Lake Winnipeg East System Improvement Transmission Project

Environmental Effects Monitoring Report

Prepared by:
Manitoba Hydro
Winnipeg, Manitoba
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Manitoba Hydro

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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
km	kilometre
LWESI	Lake Winnipeg East System Improvement
kV	kilovolt
m	metres
PR	Provincial Road
ROW	Right-of-Way
SD	Sustainable Development

1 INTRODUCTION

This report presents the results of the environmental effects monitoring plan for the Lake Winnipeg East System Improvement (LWESI) Transmission Project, hereby known as "the Project". This report is produced in compliance with clause 43 of *The Environment Act* licence No. 3210. 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 is the Project's second annual monitoring report and describes construction progress from April 1, 2016 through March 31, 2017, but also includes some more recent monitoring results. Map 1 outlines the Lake Winnipeg East System Improvement 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
820 Taylor Ave (3)
Winnipeg MB R3M 3T1
1-877-343-1631 or 204-360-7888

2 PROJECT OVERVIEW

The Lake Winnipeg East System Improvement Transmission Project involves the construction, operation, and decommissioning of a new 75km 115 kV transmission line from the Town of Powerview-Pine Falls to Manigotagan Corner Station, a new 115-66 kV transmission station west of the intersection of Provincial Road (PR) 304 and Rice River Road, and modifications to the existing Pine Falls Generating Station Switchyard.

3 PROJECT STATUS

Construction of the Project began in August 2015. The revised in-service date is spring 2018.

3.1 Pine Falls Generating Station Switchyard Modifications

Improvements to the Pine Falls Generating Station switchyard are required to accommodate the Project. Staging and outage coordination activities are finalized including relay building modifications, cable trench extensions, breaker replacements zone box installation and the installation of a new bus conductor.

3.2 115-66kv Transmission Station

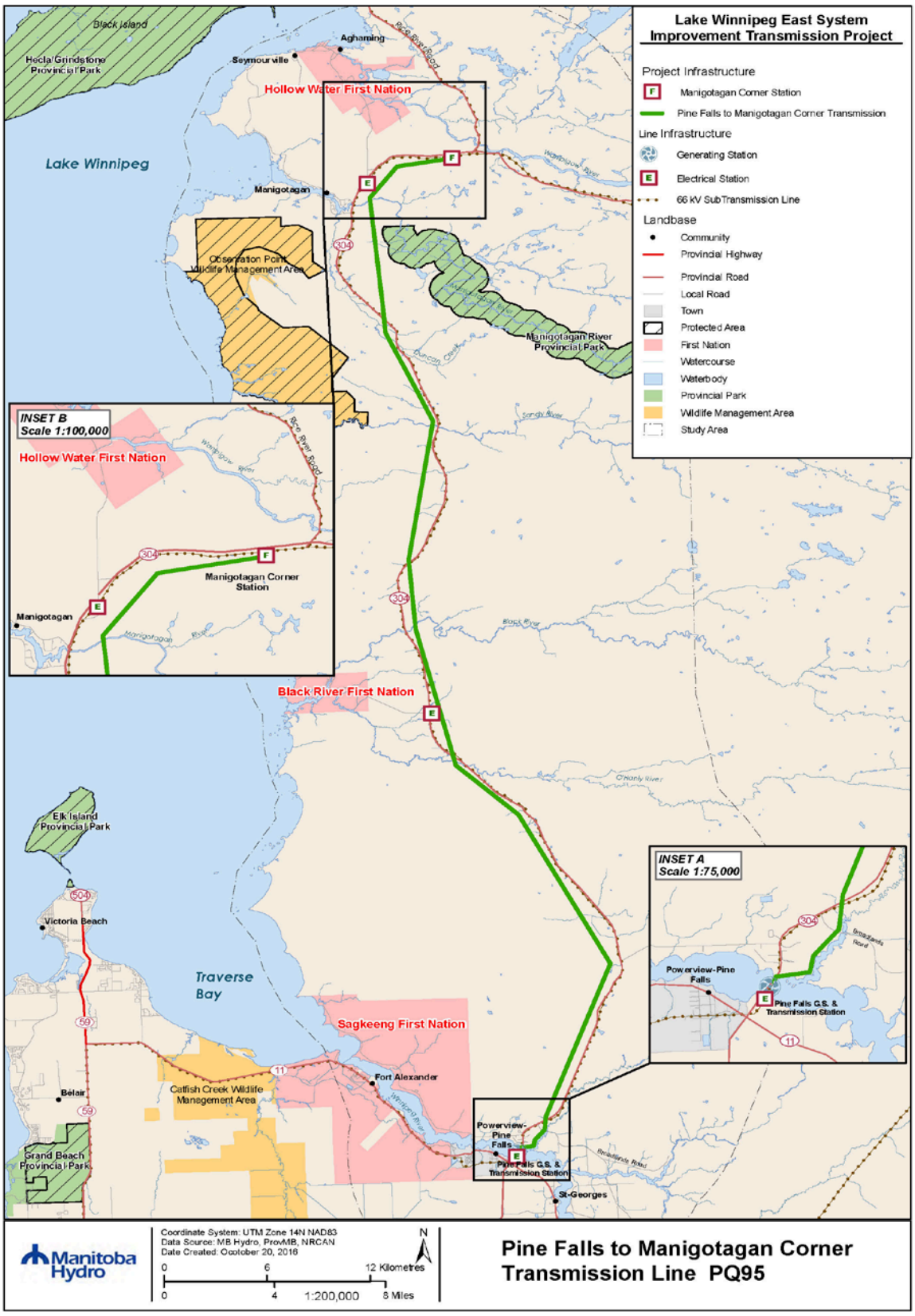
The new 115-66kv switching station near Manigotagan will accept power from the generating station via a 75 km transmission line. Station construction will be completed by fall 2017. Station will be fully commissioned by April 2018.

3.3 115 kV Transmission Line

Clearing of the 60 meter ROW (right of way) was conducted in the winter 2015/16 in joint ventures with Sagkeeng First Nation, Black River First Nation and Hollow Water First Nation. Tower assembly was conducted 2016/17 in joint ventures with the same communities. Foundation construction and tower erection were completed by spring 2017. Approximately 20% of the line stringing were also completed. The remainder of the line stringing is forecast to be complete by February 2018. The transmission line will be fully commissioned and integrated into the distribution system by the end of April 2018.

Photo 1: Construction crews installing a tower

Photo 2: Newly assembled tower installed on the ROW



Map 1: Lake Winnipeg East System Improvement Transmission Project Area

2016/17 Environmental Effects Monitoring Highlights

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

- Vegetation species of conservation concern conducted in July 2017 identified that most were in good condition with some potentially benefitting from the right-of-way clearing activities as a result of additional sunlight and reduced competition afforded to herbaceous plants.
- Plants and plant communities important to indigenous peoples appeared to be thriving in most areas.
- Analysis of audio recorder data indicated that common nighthawk and eastern whip-poor-will are common in the study area.
- There was no statistically significant difference between common nighthawk and eastern whip-poor-will activity at sites on the right-of-way and at comparison sites in similar habitat.
- An aerial survey was conducted for moose, white-tailed deer, and wolves. 128 moose, nine white-tailed deer and two wolves were detected during the three day survey.
- With the support of Manitoba Hydro, a GPS wolf study has been initiated within and neighbouring the Project study area by a PhD student from Memorial University.
- 24 stream crossing sites were surveyed. All were in compliance with the environmental protection plan.

4 ENVIRONMENTAL EFFECTS MONITORING PLAN OVERVIEW

Manitoba Hydro's commitment to environmental protection includes the development of a comprehensive Environmental Protection Program (EPP) for the Project. This includes monitoring and follow-up of biophysical environmental components identified in the environmental assessment. The Environmental Effects Monitoring Plan (EEMP) was approved by the Department of Sustainable Development (SD) on August 9th, 2016, and 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 (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;
- Vegetation;
- Birds;
- Mammals; and
- Access

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 helps validate the accuracy of the environmental assessment and effectiveness of mitigation measures. Manitoba Hydro utilizes internal staff for the implementation of the EEMP, funded participation of community representatives, 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 2016/17 transmission line construction season. In addition, Manitoba Hydro's Licensing and Environmental Assessment Department provided advice and guidance to environmental inspectors on all conditions outlined in *The Environment Act* licence.

Community Involvement

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 Project. In 2016/17, Manitoba Hydro approached impacted First Nation communities to request they recommend interested individuals from their community to work as community representatives for the Project.

This communitiy representative position provided an opportunity for an individual from Sagkeeng First Nation to perform site visits and observe ongoing construction activities. The community representitive was trained in environmental protection procedures, equipment and inspection documentation. Environmentaly sensitive sites were evaluated for proper signage, identification and mitigation measure compliance(Photo 3 and 4). The community representitive served as both environmental monitor and community liaison. As a community liaison he kept community leadership informed on the status of construction activities through daily reporting and also informed the Manitoba Hydro construction supervisor of any community related concerns.

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 3: Environmental protection signage installed to assist construction crews

Photo 4: Crews preparing to travel to an environmentally sensitive site to conduct hand clearing, an important mitigation measure to protect certain environmental features

Table 1: 2016/17 Monitoring Activities by Environmental Component

Component	Environmental Indicator	2016/17 Monitoring Status
Aquatics	Condition of Watercourse and Banks	Stream crossing assessment completed
Vegetation	Vegetation Species of Conservation Concern	Plant survey completed
	Plants and Plant Communities important to Aboriginal peoples	Plant survey completed
	Rehabilitation	Plant survey completed
	Invasive and Non-Native Species	Plant survey completed
Birds	Stick Nests	None identified within the Project ROW
	Bird Collision and Bird Diverter Monitoring	Scheduled to begin after conductor installation
	Bird Species of Conservation Concern	Breeding surveys completed for whip-poor-will and common nighthawk
Mammals	Moose	Aerial and ground surveys completed
	White-tailed Deer	Aerial and ground surveys completed
	Wolves	Aerial and ground surveys completed
Access	Humans on ROW	Human access survey ongoing

6 ENVIRONMENTAL COMPONENT MONITORING

Multiple environmental components were identified for follow-up in the environmental assessment 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). Map 2 shows an overview of monitoring site locations.

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. 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. Sites were surveyed from a helicopter, with ground surveys if required.

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. All 24 sites observed were, constructed and cleaned up in accordance with the mitigation measures outlined in the EnvPP, and the crossing and site conditions met the EnvPP and EAL requirements.

Assess the effectiveness of mitigation measures implemented:

The implementation of mitigation recommendations outlined in the construction Environmental Protection Plan was effective. The three sites identified in 2016 as being non-compliant with the prescribed mitigation due to erosion, exposed soils, debris, and slash in watercourse were rehabilitated and showed signs of successful natural revegetation, with no further remediation warranted.

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

Due to the natural revegetation of disturbed locations, no further remediation is required. At the O'Hanley river crossing a single rubber tire was observed caught in natural debris along the river channel (of unknown origin). This rubber tire will be removed during 2018 construction activities.

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. No unanticipated effects have been found to date.

Photo 5: View looking east of the crossing at the Black River showing the preservation of the riparian zone and regrowth of vegetation along the ROW

8 VEGETATION

Vegetative change can be an important indicator of environmental effects of the Project.

8.1 Species of Conservation Concern

Surveys conducted in July 2017 at seven plots identified that most species of conservation concern (SCC) were in good condition with some potentially benefiting from the right-of-way clearing activities as a result of additional sunlight and reduced competition afforded to herbaceous plants.

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

As predicted in the EA, some loss of habitat has occurred for rare and uncommon plants within the Project area, including some elm and ash species. However the habitat changes have been confined to the Project right-of-way and station site.

Assess the effectiveness of mitigation measures implemented:

In general, the SCC sites appeared to be in good condition with most plants located and in healthy condition.

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 SCC in this Project area.

Photo 6: Hooker's Orchid (*Platanthera hookeri*) found within the ROW

8.2 Plants and Plant communities important to Indigenous Peoples

Surveys conducted in July 2017 at 17 plots identified that most species of of importance to Indigenous peoples appeared to be thriving in the Project ROW.

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

As predicted in the EA, some loss of habitat has occurred for plants important to Indigenous peoples within the Project area. However many species were having an excellent year for fruiting with blueberry and cranberry species fruiting profusely within the cleared right-of-way.

Assess the effectiveness of mitigation measures implemented:

In general, due in part to the effectiveness of mitigation measures and suitable moisture conditions plants in surveyed plots appeared to be in good and healthy condition. Although Sweetflag fruiting was lower this year due to reduced river flows, the number of plants remains steady and the tubers (which are valued for medicinal use) remain present in large numbers.

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

Despite the removal of mulch material , the re-appearance of dwarf bilberry at one survey plot has not occurred as expected. Depending on future moisture conditions this plot may require another year to reestablish.

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 plants important to indigenous peoples in this Project area.

Photo 7: Early lowbush blueberry (*Vaccinium angustifolium)* in fruit within the ROW

8.3 Invasive and Non Native Plants

Surveys were conducted in July 2017 at key locations along the ROW. White sweet clover *(Melilotus albus)* and Canada thistle (*Cirsium arvense*) were identified in a few locations.

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 observed along some portions of the transmission line, typically close to PTH 304, but these species were very likely present prior to the clearing of vegetation and have since benefitted from the reduction in tree and shrub cover.

Assess the effectiveness of mitigation measures implemented:

Mitigation actions in the construction Environmental Protection Plan, to limit the exposure of mineral soils by clearing equipment appeared to be at least partially successfully. The periodic regrowth of tree and shrub cover will naturally suppress these species in the future.

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:

Manitoba Hydro and its contractors will continue to apply a clean equipment protocol to limit the spread of these species.

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

Survey information will contribute to evaluating long-term changes or trends in invasive plants in this Project area.

Photo 8: Aerial survey for invasive species occurrences and disturbed areas

9 BIRDS

9.1 Bird Collision and Diverter Monitoring

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 spring of 2018, after the conductors, skywires and bird deterrents are installed.

9.2 Stick Nests

An aerial stick nest search conducted by an experienced biologist prior to Project clearing. No stick nests were detected.

9.3 Bird 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. Point count surveys in 2015 did not detect any golden winged warblers, a species identified as high concern by local communities. In response to this, efforts shifted to whip-poor-will (*Caprimulgus vociferous*) and common nighthawk (*Chordeiles minor*). Other listed species observations were collected incidently including Canada warbler (*Cardellina canadensis*) , olive-sided flycatcher (*Contopus cooperi*), rusty blackbird (*Euphagus carolinus*), and red-headed woodpecker (*Melanerpes erythrocephalus*).

During the 2016 monitoring program passive audio recorders were deployed at 58 locations around the Project site during the breeding season in a paired control-impact study design.

Data analysis showed that common nighthawk and eastern whip-poor-will appeared common in the study area, as indicated by their presence at more than half of the sites surveyed and by the frequency of their calls. There was no statistically significant difference between common nighthawk and eastern whip-poor-will activity at sites on the ROW and at comparison sites in similar habitat. The similarities in detection rate between ROW and comparison sites suggest that there were no measurable adverse effects of the cleared transmission line ROW on either species to date. It is well understood that both species forage and nest in forest clearings and edges (Environment Canada 2015, 2016), so no detectable effect was hypothesized. Portions of the cleared transmission line appeared to provide suitable habitat for common nighthawk and eastern whip-poor-will. However, other factors affecting these populations in the study area, such as insect populations, predation rates and reproductive success, are unknown.

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

As predicted in the EA, some habitat loss and alteration has occurred as a result of the Project. Some sensory disturbance has also likely occured. Construction activity was conducted outside of the breeding bird window preventing an effect to any nests. Monitoring studies have shown that both common nighthawk and whip-poor-will utilized the right-of-way in a similar manner as comparable adjacent habitat.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including Project routing, vegetation buffers, access management, and 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.

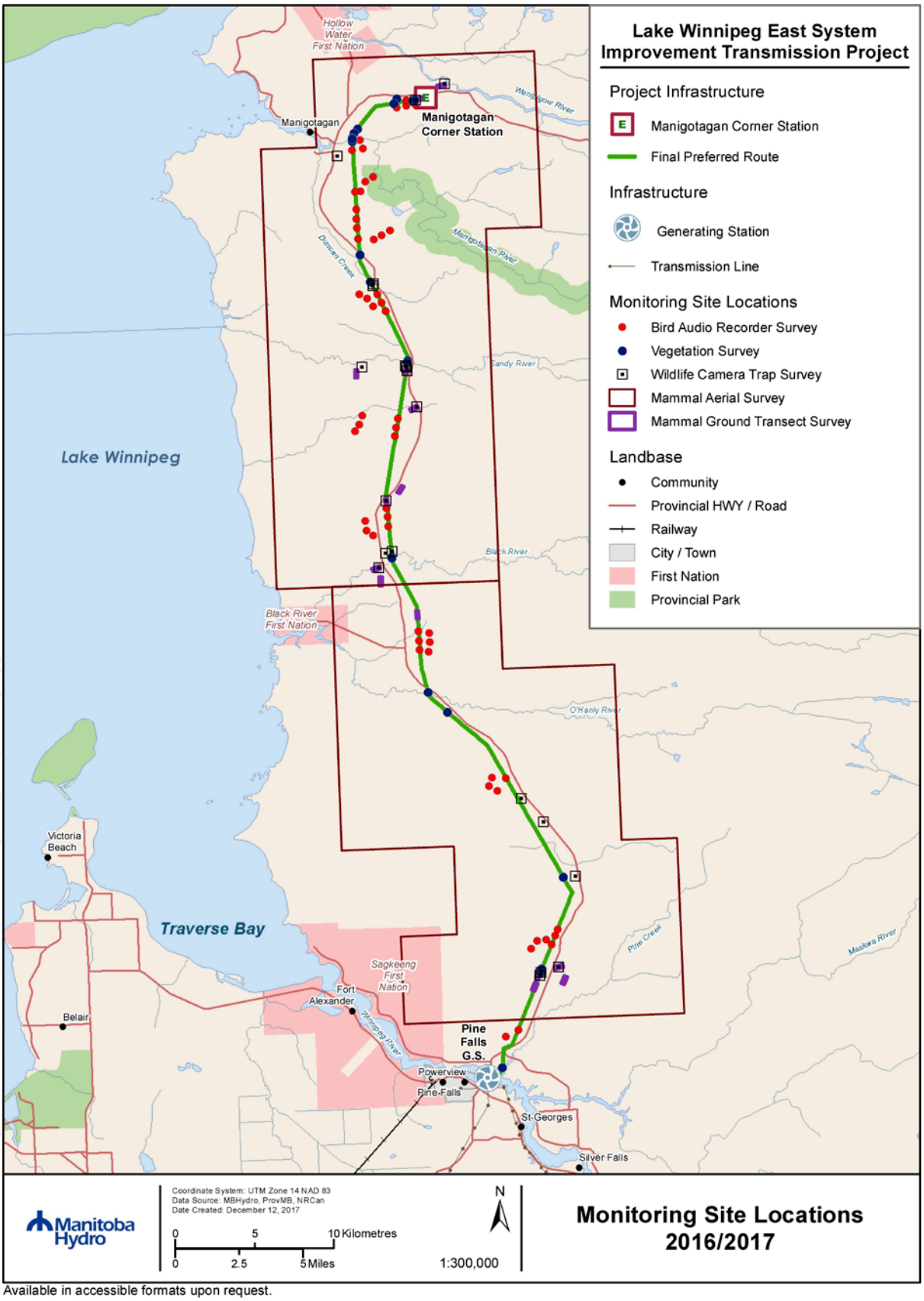
Confirm compliance with regulatory requirements;

Compliance with regulatory requirements continues.

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

This monitoring has helped in understanding use of the cleared right-of-way by some bird species of conservation concern.

Photo 9: Passive audio recorders were used to monitor for common nighthawk and whip-poor-will



Available in accessible formats upon request.

Map 2: Lake Winnipeg East System Improvement Transmission Project Monitoring Site Locations

10 MAMMALS

The potential effect of the Project on mammals was the focus of the environmental assessment especially for moose, white-tailed deer and wolves. All species occur within the Lake Winnipeg East System Improvement Transmission Project study area.

The overall objectives of the mammals monitoring program are to expand baseline knowledge, ensure compliance with regulatory requirements and environmental report commitments, monitor and measure mammal responses to ROW creation, and assess the success of mitigation measures. The EEMP outlines the species specific monitoring commitments for moose (*Alces alces),* wolves *(Canis lupus),* and white-tailed deer *(Odocoileus virginianus)*.

10.1 Moose

Manitoba Hydro conducted an intensive aerial ungulate survey of the Project area from February 12-15, 2017. 47 survey blocks were identified ('3 minute grid' – 3.5km x 5.5km) that intersect a five kilometer buffer of the LWESI right-of-way. These survey blocks were derived from the same spatial grid Manitoba Sustainable Development utilizes in conducting Gassaway-style moose population surveys in Game Hunting Area 26.

A Bell 206 Jet Ranger helicopter was used to fly intensive grid survey at 500 meter spacing at a 122 meter altitude with an average air speed of 100km/hr. Pre-loaded GPS flight lines ensured complete coverage on east to west orientation. Two experienced observers recorded observations of moose, white-tailed deer, wolves, and tracks of moose, deer, wolves and snowmobiles.

A total of 128 moose were detected during the survey with the bull:cow:calf ratio of 30:58:38. 10% of the cows had twins. This equates to an average density of approximately 14 moose/100 km^2. One collared cow was detected within the study area. Manitoba Sustainable Development confirmed that this was the only collared cow in the study area at the time of this survey.

Moose appeared to have an uneven distribution in the survey area, but were generally found in higher numbers to the east of the Project area. Although a higher number of moose were detected in 2017 than 2016, comparison of total moose numbers between years is not appropriate due to differing survey techniques (fixed wing vs intensive helicopter survey). However, moose detection locations between 2016 and 2017 indicate that moose do not appear to avoiding the Project area to a greater degree in 2017 than 2016.

Replicates of this survey in the future will help in understanding changes in moose distribution and provide some inferences on changes in relative abundance of both moose and white-tailed deer in the project area.

Ground track surveys were also conducted at five monitoring blocks on the ROW and at control sites off the ROW to detect the presence of moose, white-tail deer, and wolves. These surveys occured at regular intervals throughout the year and have provided baseline data on the presence of moose along and adjacent to the Project work area. Early results indicate that moose tracks were present before and after the clearing activities at most monitoring blocks. However, due to very low number of detections, statistical comparisons were not achievable. This survey method has therefore been adjusted from ground track surveys to camera trap surveys. This technology will allow for better animal detection, regardless of ground conditions (snow, wet, dry, muddy etc).

Early results from the camera trap survey have shown the presence of moose occuring at 3 of 5 ROW monitoring sites and 4 of 5 control monitoring sites over 102 trap days in 2017. When data was pooled, significantly less moose were detected on the ROW monitoring sites then at control sites (p-value = 0.755). However a larger sample size will need to be collected in future years to allow for more fullsome analysis.

No moose were killed or injured as part of the Project activities in 2016/17. In addition, no mineral licks were identified.

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

As predicted in the EA, some habitat loss and alteration has occurred as a result of the Project. However the changes have been confined to the Project right-of-way and station site. Surprisingly when considering the data collected as part of multiyear aerial surveys, there has been little evidence that moose have avoided the Project area. No moose mortalities due to vehicle collisions or other sources have been reported by environmental inspectors or construction crews.

Preliminary information from a PhD study on wolf movements in the region indicates that wolves have avoided the Project area, to date, therefore limiting the likelyhood of increased moose predation as a result of the Project.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including Project routing, vegetation buffes, access management, and 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 requirements:

Compliance with regulatory requirements continues.

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

This monitoring will help in understanding changes in moose distribution and provide some inferences on changes in relative abundance of both moose and white-tailed deer in the Project area.

Photo 10: Moose detected in a camera trap

10.2 White-tailed Deer

Manitoba Hydro conducted an intensive aerial ungulate survey of the Project area from February 12-15, 2017. 47 survey blocks were identified ('3 minute grid' – 3.5km x 5.5km) that intersect a five kilometer buffer of the LWESI right-of-way. These survey blocks were derived from the same spatial grid Manitoba Sustainable Development utilizes in conducting Gassaway-style moose population surveys in Game Hunting Area 26.

A Bell 206 Jet Ranger helicopter was used to fly intensive grid survey at 500 meter spacing at a 122 meter altitude with an average air speed of 100km/hr. Pre-loaded GPS flight lines ensured complete coverage on east to west orientation. Two experienced observers recorded observations of moose, white-tailed deer, wolves, and tracks of moose, deer, wolves and snowmobiles.

A total of nine deer were detected in the survey. No deer or deer tracks were detected in the northern portion of the study area.

Ground track surveys were also conducted at five monitoring blocks on the ROW and at control sites off the ROW to detect the presence of moose, white-tailed deer, and wolves. These surveys occurred at regular intervals throughout the year and have provided baseline data on the presence of white-tailed deer along and adjacent to the Project work area. Results indicate that a few white-tailed deer tracks were present before and after the clearing activities in two of the southernmost monitoring blocks. However, due to very low number of detections, statistical comparisons were not achievable. This survey method has therefore been adjusted from ground track surveys to camera trap surveys. This technology will allow for better animal detection, regardless of ground conditions (snow, wet, dry, muddy etc.).

Early results from the camera trap survey have shown the presence of white-tailed deer occuring at all monitoring and control sites after ~102 trap days in 2017. White-tailed deer were even detected north of the Project footprint at a control site near the Wanipagow River. When data was pooled, significantly more deer were detected on the ROW monitoring sites then at control monitoring sites (p-value = 0.56), however this is largely due to repeated deer visits at a ROW monitoring site near Black river. These camera trap detections provide the first Project collected evidence of white-tailed deer in the northern portion of the study area.

No white-tailed deer were killed or injured as part of the Project activities in 2016/17. In addition no deer mortalities were observed by Project staff (i.e. hunter or vehicle collsions).

The overall low number of white-tailed deer detected during this survey period correspondes to what was detected in previous survey periods. The recent scarcity of deer in this study area has been attributed to severe winters in 2013/14 and 2014/15.

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

As predicted in the EA, some habitat loss and alteration has occurred as a result of the Project. However the changes have been confined to the Project ROW and station site.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including Project routing, vegetation buffes, access management, and 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 requirements;

Compliance with regulatory requirements continues.

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

This monitoring will help in understanding changes in white-tailed deer distribution and provide some inferences on changes in relative abundance of both moose and white-tailed deer in the Project area.

Photo 11: White-tailed deer detected in a camera trap north of the Project footprint at a monitoring control site near the Wanipigow River

10.3 Wolves

Ground track surveys were also conducted at five monitoring blocks on and off the ROW to identify the presence of moose, white-tail deer, and wolves. These surveys occur at regular intervals have provided baseline data on the presence of moose along and adjacent to the Project work area. Results indicate that a few wolf tracks were present before and after the clearing activities in a few monitoring blocks. However, due to very low number of detections, statistical comparisons were not achievable. This survey method has therefore been adjusted from ground track surveys to camera trap surveys. This technology will allow for better animal detection, regardless of ground conditions (snow, wet, dry, muddy etc.).

Early results from the camera trap program have shown that wolves have been detected on 1 of 5 ROW monitoring sites, and 2 of 5 control monitoring sites after ~102 traps days in 2017. When data was pooled, significantly more wolves were detected on the control monitoring sites then at ROW monitoring sites.

Two wolves were detected as part of intensive aerial ungulate surveys for moose and white-tailed deer.

In addition, Manitoba Hydro has sponsered a Memorial University PhD student who is investigating the movement patterns of wolves along linear features (e.g. highways, gravel roads, trails, transmission lines) in southeastern Manitoba. This multi year study involves placing GPS collars on wolves and tracking them throughout the year. The results will help Manitoba Hydro understand the extent wolves use linear features, and other natural features to move within their environment.

Early results of this study have shown that all linear features in the study area were selected for by wolves with the exception of transmission ROWs adjacent to a primary road. Among linear features selected for, secondary roads had the highest probability of use, followed by ROWs without an adjacent primary road and waterways.

Transmission ROWs with an adjacent primary road, including the Lake Winnipeg East System Improvement Project were avoided by wolves. The continuation of this multiyear study will help improve our understanding of wolf movements.

No wolves were killed or injured as part o the Project activities in 2016/17. In addition no wolf mortalities were observed by Project staff (i.e. hunter or vehicle collisions).

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

As predicted in the EA, some habitat loss and alteration has occurred as a result of the Project. However the habitat changes have been confined to the Project right-of-way and station site.

Assess the effectiveness of mitigation measures implemented:

Mitigation efforts, including Project routing, vegetation buffes, access management, and 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 requirements;

Compliance with regulatory requirements continues.

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

This monitoring will help in understanding changes in wolf distribution and provide some inferences on changes in movements before and after the Project.

Photo 12: GPS collared wolf detected in a camera trap at a monitoring control site near the Sandy river

Photo 13: PhD student conducting analysis of a wolf killed moose near the Project area

11 ACCESS

In September 2015, Manitoba Hydro began right-of-way access monitoring with camera traps on existing all-weather access trails along the Project area. In May 2016, after the construction season, all camera traps were redeployed along the existing sites as well as four more along the cleared ROW to document the frequency of access along the access road as well as the ROW. These 20 cameras will continue to be maintained in the 2017/18 monitoring period. Analysis of the photos captured will assist in documenting change of wildlife and human use of the Project area.

In addition, Manitoba Hydro conducted an intensive population survey for moose and white-tailed deer in the study area. As part of that survey, all recent snowmobile trails were marked. The replication of this survey in 2017/18 will assist in understanding changes in winter access as a result of the Project.

12 COMPLIANCE MONITORING

Compliance monitoring involves reviewing Project activities for adherence to legislation, licence conditions, permits, and environmental protection plans.

The compliance monitoring program included the use of a dedicated environmental inspector to observe and verify the implementation of all Project related mitigation measures. Community representatives also supported these efforts towards compliance monitoring. Information generated from this program is used within adaptive management to improve both mitigation measure effectiveness and overall monitoring program design.

A Manitoba Sustainable Development Conservation Officer conducted routine inspections of the Project. For the 2016/2017 construction season, no enforcement warnings or notices were issued.

Compliance Monitoring Summary 2016/17

- Environmental inspectors were employed by Manitoba Hydro for the Lake Winnipeg East System Improvement Transmission Project to conduct compliance monitoring to ensure mitigation measures outlined in the environmental protection plan, licences, permits and approval were adhered to during construction.
- Construction related activities did not result in any wildlife mortalities.
- Throughout the winter construction season, an environmental inspector conducted daily 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, excessive vegetation clearing, and rutting were cleaned up and reported to regulators, as required.
- On numerous occasions, the regional Conservation Officer toured the site with Manitoba Hydro staff to ensure compliance with the Project licence and environmental protection plans.

13 FUTURE MONITORING

The following monitoring activities are planned for 2017/18. The environmental effects monitoring plan contains detailed descriptions of all monitoring activities. Community representatives from local indigenous communities will continue to be invited to participate and and provide input into the monitoring program.

Aquatics

Stream crossing surveys will continue in 2017/18 in accordance with the EEMP. This includes monitoring post-construction and conductor stringing.

Vegetation

Post construction surveys will continue in 2017/18 in accordance with the EEMP. This includes surveys for species of conservation concern, non-native and invasive plants, plants and plant communities important to Indigenous peoples.

Birds

Post construction surveys will continue in 2017/18 in accordance with the EEMP. This includes bird-wire collision monitoring.

Mammals

Post construction surveys will continue in 2017/18 in accordance with the EEMP. These include camera traps surveys for moose, white-tailed deer, and wolves.

Access

Surveys will continue in 2017/18 in accordance with the EEMP. These include camera trap surveys along the Project area, including access points.