



The Lake Winnipeg East System Improvement Transmission Project

Environmental Effects Monitoring Summary



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This document is a summary of the results of the environmental effects monitoring plan for the Lake Winnipeg East System Improvement (LWESI) Transmission Project.

This environmental monitoring summary outlines activities from 2015 through 2020.



The Lake Winnipeg East System Improvement (LWESI) Transmission Project includes the construction and operation of a new 75 km, 115 kilovolt (kV) transmission line from the Town of Powerview-Pine Falls to Manigotagan Corner Station; a new 115 kV to 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.

The LWESI Transmission Project was required to provide system upgrades



in the region east of Lake Winnipeg. It is expected that these upgrades will meet electrical requirements for at least the next twenty years.

Construction of the project began in August 2015 and officially came into service on June 30th, 2018.

Environmental Effects Monitoring Plan



The Environmental Effects Monitoring Plan (EEMP) was developed as part of an environmental assessment, which also included Indigenous and public engagement.

The EEMP was intended to outline the key activities that would be conducted as part of monitoring and follow-up that will verify potential effects and effectiveness of mitigation measures. The objectives were:

- confirm the nature and magnitude of predicted environmental effects as stated in the environmental assessment (EA);

- assess the effectiveness of the mitigation measures;
- identify unexpected environmental effects, 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 include:

- Water Body Crossings
- Vegetation
- Birds
- Mammals
- Access

Monitoring and Follow-up Activities

Environmental monitoring helped validate the accuracy of the environmental assessment and effectiveness of mitigation measures. Manitoba Hydro used internal staff for the implementation of the EEMP, funded participation of Indigenous community representatives, and retained highly qualified specialists in appropriate disciplines.

Manitoba Hydro's Environmental Protection Information Management System (EPIMS) also played a major role in managing the EEMPs

implementation, coordination of field work, data collection, and communication for the monitoring team.

Key monitoring highlights:

- Unexpected environmental effects were not observed for any environmental components.
- Water body crossing surveys showed environmental effects were minor. All 24 crossing sites were cleaned up, as required.

- Surveys identified that most species of vegetation that were of concern for conservation were in good condition, with some potentially benefitting from the right-of-way clearing activities. For example, the removal of other plants resulted in additional sunlight received by remaining plants and reduced resource competition.
- Plants and plant communities important to Indigenous Peoples appeared to be thriving in most areas.
- Bird/wire collision monitoring was conducted at all major river crossings. The results indicate a very low rate of bird/wire collisions and signify the effectiveness of bird diverters.
- Common nighthawk and eastern whip-poor-will birds showed no significant difference in levels of activity between monitoring sites on the right-of-way versus monitoring sites in comparable nearby, non-right-of-way habitat.
- Moose abundance and distribution showed only minor changes during and after construction.

- A survey, using trail cameras, showed significantly fewer wolves detected at monitoring sites on the right-of-way than at nearby, non-right-of-way comparison sites.
- White-tailed deer population levels are very low in the area of the project, especially in northern areas.
- Very few resource users were detected using the right-of-way, compared to existing nearby, non-right-of-way access trails.
- With the support of Manitoba Hydro, a wolf study using GPS collars has been ongoing in and around the Project study area, conducted by PhD and MSc students from Memorial University.
 - Preliminary information from these studies on wolf movements in the region indicate that wolves generally avoid the area around the project, therefore limiting the likelihood of increased predation on moose as a result of this project.

- Two warnings for minor violations were issued by Manitoba Conservation Officers to the project (during the first year of project construction).



Great Gray Owl perched near a right-of-way

Environmental Components

Water Body Crossings

The potential effect on aquatic habitats was included in the environmental assessment and monitoring plan. Post-construction monitoring concluded that all aquatic habitat sites were determined to be in compliance, with no additional mitigation measures required.

One of the main risks to existing fish habitat from transmission line construction is damage to stream banks and shoreline plants, leading

to loss of plant cover for the fish and creating an increase in sediment suspended in the water. 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 additional ground surveys when required.

The implementation of recommendations outlined in the EEMP was effective. The three sites identified in 2016 as being non-compliant due to erosion, exposed soils, debris, and branches/limbs in the water were rehabilitated and showed signs of successful natural revegetation, with no further remediation warranted.



Monitored indicators

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

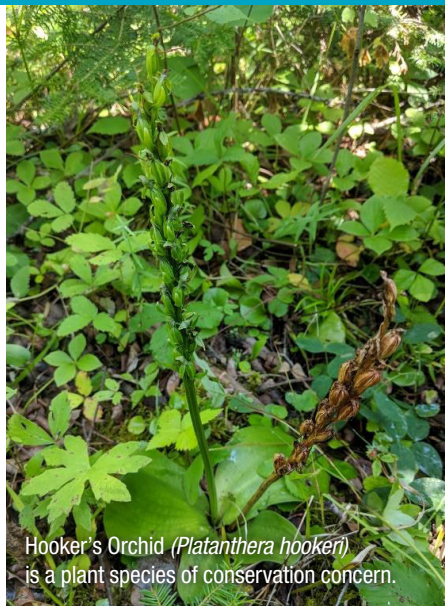
- ✓ As predicted, project effects on water body crossings were minor. All 24 sites observed were constructed and cleaned up in accordance with the mitigation measures outlined in the EEMP, and the crossing and site conditions met the EEMP and Environment Act licence requirements.

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 (of unknown origin) was observed caught in natural debris along the river channel. This rubber tire was removed during 2018 construction activities.

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

- ✓ Survey information contributed to evaluating any long-term changes or trends in water body crossings. No unanticipated effects were found to date.



Hooker's Orchid (*Platanthera hookeri*)
is a plant species of conservation concern.

VEGETATION

Vegetative change can be an important indicator of environmental effects.



Conservation of Plant Species

Pre-construction, and during the first year of construction, rare and uncommon plants (plants considered of concern for conservation efforts) were found at seven locations; these plants were surveyed, and their locations recorded for future monitoring.

The surveys carried out by botanists involved locating the plants; completing stem counts; and evaluating the health of the plants (various parameters), describing site conditions, and noting the effectiveness of mitigation efforts.

Most plant species of conservation concern were in good condition with some potentially benefiting from the right-of-way clearing activities resulting in additional sunlight received by existing plants and reduced competition due to the removal of other plants.



Monitored indicators

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. Dwarf bilberry (*Vaccinium caespitosum*) has still not reemerged

at one site where it was previously found on the right-of-way. The re-appearance of dwarf bilberry may require several years.

Assess the effectiveness of mitigation measures implemented.

- ✓ With the exception of dwarf bilberry, which could not be relocated at one site, mitigation measures have ensured that vegetation at environmentally sensitive sites are in good condition.

Identify unexpected environmental effects of the project, if they occur.

- ✓ With the exception of dwarf bilberry, which could not be relocated at one site, no unexpected environmental effects have been observed.

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

- ✓ No mitigation measures were required.

Confirm compliance with regulatory requirements.

- ✓ Compliance with regulatory requirements was achieved.

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

- ✓ Survey information contributed to evaluating long-term changes or trends in species of conservation concern in the project area.

Plants and Plant Communities important to Indigenous Peoples

Plant species gathered by Indigenous people for food or medicine appear to have responded well to the clearing along the right-of-way.

Community members from Sagkeeng, Black River, and Hollow Water First Nations participated in vegetation monitoring.

Blueberry is the most abundant gathering plant which was identified and both low sweet blueberry and velvet-leaf blueberry are present in large numbers. Blueberry prefers rocky outcrops and shallow soils and these areas generally lacked abundant tree cover, thus the accumulation of mulch at these sites is not a concern.

Other edible or medicinal species including highbush cranberry (*Viburnum trilobum*), wild ginger (*Asarum canadense*), weekay/sweetflag (*Acorus americanus*), various raspberry species (*Rubus spp.*), wild rice (*Zizania aquatic*), beaked hazel (*Corylus cornuta*), and wild plum (*Prunus americana*) were observed incidentally during the surveys and remain present in similar numbers.



Blueberry plants growing in the project area

Monitored indicators

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 found to exhibit strong growth and fruiting, with blueberry and cranberry species fruiting profusely within the

right-of-way after construction. Aquatic plant species including weekay/sweetflag, wild rice, and sessile-fruited arrowhead were all observed to be in good condition, with abundant flowering or fruiting.

Assess the effectiveness of mitigation measures implemented.

- ✓ In general, plants in surveyed plots appeared to be in good and healthy condition, due in part to the effectiveness of mitigation measures and suitable moisture conditions.

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 site has not occurred as expected. Depending on future moisture conditions this plot may require a few more years to reestablish.

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

- ✓ No mitigation measures were required.

Confirm compliance with regulatory requirements.

- ✓ Compliance with regulatory requirements was achieved.

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

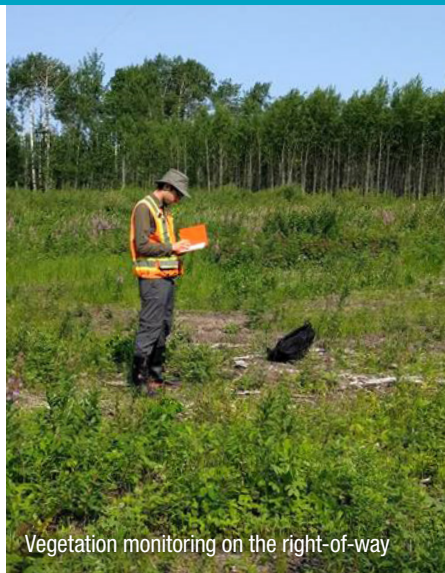
- ✓ Survey information contributed to understanding long-term changes in plants important to Indigenous peoples in the project area.

Invasive and Non-Native Plants

The section of right-of-way between the Pine Falls Generating Station and Broadlands Road was surveyed to assess the presence of invasive, non-native species. Surveys were conducted in July 2018 at key locations along the right-of-way. These surveys did not identify any notable populations or species that require management.

Assessing the presence and extent of invasive, non-native species across the remaining portion of the right-of-way involved a combination of on-the-ground surveys, as well as an aerial survey along the entire transmission line. Although tower construction locations had been identified as potential sites for invasive species establishment and spread, these sites were found to be very limited in non-native species establishment as a result of the project construction.

White sweet clover (*Melilotus albus*) and Canada thistle (*Cirsium arvense*) continue to be the two most prevalent non-native and invasive species within the right of way.



Vegetation monitoring on the right-of-way

Monitored indicators

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

- ✓ As predicted in the EA, construction had minimal effect on the spread of 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 benefitted from the reduction in tree and shrub cover.

- ✓ These species continue to be found only within upland areas with wetland communities largely free of these species.

Assess the effectiveness of mitigation measures implemented.

- ✓ Mitigation actions to limit the exposure of mineral soils by clearing equipment appeared to be at least partially successful.

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 were observed.

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

- ✓ No mitigation measures were required.

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

- ✓ Survey information contributed to evaluating long-term changes or trends in invasive plants in the project area.

In addition to vegetation monitoring activities, willow stems were planted at three locations after construction to provide an enhanced visual screen from PTH 304 down the transmission right-of way. Although these planted willow stems experienced some dieback, they supplemented natural willow regrowth and achieved their objective.



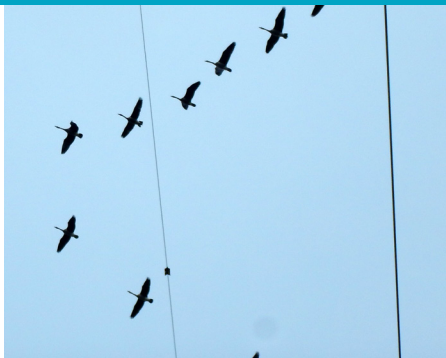
Willow stems were planted on the right-of-way to provide a visual screen from PTH 304.

BIRDS

Bird/Wire Collision Monitoring

The presence of transmission lines in proximity to areas of high bird activity may lead to bird-wire collisions.

Manitoba Hydro installed bird diverters along transmission line sections that transect areas of high bird activity. Preconstruction surveys identified sensitive sites for birds, which were used to select locations for bird diverters.



Bird/wire collision monitoring was conducted in the spring and autumn of 2018, after construction was completed.

Monitored indicators

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

- ✓ As predicted in the EA, some bird/wire collisions were anticipated as a result of the project. It was also predicted that although some individual birds may collide with wires, otherwise healthy populations are not expected to be affected.

- ✓ Monitoring surveys have confirmed that bird/wire collision rates are well below North American averages, and healthy populations have not been affected.

Assess the effectiveness of mitigation measures implemented.

- ✓ Mitigation efforts including routing and installation of bird diverters appear to have been effective.

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

- ✓ No unexpected environmental effects were observed.

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

- ✓ No mitigation measures were required.

Confirm compliance with regulatory requirements.

- ✓ Compliance with regulatory requirements was achieved.

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

- ✓ Survey information has contributed knowledge to the broader - and long-term - understanding of trends in bird/wire collisions across Manitoba Hydro infrastructure.

Conservation of Bird Species

Bird species of concern for conservation include species that are protected under the *Endangered Species and Ecosystem Act (Manitoba)*, the *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 (*Vermivora chrysoptera*) - a species identified as high concern by local

communities. In response to this, efforts shifted to the whip-poor-will (*Caprimulgus vociferous*) and the common nighthawk (*Chordeiles minor*).

While not the focus of this program, during the survey the project also took note of spottings of Canada warbler (*Cardellina canadensis*), olive-sided flycatcher (*Contopus cooperi*), rusty blackbird (*Euphagus carolinus*), and red-headed woodpecker (*Melanerpes erythrocephalus*).



During the 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 the common nighthawk and the 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 right-of-way and at comparison sites in similar habitat.

The similarities in detection rate between right-of-way and comparison sites suggest that there were no measurable adverse effects of the cleared transmission line right-of-way on either species to date.

It is well understood that both species forage and nest in forest clearings and edges, so no detectable effect was hypothesized. Portions of the cleared transmission line appeared to provide suitable habitat for the common nighthawk and the 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.

Monitored indicators

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

- ✓ As predicted, some habitat loss and alteration has occurred as a result of the project. Some sensory disturbance has also likely occurred. Construction activity was conducted outside of the bird-breeding window preventing any effects on any nests.

- ✓ Monitoring studies have shown that both the common nighthawk and the whip-poor-will used the right-of-way in a similar manner as comparable adjacent habitat.

Assess the effectiveness of mitigation measures implemented.

- ✓ Mitigation efforts - including the route chosen for the project, vegetation buffers, access management, and construction timing windows - appear to have been effective.

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

- ✓ No unexpected environmental effects were observed.

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

- ✓ No mitigation measures were required.

Confirm compliance with regulatory requirements.

- ✓ Compliance with regulatory requirements was achieved.

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

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

MAMMALS

The potential effect of the project on mammals was the focus of the environmental assessment, especially for moose (*Alces alces*), wolves (*Canis lupus*), and white-tailed deer (*Odocoileus virginianus*). All of these species occur within the Lake Winnipeg East System Improvement Transmission Project study area.

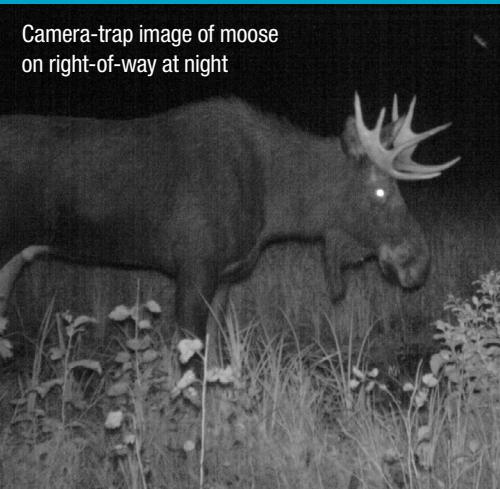
Manitoba Hydro conducted an intensive, large mammal survey of the project area in the winters of 2016,

Trail camera placed for camera-trap monitoring of mammals



2017, 2018, and 2019 by helicopter. Two experienced observers recorded observations of moose, white-tailed deer, wolves; and the tracks left by moose, deer, and wolves. The project also recorded signs of snowmobile use.

Camera-trap image of moose
on right-of-way at night

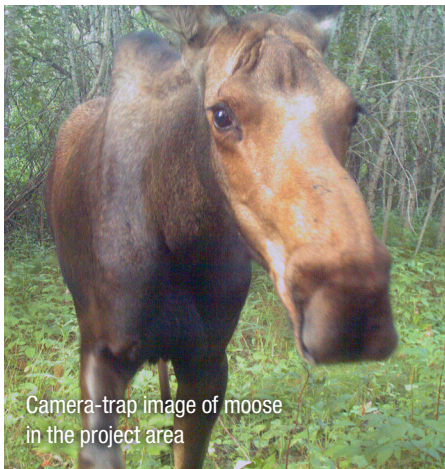


Moose

Moose appeared to avoid the project areas during the construction phase but appeared to return in the post-construction phase. Overall moose populations in the project area appeared relatively stable between pre- and post-construction phases. Over the years of observations, the count of moose ranged from 94 to 128, from year-to-year.



A camera-trap program was deployed after construction to study moose presence on the right-of-way and compare that to control sites in nearby areas. A total of ten cameras were deployed. Overall, camera-trap data that was gathered from 2016 to 2020 (for a total of more than 3,603 combined days of data) showed no significant difference between the presence of moose at control monitoring sites and on right-of-way monitoring sites. No moose were killed or injured as part of the project.



Camera-trap image of moose
in the project area

Monitored indicators

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

- ✓ As predicted in the EA, some habitat loss and alteration occurred as a result of the project. However, the changes have been confined to the project right-of-way and the station site.
- ✓ When considering the data collected, there has been little evidence that moose now avoid the project area or have experienced population declines. No project-related moose

mortalities – due to vehicle collisions or other sources – were reported by environmental inspectors or construction crews.

- ✓ Preliminary information from a study on wolf movements in the region indicate that wolves have generally avoided the project area, therefore limiting the likelihood of increased moose predation as a result of the project.

Assess the effectiveness of mitigation measures implemented.

- ✓ Mitigation efforts – including the route chosen for the project,

vegetation buffers, access management, and construction timing windows - appear to have been effective.

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

- ✓ No unexpected environmental effects were observed.

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

- ✓ No mitigation measures were required.

Confirm compliance with regulatory requirements.

- ✓ Compliance with regulatory requirements was achieved.

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

- ✓ Monitoring has helped in understanding changes in the distribution of moose and provided insight into changes in the relative abundance of both moose and white-tailed deer in the project area.

White-tailed Deer

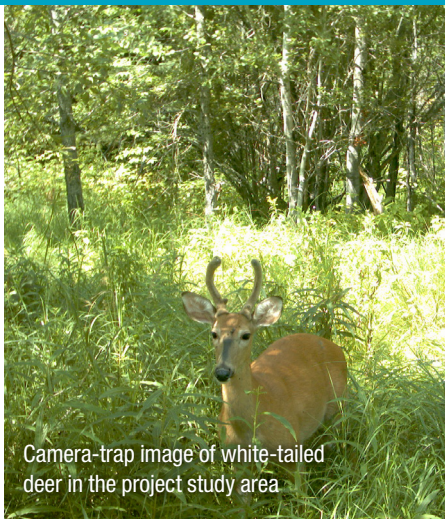
A very low number of white-tailed deer were detected during the aerial surveys (a range of four to nine).

A camera-trap program was deployed after construction to study white-tailed deer presence on the right-of-way and compare that to control sites in nearby areas. A total of ten cameras

were deployed. The camera-trap data gathered over three years (for a total of more than 3,603 combined days of data) showed significantly more white-tailed deer on right-of-way monitoring sites than on control monitoring sites.

The low number of white-tailed deer detected during all of the survey periods corresponds to what was expected in the EA.

No white-tailed deer were killed or injured as part of the project activities.



Camera-trap image of white-tailed deer in the project study area

Monitored indicators

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 the station site.

Assess the effectiveness of mitigation measures implemented.

- ✓ Mitigation efforts - including the route chosen for the project, vegetation buffers, access management, and construction timing windows - appear to have been effective.

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

- ✓ No unexpected environmental effects were observed.

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

- ✓ No mitigation measures were required.

Confirm compliance with regulatory requirements.

- ✓ Compliance with regulatory requirements was achieved.

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

- ✓ This monitoring has helped our understanding of the distribution of moose and provided insight into

changes in the relative abundance of both moose and white-tailed deer in the project area. The white-tailed deer in the project area are at the northern limit of the range for white-tailed deer. During the course of this study we found that the detection of deer decreased as you moved from the south to the north. Over the course of the four-year study, the detection of deer was generally low, but appeared relatively consistent over time.

Wolves

A camera trap program was deployed after construction to study wolf presence on the project's right-of-way, compared to control sites in nearby areas. A total of ten cameras were deployed. Camera-trap data gathered over three years (for a total of more than 3,603 combined days of data)

showed significantly more wolves within control monitoring sites than found on right-of-way monitoring sites.

No wolves were killed or injured as part of the Project activities. In addition, no wolf mortalities were observed by Project staff (i.e. hunter or vehicle collisions).

Camera-trap image of a wolf on a trail
in the project study area



Monitored indicators

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 the station site.

Assess the effectiveness of mitigation measures implemented.

- ✓ Mitigation efforts - including the route chosen for the project, vegetation buffers, access management, and construction timing windows - appear to have been effective.

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

- ✓ No unexpected environmental effects were observed.

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

- ✓ No mitigation measures were required.

Confirm compliance with regulatory requirements.

- ✓ Compliance with regulatory requirements was achieved.

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

- ✓ This monitoring has helped our understanding of changes in the distribution of wolves and provided some insight into changes in their movements before and after the project.

Manitoba Hydro has sponsored students from the Wildlife Evolutionary Ecology Lab at Memorial University to investigate the movement patterns of wolves along features such as roads, rivers, trails, and power lines. in southeastern Manitoba. This multi-year study involves placing G.P.S. collars on wolves and tracking them throughout the year. The final results will help Manitoba Hydro understand how much wolves use those features and other natural features to move within their environment.

So far, results of the study indicate that most wolves avoid locations close to major highways, all wolves choose to be closer to secondary roads and waterways, and they don't care one way or another about smaller roads.



Camera-trap image of wolves wearing collars from the study



PhD student researcher studying
wolves in the project study area

Transmission rights-of-way with an adjacent major highway, including the Lake Winnipeg East System Improvement Project were generally avoided by wolves. The continuation of this multi-year study will help improve our understanding of wolf movements.

Lake Winnipeg East System Improvement Transmission Project Monitoring Site Locations



ACCESS

After the Project construction was completed, decommissioning of access trails was conducted as required by Manitoba Sustainable Development. This involved placing large boulders, ditches/trenches, and trees over unnecessary access trails to prevent future vehicular traffic. This was intended to minimize the potential for increased accessibility to the Project area which may have resulted in additional pressure on moose populations. These decommissioning



efforts appear to have been effective at preventing truck usage while allowing off road vehicle access..

During the post-construction phase of the Project, access monitoring was conducted along the right-of-way and nearby pre-existing trails. Monitoring generally showed people made very low use of the right-of-way. When people were detected on the right-of-way they were on foot, snowmobile, or all terrain vehicle. Monitoring of pre-existing trails (most developed for forestry),

showed higher levels of use by people than the right-of-way. This monitoring demonstrated that although people do use the right-of-way, their use is minimal compared to other pre-existing trails in the area. This is likely due to the wet conditions and dense shrubby vegetation on much of the the right-of-way. In addition, since the project right-of-way runs parallel to PTH 304, it offers limited entry to areas not already accessible by using PTH 304.



COMPLIANCE MONITORING

Compliance monitoring involved reviewing project activities to see if they followed legislation, licence conditions, permits, and environmental protection plans.

A Manitoba Sustainable Development Conservation Officer conducted routine inspections of the project throughout construction and operation. During the 2015/2016 construction season, two enforcement notices,

by way of warnings, were issued to the project on two separate occasions. One was issued regarding the improper storage of timber on Crown Land without a permit, and the other was due to the development of an unapproved access trail without a permit. In both occasions corrective measures were immediately taken; the timber was moved to approved locations as per the scaling plan, and the unapproved access trail was decommissioned.

No other enforcement notices were issued during the construction or the operation phase of the project.



Manitoba Hydro would like to thank Indigenous communities involved in the Project for their participation.

Anyone interested in further information about the Lake Winnipeg East System Improvement Transmission Project is invited to contact Manitoba Hydro at:

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