice and guidance to these on-site Environmental Inspectors and Site Environmental Officers.

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 Keyask 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 of the Keyask Transmission Project and collect monitoring information in support of Manitoba Hydro's biophysical and socio-economic effects monitoring programs. The community liaisons observe the construction and environmental protection program activities and reports back to community leadership as well as informs the Manitoba Hydro construction supervisor of any concerns the communities may have with those activities.

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: Keyask Transmission Line Stringing



Photo 3: Keyask Transmission Tower Erection

Table 1: 2015/16 Monitoring Activities by Environmental Component

Component	Environmental Indicator	2015/16 Monitoring Status
Aquatics	Fish habitat	Post-construction stream crossing surveys
Mammals	Moose	No activity in 2015/16. – Reported in Keeyask Generation Terrestrial Effects Monitoring Plan
	Caribou	Winter Transect Survey – Reported in Keeyask Generation Terrestrial Effects Monitoring Plan
	Black bear dens	No dens discovered in 2015/16
Terrestrial Ecosystems and Vegetation	Priority plants	Preconstruction survey completed in 2015. Follow-up surveys planned for 2016/17
	Fragmentation	Planned for 2016/17
	Ecosystem diversity	Planned for 2016/17
	Invasive and non-invasive species	Planned for 2016/17
Birds	Bird wire collision mortality	Planned for 2016/17
	Bird species of conservation concern	Breeding Bird Population Survey – Spring 2016
	Colonial bird nesting sites	Aerial Survey – Reported in Keeyask Generation Project Monitoring Reports
	Raptor nests	Preconstruction survey completed in 2015

6 ENVIRONMENTAL COMPONENT MONITORING

Multiple environmental components were identified for follow-up in the EA and technical reports. 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

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. In recognition of this, mitigation measures such as buffers were prescribed to protect streams and habitat. The monitoring program for this component is focused on evaluating the effectiveness of mitigation at stream crossings and prescribing any remedial actions.

7.1 Stream Crossings

Of the 30 crossing sites where construction was underway or had been completed, excessive clearing of the riparian buffer was the only mitigation measure in non-compliance (four sites). At site KN36-Aqua-104 the risk of damage to fish habitat due to over-clearing is expected to be minimal due to slow water flow and an extensive well vegetated floodplain. This area will be revegetated naturally, but monitored for revegetation success and assisted with planting if required. Part of the ROW on north side of the Nelson River where the Construction Power Line and the temporary line cross the river (KN36-Aqua-100 and KN36T-Aqua-100), had been cleared to the bank edge. Erosion control measures were in place and the bank is stable. Environmental inspectors are continuing to work with contractors to ensure full future

compliance with the environmental protection plan.



Photo 4: Riparian Zone Clearing Mitigation

8 MAMMALS

The potential effect of the Project on mammals was the focus of the environmental assessment especially for moose and caribou. Both species occur in vicinity of the Keeyask transmission project.

The overall objectives of the mammals monitoring program are to expand baseline knowledge, ensure compliance with regulatory requirements and EA report commitments, monitor and measure mammal responses to ROW creation and operation, and assess the success of mitigation measures. The EEMP outlines the species specific monitoring commitments for moose and caribou.

8.1 Moose

Manitoba Hydro is working with the Keeyask Hydroelectric Limited Partnership (KHLPL) and the Keeyask Generation Project to jointly study project effects on moose. In January 2015 an aerial population survey was conducted for moose in the study area. The outcome of that survey indicated a 21% increase in the population of moose in the study area since the last survey in 2010. A complete report on the findings of the moose population survey can be found in the 2015/16 KHLPL Keeyask Generation Project Terrestrial Effects Monitoring Plan Report. A monitoring summary of the effect of the Keeyask Transmission Project will be produced in future years as the project progresses.

8.2 Caribou

The abundance and distribution of caribou in the Keeyask region varies from year to year. Due to this variability it is difficult to attribute changes in abundance to a particular cause. In order to monitor project effects on caribou in the Keeyask region, caribou abundance and distribution (or absence) near the Project area are documented annually. In 2015/16 caribou were not found in large numbers in the project area.

Manitoba Hydro is working with the KHLPL and the Keeyask Generation Project to jointly study project effects on caribou. In winter 2015/16 an aerial transect survey was conducted for caribou in the study area. The outcome of that survey showed a low density of caribou in the Keeyask region during the winter of 2015/16. The caribou that were identified appeared to be small groups of animals from the Pen Island herd, and possibly some summer residents. More details on the survey results can be found in the 2015/16 KHLPL Keeyask Generation Project Terrestrial Effects Monitoring Plan Report. A monitoring summary of the effect of the Keeyask Transmission Project will be produced in future years as the project progresses.

8.3 Black Bear Dens

Black bears are common in the project area and the potential exists for denning sites to be located with the Project

footprint area. All project clearing activities have now been completed. No black bear dens were identified.

8.4 Wildlife Mortalities

With the implementation of wildlife protection mitigation measures as described in the Environmental Protection Plan, there were no wildlife mortalities related to the Project in 2015/16.

9 TERRESTRIAL ECOSYSTEMS AND VEGETATION

The protection of terrestrial ecosystems and vegetation was identified and confirmed as an important priority for mitigation during Project construction and also in later maintenance activities. To date, no rare plant species (individuals or groupings) have been damaged or lost due to construction activities. The post-clearing monitoring of terrestrial vegetation and ecosystems will continue in 2016/17. No activities were conducted in 2015/16.



Photo 5: Vegetation Survey near the Keeyask Transmission Line

10 BIRDS

10.1 Bird-Wire Collision

The presence of transmission lines in proximity to areas of high bird activity may lead to bird – wire collisions. Manitoba Hydro has committed to installing bird diverters along transmission line sections that transect areas of high bird activity. Pre-construction surveys identified sensitive sites for birds, which were used to select locations for bird diverters. Bird-wire collision monitoring will initiate in 2016/17.



Photo 6: Keeyask Transmission Line with Bird Diverters

10.2 Species of Conservation Concern

Species of conservation concern include species that are protected under *The Endangered Species and Ecosystem Act* (Manitoba), *Species At Risk Act* (Canada) or are listed as rare by the Manitoba Conservation Data Centre. These species generally exist in low numbers and are sensitive to changes in habitat. In 2015/16 surveys determined the presence and locations of breeding territories for olive-sided flycatcher (*Contopus cooperi*) and rusty blackbird (*Euphagus carolinus*). This information will serve to allow the development of a multi-year monitoring program.



Photo 7: Completed Keeyask Transmission Tower Assembly and Stringing

10.3 Colonial Nesting Sites

The installation of the Keeyask Transmission Line has the potential to adversely affect the behavior of nearby colonial nesting birds and the use of colonial nesting sites.

Manitoba Hydro is working with the KHLP and the Keeyask Generation Project to jointly study project effects on colonial nesting birds. In 2015/16 five species of colonial waterbirds were encountered during helicopter and unmanned aerial vehicle surveys. Ring-billed gull was the most numerous birds, followed by common tern. A few American white pelicans, Bonaparte's gulls, and herring gulls were also observed. Gulls and terns congregated on rocky reefs and islands throughout the islands in Gull Rapids. A complete report on the findings of the colonial nesting bird survey can be found in the 2016 KHLP Keeyask Generation Project Terrestrial Effects Monitoring Report. A monitoring summary of the effect of the Keeyask Transmission Project will be produced in a future years as the project progresses.



Photo 8: Ring-billed gull colony in the Nelson River

Compliance Monitoring Summary 2015/16

- The Keeyask Transmission Project hired an environmental inspector who conducted compliance monitoring to ensure mitigation measures outlined in the Environmental Protection Plan, licences, permits and approval were followed during construction.
- Construction related activities did not result in any wildlife mortalities.
- Throughout the winter construction season, the environmental inspector conducted periodic inspections of all project sections. Inspection reports indicated there were no major issues and work was in compliance with applicable approvals and permits. Minor spills, vegetation clearing, and garbage issues were quickly addressed and remediated.
- On a numerous of occasions the regional Conservation Officer toured the site with the environment inspector to ensure compliance with the project licence and environmental protection plans.

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.

12 FUTURE MONITORING

The following monitoring activities are planned for 2016/17. Detailed descriptions of all monitoring activities can be found in the Environmental Effects Monitoring Plan.

Aquatics

Post construction surveys will continue in 2016/17 in accordance with the EEMP. This includes post clearing monitoring of stream crossings.

Terrestrial & Vegetation

Post construction surveys will continue in 2016/17 in accordance with the EEMP. This includes surveys for invasive and non-native species and priority plants.

Mammals

Post construction surveys will continue in 2016/17 in accordance with the EEMP. These include winter aerial surveys for caribou. The next moose aerial survey is planned for 2018.

Birds

Post construction surveys will continue in 2016/17 in accordance with the EEMP. These include breeding bird surveys for species of conservation concerns, colonial waterbird surveys, and bird-wire collision monitoring.